

# Arlington County

## Comprehensive Water and Sewer Rate Study Report

FINAL REPORT / July 30, 2021

July 30, 2021

Mr. Greg Emanuel  
Chief Environmental Officer  
Arlington County DES  
2100 Clarendon Boulevard  
Suite 900  
Arlington, VA 22201

**Subject: Water and Sewer Financial Planning and Rate Study**

Dear Mr. Emanuel,

Raftelis Financial Consultants, Inc. (Raftelis) is pleased to provide this Comprehensive Water and Sewer Rate Study Report (Report) for Arlington County, VA (County). The Study has been conducted in accordance with the American Water Works Association's M1 Manual and the Water Environment Federation Manual of Practice No. 27 and is consistent with industry standards and best practices. The major objectives of the Study included the following:

- Creating a five-year financial plan to ensure long-term financial stability and compliance with internal financial policies and debt covenants;
- Evaluating the cost equity of the County's existing rate structure for providing water and sewer services;
- Recommending cost-justified water and sewer rates that are consistent with core community values identified by internal and external stakeholders feedback through extensive public engagement, industry pricing standards and practices, and that fully support system operations and maintenance (O&M), capital repair and replacement, system improvements, debt service, debt service coverage, and reserve requirements;
- Communicating the basis and merits of the recommended utility rate changes to the County, County staff, elected officials, and other key stakeholders;
- Reviewing, updating, and calculating cost-justified miscellaneous fees and Infrastructure Availability Fees; and
- Developing a financial planning and rate model for continued use by County staff.

The Report describes our analyses and discusses the key findings and recommendations related to the development of cost-justified water and sewer user charges that support the County's core values for rate-setting.

It has been a pleasure working with you, and we thank you and the County staff for the support provided during the course of this study.

Sincerely,

A handwritten signature in black ink, appearing to read 'Bart Kreps', written over a white background.

**Bart Kreps**  
*Vice President*

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# 1. Executive Summary

Raftelis Financial Consultants, Inc (Raftelis) was engaged by Arlington County, VA (County) to perform a Comprehensive Water and Sewer Rate Study (Study) for its water and sewer utilities. This report provides a summary of the findings of the Study and provides recommendations for rate and rate structure adjustments to address the County and its stakeholders' core values. The results from the miscellaneous fees and infrastructure availability fees analyses are also included in this report.

## Study Objectives

The Study was commissioned to achieve the goals and objectives identified by the County and supported by County staff. The specific goals and key outcomes of the Study were to:

- Create a five-year financial plan to ensure long-term financial stability and compliance with internal financial policies and debt covenants;
- Evaluate the cost equity of the County's existing rate structure for providing water and sewer services;
- Recommend cost-justified water and sewer rates that are consistent with core community values identified by internal and external stakeholders feedback through extensive public engagement, industry pricing standards and practices, and that fully support system operations and maintenance (O&M), capital repair and replacement, system improvements, debt service, debt service coverage, and reserve requirements;
- Communicate the basis and merits of the recommended utility rate changes to the County, County staff, elected officials, and other key stakeholders; and
- Develop a financial planning and rate model for continued use by County staff.

The following sections summarize the findings and recommendations from the Study.

## Core Values

To understand external stakeholders' perspectives on rate-setting core values, the Project Team conducted a robust public engagement program. Kearns & West, sub-consultant to Raftelis for this Study, and County public engagement staff led this effort, with Raftelis serving in a technical role. The details of the public engagement program are described in the Appendix A. Input on core values as they relate to rate-setting were solicited from the community primarily through three mediums: the Rate Study Community Advisory Group (RSCAG), Pop-Up Events, and Engage Arlington (utilizing 76Engage, an online engagement platform). Based on input from external and internal stakeholders, the County's highest-priority values were:

- Affordability (Internal & External)
- Conservation (Internal & External)
- Equity across customer categories (Internal & External)
- Revenue stability (Internal)

## Financial Plan

The primary goal of every rate and cost of service study is the recovery of revenue that is sufficient to fund the annual revenue requirements of the system during the Test Year (FY 2022) and forecast period. Revenues and revenue requirements were forecasted over the five-year forecast period (FY 2021 – FY 2025). Under the current rates,

revenues are not projected to be sufficient to fully recover the County’s revenue requirement through the duration of the forecast period. Annual inflationary revenue increases (in the 1% to 3.5% range) are needed to fully recover the County’s revenue requirements starting in FY 2022 and continuing throughout the remainder of the forecast period.

## Cost of Service and Rate Structure

The calculated cost of service rates consider the need for a revenue increase, while also addressing the County’s core values (affordability, conservation, equity, and revenue stability). The current rate structures are purely volumetric water and sewer rates regardless of customer type or usage levels. The current rate structure, while providing revenue sufficiency for the utility, does not incorporate these community values. The resulting recommended rate structure includes establishing customer classes, adding fixed/base charges per billing cycle, and a two-tiered single-family residential volumetric rate, as well as using average winter water consumption as a proxy for residential wastewater generation. Exhibit 1 presents the FY 2022 recommended rates<sup>1</sup>.

**Exhibit 1: FY 2022 Recommended Rates**

Description	Water	Sewer
Base Charge – Quarterly	\$ 13.26	\$ 10.76
Base Charge – Monthly	\$ 9.10	\$ 7.42
<u>Volume Charges</u>		
Single-Family Residential		
Tier 1 (0-9 Thousand Gallons)	\$ 3.71	\$ 9.61 (*)
Tier 2 (> 9 Thousand Gallons)	\$ 5.94	\$ 9.61 (*)
Multi-Family (All Usage)	\$ 4.42	\$ 9.61
Commercial (All Usage)	\$ 4.79	\$ 9.61

(\*) Single-family residential customers will be billed for sewer on the lesser of actual water usage or winter period use.

Impacts to individual customers vary based on customer class, usage patterns, and, for single-family Residential customers, peaking characteristics. In general, single-family residential customers will see modest increases driven mostly by the implementation of a fixed/base charge. The fixed/base charge is designed to recover meter reading, billing, and customer service costs, which are largely fixed/static per account. Single-family residential customers will be charged lower rates for their first 9,000 gallons of usage (conservation and affordability) and will pay higher rates for each thousand gallon (TG) increment above 9,000 gallons quarterly. Single-family customers that have extensive summer (exterior) usage will likely pay the higher rate (conservation) for that water, but will see reduced costs, as they would not pay sewer fees for that (presumed) exterior water.

Multi-family customers will generally experience minor bill decreases while Commercial customers will generally see small bill increases. In February 2021, the County published a [“Water and Wastewater Bill Calculator”](https://waterbillcalculator.arlingtonva.us/)<sup>2</sup> tool to the County’s website where customers can enter account information and review a potential bill under the new rate structure based on their 2020 usage statistics. A summary of annual impacts for some representative customers is shown in Exhibit 2. As noted above, the new rate structure has varying impacts to single-family residential customers based upon their individual consumption patterns during each billing period throughout the year.

<sup>1</sup> Expected to be implemented January 1, 2022.

<sup>2</sup> <https://waterbillcalculator.arlingtonva.us/>

## Exhibit 2: Customer Impacts

Customer	Annual Usage	Winter Quarter Usage	Existing Annual Cost (FY 2022)	Proposed Annual Cost (FY 2022)	\$ Increase	% Increase
Residential (10 <sup>th</sup> Percentile)	21 TG	5 TG	\$ 301.35	\$ 366.19	\$ 64.84	21.5%
Residential (25 <sup>th</sup> Percentile)	32 TG	8 TG	459.20	522.32	63.12	13.7%
Residential (Median)	48 TG	10 TG	688.80	704.54	15.74	2.3%
Residential (75 <sup>th</sup> Percentile)	77 TG	17 TG	1,104.95	1,088.22	(16.73)	-1.5%
Residential (90 <sup>th</sup> Percentile)	91 TG	28 TG	1,305.85	1,421.24	115.39	8.8%
Multi-Family (Average)	137 TG	n/a	1,965.95	1,938.63	(27.32)	-1.4%
Commercial (Average)	113 TG	n/a	1,621.55	1,643.72	22.17	1.4%

## Infrastructure Availability Fees & Miscellaneous Fees

In conjunction with the Financial Plan and Cost of Service analyses, Raftelis calculated infrastructure availability fees (i.e. system development charges) and miscellaneous fees using guidance from the American Water Works Association (AWWA) and Water Environment Federation (WEF). Raftelis recommends miscellaneous fees and infrastructure availability fees be consistent with those calculated in this Study. It is important to note that many of the fees calculated in this Study represent a maximum cost-justified fee level. The County has the flexibility to be below these charges and to implement increases programmatically or phased as appropriate.

## Conclusion

We recommend that the County continually monitor the five-year financial plan to help maintain its proactive approach to financial planning and rate-setting. The financial planning and rate model, developed as a part of this Study, provides the flexibility to analyze various financial operating and capital scenarios and the impacts that such scenarios have on the utility rates.

## 2. INTRODUCTION

Raftelis Financial Consultants, Inc (Raftelis) was engaged by Arlington County, VA (County) to perform a Comprehensive Water and Sewer Cost of Service and Rate Study (Study) for a five-year forecast period beginning in fiscal year (FY) 2021. In addition to user charges, Raftelis also evaluated the County's current miscellaneous fees and infrastructure availability fees. This report provides a summary of the results and findings of the Study and provides a recommended rate program to address the County's financial planning and pricing objectives. The results from the miscellaneous fees and infrastructure availability fees analyses are also included in this report.

### 2.1. Background

The Arlington County Department of Environmental Services (DES) provides residents and businesses in Arlington County, Virginia, with water and sewer services. The County's drinking water is sourced from the Potomac River through the U.S. Army Corps of Engineers (Corps of Engineers) Washington Aqueduct (Aqueduct). Raw water is treated at the Corps of Engineer's Dalecarlia Treatment Plant for wholesale to the County and other regional water utilities. Roughly 19 million gallons per day (MGD) of purchased water is delivered to the County's roughly 37,000 retail accounts through a network of pumping, storage, transmission, and distribution infrastructure. In terms of sewer, the County's collection and conveyance system transmits wastewater to the County's Water Pollution Control Plant (WPCP), which has a maximum daily capacity rated at 40.0 MGD, as well as sending a small portion to DC Water's Blue Plains Advanced Wastewater Treatment Plant via Fairfax County sanitary sewer transmission mains. In addition to retail sewer service, the County maintains several inter-jurisdictional (IJ) agreements to provide wholesale sewer services to neighboring communities.

### 2.2. Scope of the Study

The County engaged Raftelis to perform a comprehensive financial planning and cost of service study (or Rate Study) for its water and sewer utilities. The primary objective of the Study was to evaluate the County's existing and projected cost basis for utility operations and make appropriate recommendations for rate structure adjustments that will sufficiently address operating and capital revenue requirements and meet the County's most important pricing objectives. The work plan included the following major components:

- Creating a five-year financial plan to ensure long-term financial stability and compliance with internal financial policies and debt covenants;
- Evaluating the cost equity of the County's existing rate structure for providing water and sewer services;
- Recommending cost-justified water and sewer rates that are consistent with core community values identified by internal and external stakeholders feedback through extensive public engagement, industry pricing standards and practices, and that fully support system operations and maintenance (O&M), capital repair and replacement, system improvements, debt service, debt service coverage, and reserve requirements;
- Communicating the basis and merits of the recommended utility rate changes to the County, County staff, elected officials, and other key stakeholders; and
- Developing a financial planning and rate model for continued use by County staff.



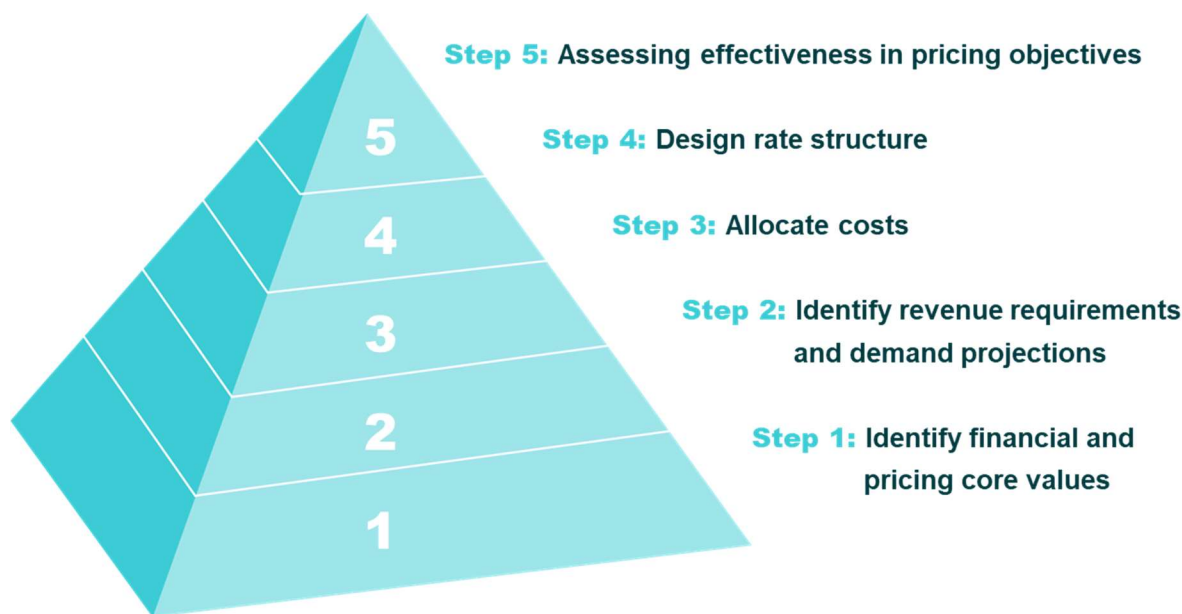
## 2.3. Methodology

Raftelis relied on several key resources in performing the Study. For preparing the water cost of service, Raftelis utilized the “Base Extra-Capacity” methodology, which is one of two methods identified in the American Water Works Association (AWWA) M-1 Manual, *Principles of Water Rates, Fees, and Charges*. The M-1 Manual is the most prominent water utility rate design literature in the industry. For sewer, Raftelis relied on guidance from the Water Environment Federation (WEF) Manual of Practice No. 27, *Financing and Charges for Wastewater Systems*, using a hybrid approach of the “Design Basis” and “Functional Cost” methodologies to perform the cost of service study. Using these principles allows the County to demonstrate that rates have not been set in an arbitrary or capricious manner and one class of customer is not subsidizing another to an unjustifiable extent, or in a manner that is inconsistent with industry practices and regulatory requirements.

# 3. Rate Setting Process

Raftelis utilized a systematic approach for rate setting designed around a five-step process (Exhibit 3) tailored specifically to the County’s goals and objectives. The approach includes discussions with County staff, internal stakeholders, and public engagement with external stakeholders that provide a foundation for identifying and prioritizing the County’s most important objectives for the utility rates.

**Exhibit 3: Rate-Setting Process**



## 3.1. Identify Financial and Rate-Setting Core Values

The first step in the rate-setting process is the identification of pricing objectives, or rate-setting core values. Raftelis in association with Kearns & West (K&W) (collectively, the Project Team) conducted a robust public engagement program to solicit feedback on rate-setting core values from a diverse group of external stakeholders in the Arlington community. A detailed summary of the public engagement program is available in Appendix A.

In addition to external stakeholders, in May 2019, the Project Team conducted a project kick-off meeting with internal stakeholders to identify the County’s most important core values and to discuss the advantages and disadvantages of the County’s current rate structure.

The core values identified by external and internal stakeholders ultimately guided the development of the rate structure alternatives and final recommendations.

## 3.2. Identify Revenue Requirements & Demand Projections

The next step in the rate-setting process is to identify revenue requirements for the utilities for a Test Year, which represents the year in which the proposed rates are based and projected to be implemented. Revenue requirements

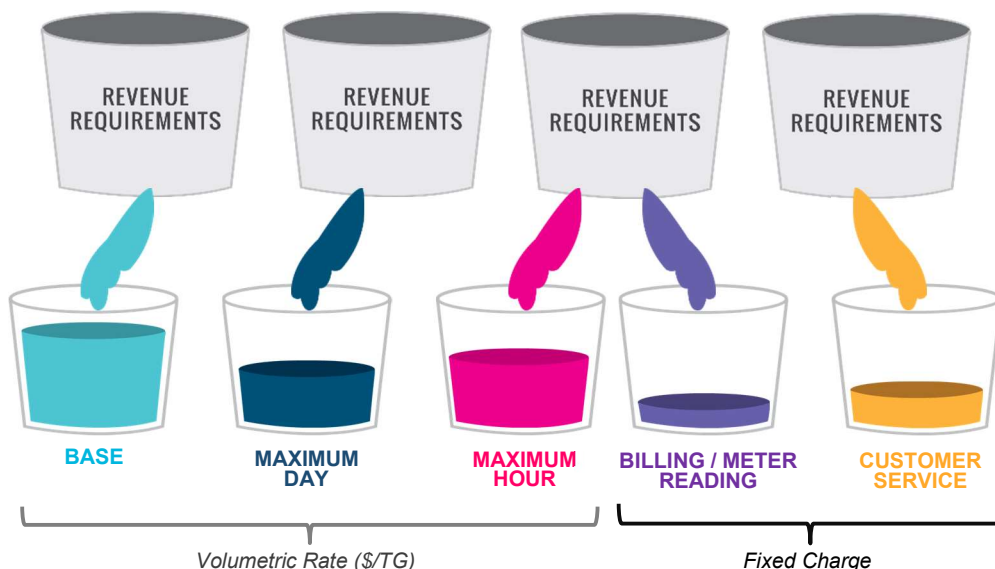
include all Operations and Maintenance (O&M) expenses and capital costs incurred by the County to operate the water and sewer utilities. Revenue requirements not only represent the minimum cash needs of the utility but also include the liquidity and debt service coverage requirements. The methodology for determining the County’s revenue requirements is discussed further in Section 5.

Another critical element in developing rate recommendations, particularly for the water and sewer utilities, is estimating customer demand for the Test Year. As will be discussed in Section 5.2, the consumption and customer account data for the County’s water and sewer customers was used to forecast customer demand for the Test Year.

### 3.3. Allocate Costs

Once the revenue requirements have been identified, the next step is to allocate these costs in a manner consistent with industry standards and practices. The purpose of this step is to determine the cost of serving the utility customers and to evaluate whether the current rate structure recovers this cost in an equitable manner. The cost of service allocation requires three steps: (1) functional allocation of revenue requirements; (2) behavioral cost classifications; and (3) allocation to customer classes. Exhibit 4 provides an example overview of this process for the water utility.

**Exhibit 4. Cost Allocation Process (Water Utility Example)**



### 3.4. Design Rate Structure

Once the pricing objectives were identified and cost and usage data was reviewed, Raftelis developed conceptual rate designs that addressed as many of the core values as possible. Exhibit 5 provides examples of how alternative values can influence rate design. For example, a utility provider such as the County, which identified affordability as one of its top values, will need to carefully consider balancing a focus on addressing affordability issues with addressing revenue stability through increasing fixed charges.

**Exhibit 5. Rate Structure Alternatives based on Pricing Objectives (Examples)**



Raftelis developed the conceptual rate structures based on extensive industry experience and input from County staff, which ensured that the resulting rate structure options were reasonable and could be implemented effectively.

**3.5. Assess Effectiveness of Addressing Objectives**

The final step in the rate setting process is to compare the results of each alternative rate structure to the financial pricing core values identified in Step 1. The resulting rates and customer impacts for each alternative are compared to the values, to identify the rate structure that best addresses the values and policies of the utility.

# 4. Stakeholder Values

The first major step in the rate-setting process was understanding the core community values as they relate to rate-setting. Rate-setting core values (or “pricing objectives”) are defined as a broad range of rate-setting and rate structure objectives that reflect the values and goals of the utility and community and properly communicate the utility’s pricing message.

Raftelis conducted a project kick-off meeting with the Project Team and internal stakeholders on May 15, 2019. The purpose of this meeting was to: (1) discuss the overall rate setting process, (2) provide a forum for County staff to communicate the utility’s short- and long-term rate and financial goals, (3) discuss the advantages and disadvantages of the County’s current rate structures and potential rate structure adjustments, and (4) identify the County’s most important rate-setting core values. Internal stakeholders represented the Department of Environmental Services (DES) and Department of Management and Finance (DMF).

County staff identified three foundational goals that must be achieved by the proposed rate structure. These were considered paramount above other internal and external rate-setting core values and set boundaries for the designing proposed rate structures. The three foundational goals were:

1. Revenue Sufficiency – The proposed rate structure must ensure that adequate revenues are generated to sustain the County Utilities Enterprise Fund.
2. Legal Defensibility – The proposed rate structure must be consistent with relevant local, state, and federal laws and regulations and must be defensible if challenged in litigation.
3. Ability to Administer – The County must be able to administer the proposed rate structure using existing billing and meter-reading infrastructure and capabilities.

To understand external stakeholders’ perspectives on these core values, the Project Team conducted a robust public engagement program in order to hear from the diverse customer base in the Arlington. K&W and County public engagement staff led this effort, with Raftelis serving in a technical role. The details of the program are described in the Appendix A. Input on core values as they relate to rate-setting were solicited primarily from the community through three mediums:

1. Rate Study Community Advisory Group (RSCAG) – A group of stakeholders appointed by the County Manager representing various interest groups across the County. The RSCAG convened 6 meetings during the course of the Study during which they collaborated with the Project Team to steer the project, prioritized community values in a facilitated workshop and informed the broader public engagement process. Additionally, the group participated in a tour of the Water Pollution Control Plant.
2. Pop-Up Events – County staff held various pop-up events during existing County-wide events. Pop-up events were targeted to reach a diverse cross-section of the entire customer base, with a particular focus on hard to reach populations. This offered the general public opportunities to learn more about the rate study and provide feedback on the core values associated with the project.
3. Engage Arlington – The County launched an online engagement platform to solicit community feedback on which core values should be prioritized when developing a rate structure. Community Values questionnaires asked respondents to consider which values were important to them in the development of a rate structure. The responses were collected from a large, diverse set of County water and sewer customers.

The importance and priority assigned to internal and external core values can vary significantly from one utility or community to the next. Exhibit 6 lists examples of potential core values.

**Exhibit 6: Rate-Setting Core Values**

<b>Pricing Objectives / Core Values</b>	<b>Description</b> <i>The rate structure should...</i>
<b>Affordability</b>	...be designed such that essential usage is available to residential customers at an affordable price. Customer Assistance Programs (CAP), often funded through partnerships and charitable contributions, may be considered if they adhere to state legal requirements.
<b>Conservation</b>	... incentivize water conservation. Conservation-oriented rates reward customers who save water through changes in appliances and/or behavior.
<b>Rate Stability &amp; Minimization of Customer Impacts</b>	...be strategically implemented to reduce dramatic rate increases over time or across among customer categories. Structures that promote rate stability rely on smaller programmatic increases, where possible.
<b>Revenue Stability</b>	...provides more steady and predictable revenues due to a higher reliance on fixed charges.
<b>Simple to Understand and Implement</b>	...be easy for customers to understand. In addition, the rate structure should be able to be implemented without significant costs to the utility.
<b>Equity Across Customer Categories</b>	...each category of customers pays their fair share of the cost of service.
<b>Economic Development</b>	...promote economic development.

It is important to note that several of these core values can conflict with each other. For example, increasing revenue stability through increases to fixed charges may cause affordability issues for low-income users, who cannot reduce the fixed portion of their bill even if they reduce their water consumption. When making rate structure adjustments, there may be “winners” and “losers” resulting from rate structure modification. These trade-offs demonstrate why rate making is sometimes considered to be as much an art as a science, since it involves careful consideration of potential compromises.

Based on input from external and internal stakeholders, the County’s highest-priority values were:

- Affordability (Internal & External)
- Conservation (Internal & External)
- Equity across customer categories (Internal & External)
- Revenue stability (Internal)

The prioritized core values informed the rate structure options that Raftelis evaluated, providing a foundation for the rest of the study.

# 5. Financial Plan

The second major step in the rate-setting process was the development of a financial plan. Developing a financial plan includes establishing a forecast of revenue requirements, determining any necessary revenue increases using demand projections, and examining the forecast operating results over the five-year planning period (FY 2021 – FY 2025).

## Revenue Requirements

The first major task in establishing a financial plan is developing an understanding of the revenue requirements of the utility over the forecast period. Revenue requirements are comprised of cash-based expenses, including operating and maintenance (O&M) expenses, annual debt service payments, cash-funded capital, and reserve fund transfers.

### O&M EXPENSES

O&M expenses represent normal, recurring expenses necessary to operate and maintain the system during the County’s annual accounting cycle, which is a Fiscal Year starting July 1<sup>st</sup> and ending June 30th. The FY 2022 operating budget provided to Raftelis by County staff serves as the baseline for projecting utility operating costs.

To develop a five-year O&M forecast that accounted for growing utility costs and inflation, Raftelis developed annual escalation factors for various categories of O&M expenses. Based on feedback from County staff and an assessment of historical trends, the O&M costs were assumed to grow at a rate between 1.5% and 5% per year depending on the category. Exhibit 7 presents the O&M escalation factors used to project operating expenses in future years.

**Exhibit 7: O&M Escalation Factors**

O&M Expenses	Annual Escalation Factors
Salaries	3.25%
Employee Benefits	3.00%
Materials and Supplies	3.00%
Chemicals	5.00%
Equipment	1.50%
Miscellaneous / Other	3.00%

Estimates for FY 2021, the FY 2022 budget, and projected operating expenses for FY 2023 – FY 2025 are shown in Exhibit 8. The budget used for FY 2022 was provided to Raftelis on February 2, 2021 and used as the basis for the financial forecast. Although the FY 2022 budget was not finalized prior to completion of the rate study, significant changes were not expected so it was deemed appropriate to use this near final draft budget for rate-setting purposes.

### Exhibit 8: Operating Expenses

Total O&M Expenses	FY 2021 <i>Estimate (1)</i>	FY 2022 <i>Forecast</i>	FY 2023 <i>Forecast</i>	FY 2024 <i>Forecast</i>	FY 2025 <i>Forecast</i>
DES Water Sewer Engineering	\$773,473	\$766,916	\$791,052	\$815,950	\$841,637
Customer Service Office	1,729,537	1,762,739	1,818,199	1,875,411	1,934,428
Water Purchase-Washington Aqueduct	8,540,488	9,351,961	9,661,872	9,971,782	10,281,692
WPCP General	23,009,716	25,632,268	26,466,560	27,328,941	28,220,396
DES Water Sewer Streets	19,251,743	19,834,987	20,449,653	21,083,409	21,736,847
DES Non-Debt/Other	5,435,259	5,479,320	5,644,384	5,814,423	5,989,585
<b>Grand Total</b>	<b>\$58,740,216</b>	<b>\$62,828,191</b>	<b>\$64,831,720</b>	<b>\$66,889,915</b>	<b>\$69,004,585</b>
<b>% Change</b>		<b>7.0%</b>	<b>3.2%</b>	<b>3.2%</b>	<b>3.2%</b>

(1) O&M expenses estimated to align closer to projected FY 2021 actual spending.

### 5.1.1. CAPITAL IMPROVEMENT PLAN

One of the major components of establishing the financial plan was examining the County's Capital Improvement Plan (CIP) and developing a corresponding financing plan based on the anticipated capital expenditures for the forecast period.

The County provided Raftelis with a summary-level system CIP for the forecast period, categorized by the County's major cost centers: WS Maintenance Capital (WSMC), Sanitary Sewer System Improvements (SSSI), Water Distribution (WD), WPCP Expansion (WWE), and WPCP Non-Expansion (WWNE). Exhibit 9 summarizes the CIP for the system over the forecast period.

### Exhibit 9: Capital Improvement Plan

CIP Summary	FY 2021 <i>Estimate</i>	FY 2022* <i>Forecast</i>	FY 2023* <i>Forecast</i>	FY 2024* <i>Forecast</i>	FY 2025 <i>Forecast</i>	Total 5-Year
WSMC	\$16,695,000	\$23,790,000	\$24,890,000	\$18,885,000	\$20,950,000	\$105,210,000
SSSI	4,450,000	1,450,000	260,000	260,000	260,000	6,680,000
WD	4,800,000	4,950,000	2,215,000	6,335,000	4,740,000	23,040,000
WWE	-	-	-	-	-	-
WWNE	15,560,000	20,280,000	25,435,000	39,875,000	50,710,000	151,860,000
<b>Grand Total</b>	<b>\$41,505,000</b>	<b>\$50,470,000</b>	<b>\$52,800,000</b>	<b>\$65,355,000</b>	<b>\$76,660,000</b>	<b>\$286,790,000</b>

*\*Note that the FY 2022 – FY 2024 Utilities Capital Improvement Plan was proposed and adopted after this report was drafted.*

Raftelis worked closely with County staff to determine an appropriate mix of debt and equity financing that aligned with the County's anticipated funding needs, financial policy goals, and current debt profile. Funding for CIP projects is expected to come from a combination of infrastructure availability fees, rate-funded cash capital (PAYGO), reserves, IJ capital contributions, existing bond proceeds, and future double barrel general obligation/revenue bonds. Exhibit 10 summarizes the CIP funding sources.



### Exhibit 10: CIP Funding Sources

Funding Source	FY 2021 Estimate	FY 2022 Forecast*	FY 2023 Forecast*	FY 2024 Forecast*	FY 2025 Forecast	Total 5-Year
Infrastructure Availability Fees	\$7,000,000	\$6,892,500	\$6,180,000	\$6,440,000	\$6,440,000	\$32,952,500
PAYGO (Current Year)	12,155,000	14,300,000	14,250,000	15,000,000	15,500,000	71,205,000
PAYGO (Reserve)	16,431,900	8,000,000	2,000,000	2,000,000	2,000,000	30,431,900
Other Funding (Interest & IJ Revenue)	2,888,100	3,619,060	4,522,000	7,039,000	8,854,000	26,922,160
New Bond Issuance	-	16,236,532	25,848,000	34,876,000	43,866,000	120,826,532
Issued but Unspent Bonds	3,030,000	1,421,908	-	-	-	4,451,908
<b>Grand Total</b>	<b>\$41,505,000</b>	<b>\$50,470,000</b>	<b>\$52,800,000</b>	<b>\$65,355,000</b>	<b>\$76,660,000</b>	<b>\$286,790,000</b>

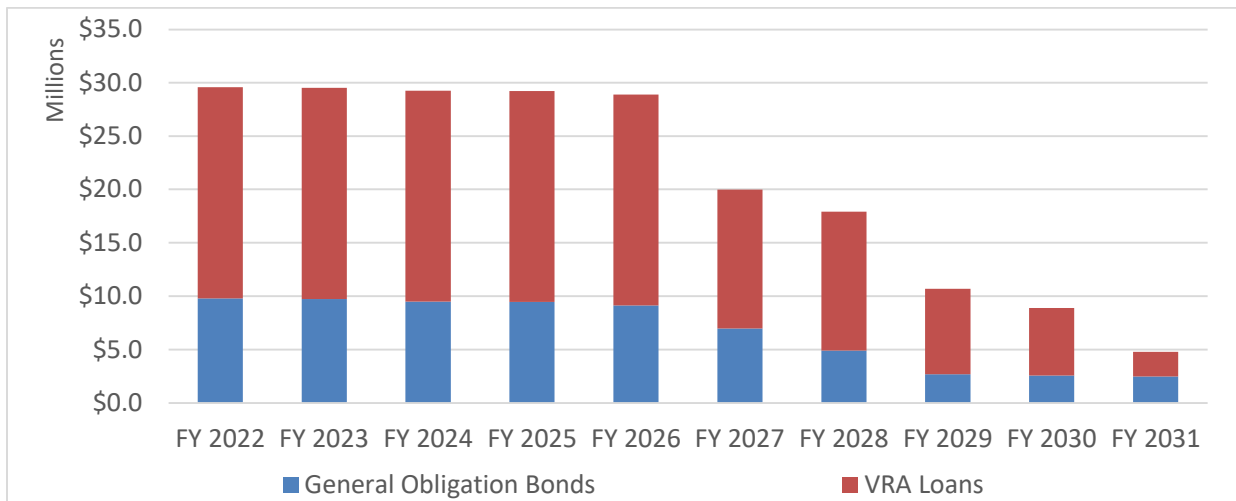
\*Note that the FY 2022 – FY 2024 Utilities Capital Improvement Plan was proposed and adopted after this report was drafted.

As will be discussed in more detail in Section 5.1.3, the County currently maintains some financial flexibility to use existing reserves to fund a portion of capital expenditures in the near-term, which helps mitigate the impact on rates while still meeting internal reserve target balances.

### 5.1.2. DEBT SERVICE OBLIGATIONS

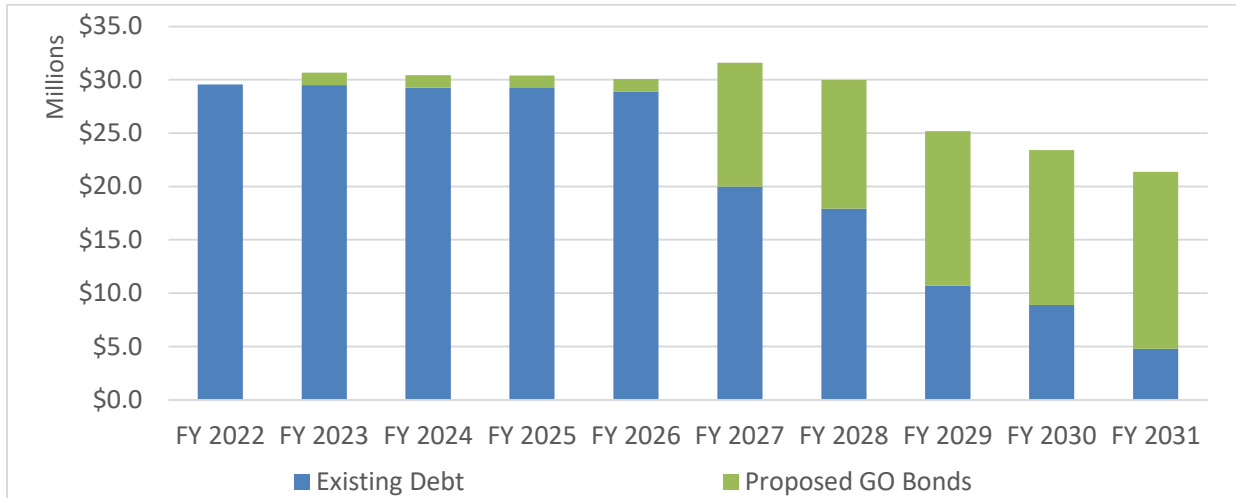
The County’s current outstanding indebtedness is comprised of double barrel general obligation bonds, which are shared between the water and sewer utilities, and Virginia Resources Authority (VRA) Revenue Bonds, which were issued for improvements/upgrades to the County’s WPCP. The projected debt service payments on existing debt for the forecast period are based on payment schedules provided by the County. Figure 1 illustrates the County’s debt service obligations on existing debt over the next ten years, which drops off significantly beginning in FY 2027.

**Figure 1: Debt Service Profile – Existing Debt**



In addition to the existing debt, and as indicated in the capital financing plan, it is assumed that the County will issue \$120.8 million in General Obligation bonds over the five-year forecast period. The future bond issuances are anticipated to have 25-year repayment terms, 5% interest rates, and issuance costs equal to 1% of principal. To provide a smooth forecast of debt service payments, Raftelis assumed that the capitalized interest would be used to shape payments on future debt until 2027. The resulting debt service profile, which includes principal and interest on both existing and proposed debt, is shown in Figure 2.

**Figure 2: Debt Service Profile – Existing & Proposed Debt**



The resulting annual debt service, both existing and proposed, used in the five-year financial forecast, is shown in Exhibit 11.

**Exhibit 11: Debt Service Forecast**

Description	FY 2021 Estimate	FY 2022 Forecast	FY 2023 Forecast	FY 2024 Forecast	FY 2025 Forecast
<b>Existing Debt</b>					
Water	\$1,086,668	\$355,734	\$296,214	\$287,276	\$277,922
Sewer	29,287,693	29,208,793	29,209,033	28,959,680	28,955,450
<b>Subtotal: Existing Debt</b>	<b>\$30,374,361</b>	<b>\$29,564,527</b>	<b>\$29,505,246</b>	<b>\$29,246,956</b>	<b>\$29,233,372</b>
<b>Proposed Debt</b>					
Water	-	-	392,075	392,075	392,075
Sewer	-	-	771,467	771,467	771,467
<b>Subtotal: Proposed Debt</b>	<b>-</b>	<b>-</b>	<b>\$1,163,542</b>	<b>\$1,163,542</b>	<b>\$1,163,542</b>
<b>Grand Total</b>	<b>\$30,374,361</b>	<b>\$29,564,527</b>	<b>\$30,668,788</b>	<b>\$30,410,498</b>	<b>\$30,396,914</b>

### 5.1.3. RESERVE CONTRIBUTIONS

The County maintains an Operating Reserve fund within the Utilities Operating Fund. The Operating Reserve fund is an unrestricted fund that can be used at the County’s discretion to manage cash flow or meet funding needs for the water and sewer utilities. The Operating Reserve fund is currently used for working capital and general liquidity purposes. The target reserve balance established by the County is 90 days O&M expenses. At the end of FY 2019,

the Operating Reserve fund had dipped slightly below its target balance; however, at the end of FY 2020 the 90-day target had been restored, well in advance of the 3-year replenishment period set by policy.

The Utilities PAYGO fund serves as a functional, but unofficial capital reserve fund. Each year the County contributes funding to the PAYGO fund to be used for cash-financed capital. Primary funding sources include infrastructure availability fees, Inter-Jurisdictional Partner capital contributions, and annual capital expenditures funded through rates. The PAYGO fund has accumulated a balance of more than \$30 million through FY 2021 because annual funding has exceeded capital spending in prior years, as well as funding for some projects being accumulated over a number of years to mitigate future rate spikes, in accordance with financial policy. Raftelis recommends that the County maintain a balance in the PAYGO fund that aligns with annual depreciation, which is approximately \$17.5 million. To bring the PAYGO fund balance into alignment with the \$17.5 million target, the forecast assumes that the PAYGO reserve will be used to fund upcoming capital projects.

### 5.1.4. TOTAL REVENUE REQUIREMENTS

The total revenue requirements, including O&M expenses, existing and proposed annual debt service, cash funded capital, and transfers to the Operating Reserve fund, are shown in Exhibit 12 for the five-year forecast period.

**Exhibit 12: System Revenue Requirements**

Revenue Requirements	FY 2021 Estimate	FY 2022 Forecast	FY 2023 Forecast	FY 2024 Forecast	FY 2025 Forecast
O&M Expenses	\$58,740,216	\$62,828,191	\$64,831,720	\$66,889,915	\$69,004,585
<u>Debt Service</u>	\$30,374,361	\$29,564,527	\$30,668,788	\$30,410,498	\$30,396,914
Existing Debt	30,374,361	29,564,527	29,505,246	29,246,956	29,233,372
Proposed Debt	-	-	1,163,542	1,163,542	1,163,542
<u>Capital Expenditures</u>	\$12,155,000	\$14,300,000	\$14,650,000	\$15,750,000	\$16,500,000
PAYGO (rate financed capital)	12,155,000	14,300,000	14,250,000	15,000,000	15,500,000
Transfer to Operating Reserve	-	-	400,000	750,000	1,000,000
<b>Total</b>	<b>\$101,269,577</b>	<b>\$106,692,718</b>	<b>\$110,150,509</b>	<b>\$113,050,413</b>	<b>\$115,901,499</b>
<i>% Change</i>		5.4%	3.2%	2.6%	2.5%

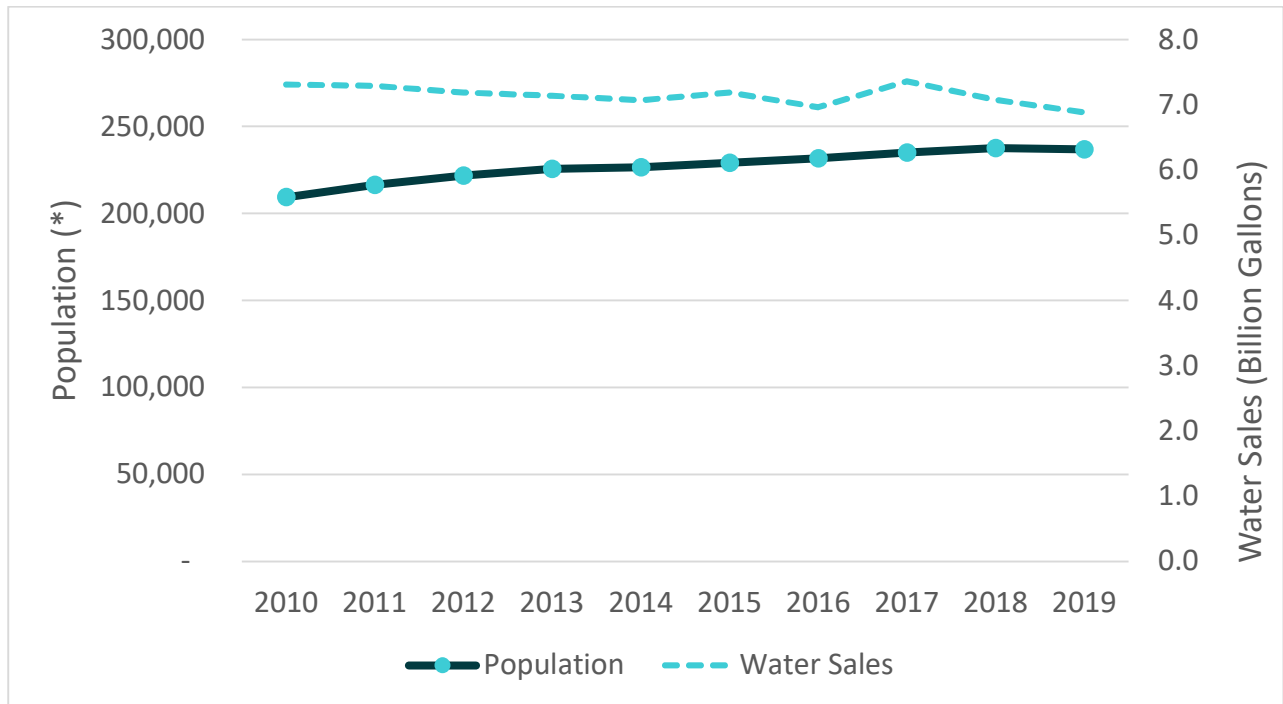
## 5.2. Revenues

The County collects revenue from a number of different sources. Operating revenues consist primarily of revenues from retail user rates and charges. Other revenue sources include revenues from IJ partners, infrastructure availability fees, and other miscellaneous fees for ancillary services.

### 5.2.1. DEMAND FOR SERVICE

To estimate the County’s retail user charge revenue, Raftelis developed a customer demand forecast to be multiplied by the applicable rates and charges. Raftelis reviewed the County’s historical demand and customer account growth to inform projections of future growth and demand over the forecast period. Through analyzing historical customer and water demand data, it was determined the County has experienced declining per capita water and sewer usage, consistent with trends in water and sewer demands across the country. Figure 3 shows the population of Arlington County vs. billed water volumes over the last decade.

**Figure 3: Population vs. Water Sales**



\* Data per US Census American Community Survey 5-year Estimates.

As shown in Figure 3, the population of Arlington County has grown roughly 1.2% per year while water sales have relatively constant to even slightly declining since 2010. These trends were considered while preparing the customer demand forecast.

### 5.2.1.1. Customer Accounts

The following tables show the historical and projected water and wastewater customer accounts by customer category. A summary of historical customer accounts is presented in Exhibit 13.

### Exhibit 13: Historical Customer Accounts

Description	FY 2017 <i>Actual</i>	FY 2018 <i>Actual</i>	FY 2019 <i>Actual</i>	FY 2020 <sup>2</sup> <i>Actual</i>
<b>Water Customers</b>				
Residential	33,866	33,931	33,932	33,238
Commercial	1,678	1,645	1,684	1,631
Apartments	1,585	1,590	1,590	1,569
County Agency	333	312	313	320
Fort Myer	1	1	1	1
<b>Total: Water Customers</b>	<b>37,463</b>	<b>37,479</b>	<b>37,520</b>	<b>36,759</b>
% Change		0.04%	0.11%	-2.03%
<b>Sewer Customers</b>				
Residential	33,513	33,562	33,624	33,007
Commercial	1,514	1,494	1,496	1,473
Apartments	1,540	1,543	1,542	1,539
County Agency	170	166	166	171
Large Sewer-Only Customers <sup>1</sup>	5	5	5	5
<b>Total: Sewer Customers</b>	<b>36,742</b>	<b>36,770</b>	<b>36,833</b>	<b>36,195</b>
% Change		0.08%	0.17%	-1.73%

- (1) Large sewer-only customers include Ronald Reagan Washington National Airport, the Pentagon, Fort Myer, Columbia Island Marina, and Cavalier Club Apartments.
- (2) The County implemented a new billing system which changed the way customer information was reported.

As shown in Exhibit 13, the County has seen modest customer growth with the majority of the account growth occurring in single-family residential accounts. After a review of historical data and discussions with County staff, it was agreed that Raftelis would assume the following customer growth assumptions over the forecast period. Single-family residential and apartment customer accounts were projected to grow at 0.5% each year. All other accounts were projected to remain flat through the duration of the forecast. Exhibit 14 presents a summary of the projected number of water and sewer customer accounts.

### Exhibit 14: Projected Customer Accounts

Description	FY 2021 <i>Projected</i>	FY 2022 <i>Projected</i>	FY 2023 <i>Projected</i>	FY 2024 <i>Projected</i>	FY 2025 <i>Projected</i>
<b>Water Customers</b>					
Residential	33,404	33,571	33,739	33,908	34,077
Commercial	1,631	1,631	1,631	1,631	1,631
Apartments	1,577	1,585	1,593	1,601	1,609
County Agency	320	320	320	320	320
Fort Myer	1	1	1	1	1
<b>Total: Water Customers</b>	<b>36,933</b>	<b>37,108</b>	<b>37,284</b>	<b>37,460</b>	<b>37,638</b>
% Change		0.47%	0.47%	0.47%	0.47%
<b>Sewer Customers</b>					
Residential	33,172	33,338	33,505	33,672	33,840
Commercial	1,473	1,473	1,473	1,473	1,473
Apartments	1,547	1,554	1,562	1,570	1,578
County Agency	171	171	171	171	171
Large Sewer-Only Customers	5	5	5	5	5
<b>Total: Sewer Customers</b>	<b>36,368</b>	<b>36,541</b>	<b>36,716</b>	<b>36,891</b>	<b>37,067</b>
% Change		0.48%	0.48%	0.48%	0.48%

### 5.2.1.2. Customer Usage

Similar to customer bills, historical customer usage must be examined and projected into future years. A summary of historical customer usage in thousands of gallons (TG) is shown in Exhibit 15.

**Exhibit 15: Historical Customer Usage (Thousand Gallons (TG))**

Description	FY 2017 <i>Actual</i>	FY 2018 <i>Actual</i>	FY 2019 <i>Actual</i>	FY 2020 <i>Actual</i>
<b>Water Usage</b>				
Commercial	2,276,199	2,119,629	2,032,179	1,957,654
County Agency	172,093	169,274	167,500	127,371
Residential	1,936,180	1,874,343	1,793,570	1,900,299
Apartments	2,885,308	2,810,279	2,745,837	2,853,161
Fort Myer	88,796	98,221	143,574	126,042
<b>Total Customer Usage (TG)</b>	<b>7,358,576</b>	<b>7,071,746</b>	<b>6,882,659</b>	<b>6,964,527</b>
<i>% Change</i>		-3.90%	-2.67%	1.19%
<b>Sewer Flows</b>				
Commercial	2,021,410	1,899,942	1,835,102	1,763,846
County Agency	130,786	133,237	132,699	101,133
Residential	1,908,949	1,829,387	1,781,689	1,873,695
Apartments	2,858,400	2,786,325	2,726,575	2,830,336
MWAA	148,203	146,013	148,967	144,316
Pentagon	132,566	125,682	125,172	127,807
Fort Myer	81,754	90,432	132,188	114,897
Marina	673	806	785	881
Cavalier APT	13,149	9,618	9,024	8,590
<b>Total Customer Usage (TG)</b>	<b>7,295,891</b>	<b>7,021,443</b>	<b>6,892,201</b>	<b>6,965,500</b>
<i>% Change</i>		-3.76%	-1.84%	1.06%

It should be noted that Raftelis discussed the potential near and medium-term implications associated with the novel Coronavirus (COVID-19) with County staff. Although COVID-19 had some impacts to demand during part of FY 2020 and into FY 2021, more recent data suggests a return to more normalized levels of consumption. As such, it was determined that it would be appropriate to forecast demand based on historical trends. Usage for all customers is projected using a three-year average of customer usage from FY 2017 – FY 2019, which results in an increase in projected customer demands in FY 2022 over FY 2021. Thereafter, the water and sewer billed usage forecast is projected to remain constant. This assumption was made such that the demand forecast would align with findings from historical customer demand analyses: modest growth in customer accounts offset by declining usage per customer account. Projected customer usage by customer category is shown in Exhibit 16.

### Exhibit 16: Projected Customer Usage (TG)

Description	FY 2021 <i>Projected</i>	FY 2022 <i>Projected</i>	FY 2023 <i>Projected</i>	FY 2024 <i>Projected</i>	FY 2025 <i>Projected</i>
<b>Water Usage</b>					
Commercial	1,879,348	2,036,487	2,036,487	2,036,487	2,036,487
County Agency	122,276	154,715	154,715	154,715	154,715
Residential	1,824,287	1,856,071	1,856,071	1,856,071	1,856,071
Apartments	2,739,035	2,803,092	2,803,092	2,803,092	2,803,092
Fort Myer	121,000	122,612	122,612	122,612	122,612
<b>Total Customer Usage (TG)</b>	<b>6,685,946</b>	<b>6,972,977</b>	<b>6,972,977</b>	<b>6,972,977</b>	<b>6,972,977</b>
<i>% Change</i>		4.29%	0.00%	0.00%	0.00%
<b>Sewer Flows</b>					
Commercial	1,693,292	1,832,964	1,832,964	1,832,964	1,832,964
County Agency	97,087	122,356	122,356	122,356	122,356
Residential	1,798,747	1,828,257	1,828,257	1,828,257	1,828,257
Apartments	2,717,122	2,781,079	2,781,079	2,781,079	2,781,079
MWAA	138,543	146,432	146,432	146,432	146,432
Pentagon	122,694	126,220	126,220	126,220	126,220
Fort Myer	110,301	112,506	112,506	112,506	112,506
Marina	846	824	824	824	824
Cavalier APT	8,246	9,077	9,077	9,077	9,077
<b>Total Customer Usage (TG)</b>	<b>6,686,880</b>	<b>6,959,714</b>	<b>6,959,714</b>	<b>6,959,714</b>	<b>6,959,714</b>
<i>% Change</i>		4.08%	0.00%	0.00%	0.00%

### 5.2.2. USER CHARGE REVENUES

User charge revenues are generated from user rates and charges assessed to retail customers. Revenue from each of the County’s customer categories has been forecasted by using projected customer billing data over the Study period and by applying the projected user rates and charges.

The County’s existing rate structure has a uniform volumetric rate for water and sewer customers. The existing rates are shown in Exhibit 17. FY 2021 rates are effective as of the date of this report while FY 2022 rates were adopted with the FY 2022 budget.

### Exhibit 17: Existing Rates

Volume Rate (per 1,000 gal)	Water	Sewer
FY 2021	\$4.91	\$9.29
FY 2022	\$4.91	\$9.44

Revenues for FY 2021 have been forecasted based on the projected number of customer bills and billable usage and the rates in place during FY 2021, which were implemented July 1, 2020. The remaining years of the forecast period (FY 2022 - FY 2025) have been projected in the same way, using the projected number of bills, billable usage, and projected user rates.

### 5.2.3. OTHER OPERATING & NON-OPERATING REVENUES

In addition to user charge revenues, the County collects revenue from several miscellaneous operating sources. The most significant of these revenues are water service connection fees, late fees, and sewer treatment service charges assessed to IJ partners (operating portion). Other sources of revenue include rentals and sales of surplus, new account

fees, and utility marking fees. Miscellaneous operating revenues are held flat throughout the forecast and are projected based on FY 2021 budgeted amounts.

Non-operating revenues consist of infrastructure availability fees, sewer treatment service charges assessed to IJ partners (capital portion), and interest earnings. Each of these are projected into the future using various assumptions, summarized below:

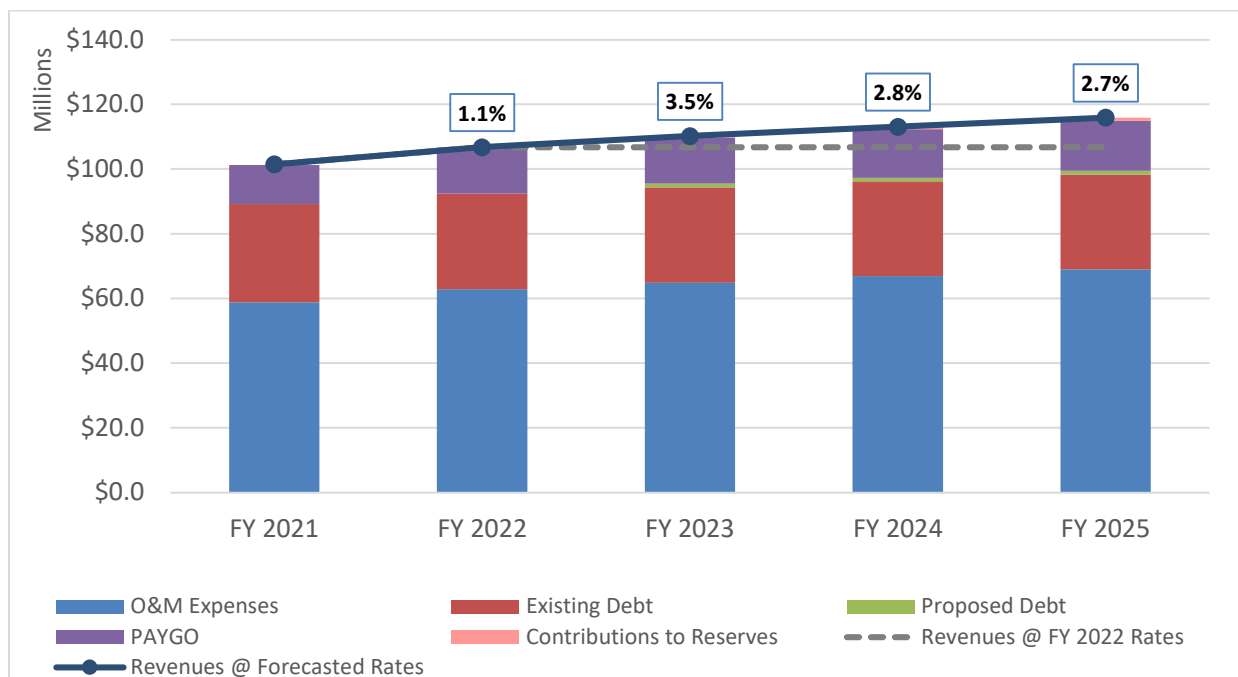
- Increases are proposed for infrastructure availability fees for FY 2022 and thereafter (described in Section 8 of this report). The forecast of infrastructure availability fee revenues relies on projections from County staff which were determined based on historical performance. This projection considers the increases proposed as part of this study.
- The capital portion of sewer treatment service charges assessed to IJ partners is based on the level of capital reinvestment by Arlington County in the system serving these customers. Projections for these revenues were provided by County staff but are based on projected spend in the County’s sewer CIP.
- Interest earnings are held flat throughout the forecast and are projected based on the preliminary FY 2022 budgeted amounts.

## 5.1. Revenue Sufficiency

The most important element to any rate study is to ensure that a utility generates revenues that are sufficient for operating the system. Once the revenue requirements for user charges were projected over the forecast period, the next step was determining the ability of the existing user charges to provide sufficient revenues to fully recover the anticipated operating and capital needs of the utility.

Figure 4 shows the revenue sufficiency of the system under existing (FY 2021), approved (FY 2022), and forecasted rates (FY 2023 – FY 2025). The bars represent revenue requirements while the lines represent system revenues. Due to rising costs to operate, maintain, and properly reinvest in the water and sewer system, revenue increases (expressed in percentages) to achieve the projected revenue requirements are shown above the revenues at proposed rates.

Figure 4: Revenue Sufficiency



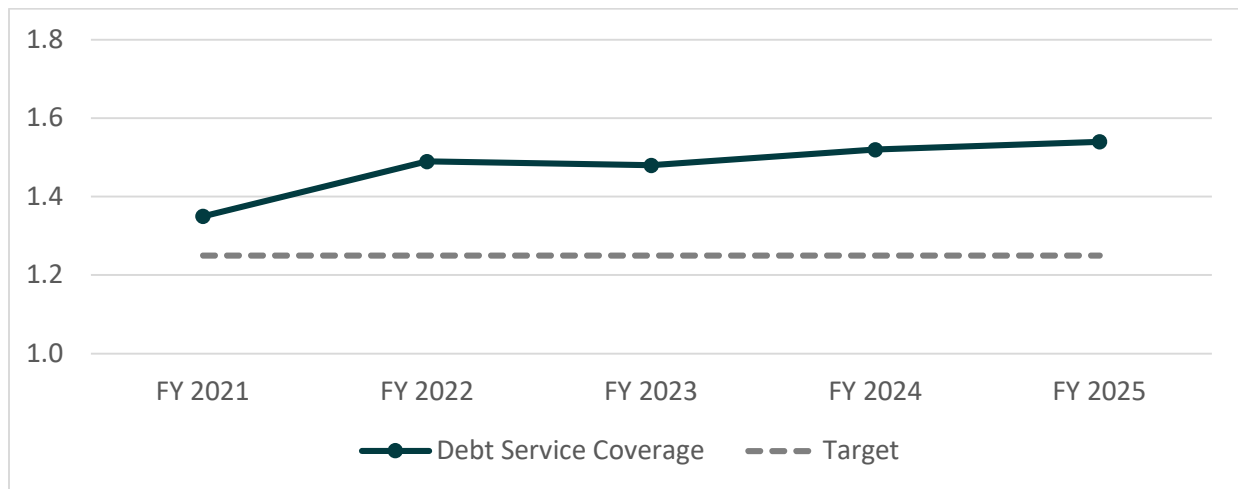


Under the current rates, revenues are not projected to be sufficient to fully recover the County’s revenue requirement through the duration of the forecast period. Annual inflationary revenue increases (in the 1% to 3.5% range) are needed in to fully recover the County’s revenue requirements starting in FY 2022 and continuing throughout the remainder of the forecast period.

Debt Service Coverage

Another key financial metric tracked in the financial forecast is debt service coverage. Debt service coverage is a representation of the County’s ability to service its water and sewer system debt including a sufficient cushion above annual principal and interest requirements. For the purposes of this financial forecast, we have assumed a minimum debt service coverage target of 1.25 times total debt service. Figure 5 provides a projection of the County debt service coverage over the five-year forecast period.

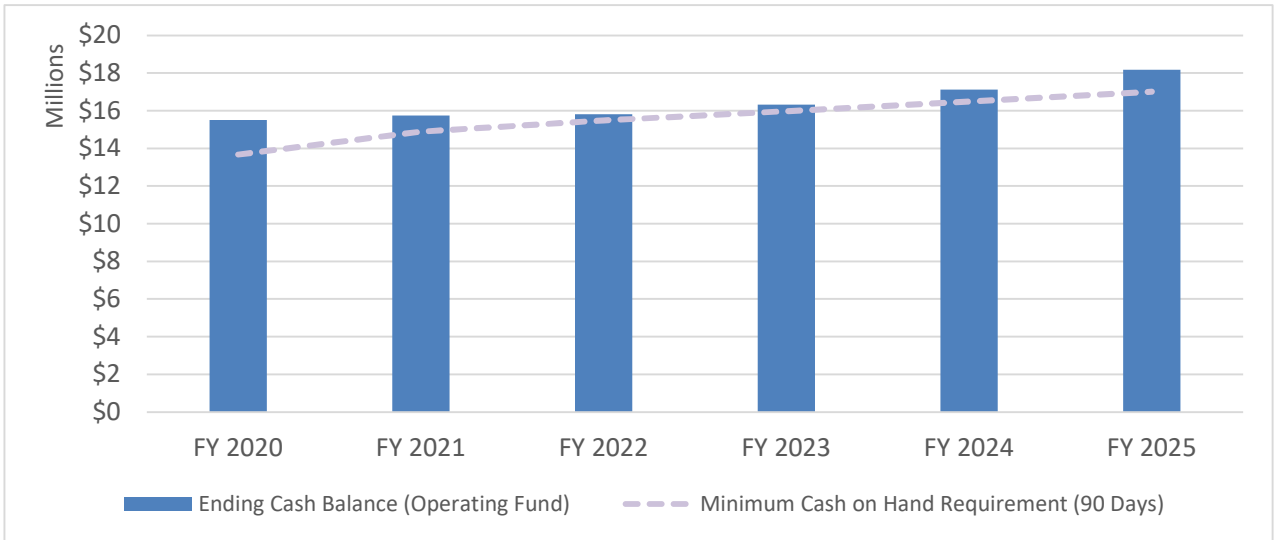
Figure 5: Debt Service Coverage



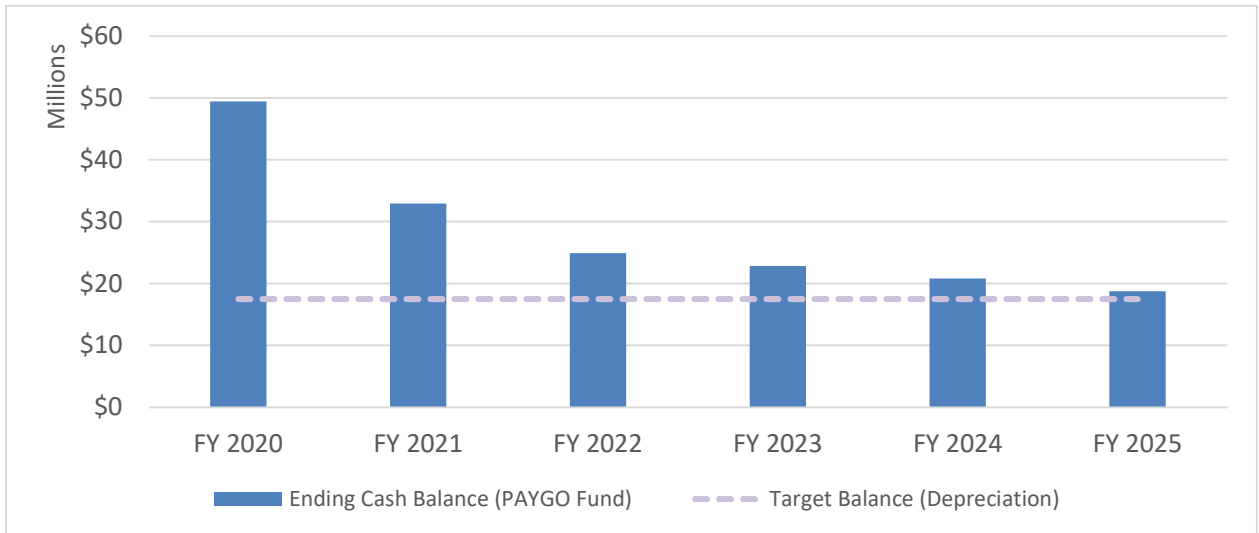
Reserves

As noted previously, the County has an Operating Reserve fund balance target of 90 days O&M expenses. To achieve this target, the County should continue to programmatically contribute to the fund over the forecast period as appropriate. Conversely, should the County formally establish a capital reserve, Raftelis recommends maintaining an annual balance roughly equal to annual depreciation expense (\$17.5 million in FY 2020). The County’s PAYGO fund is above the recommended target of annual depreciation and the forecast includes drawdowns from the PAYGO fund to support capital needs. Figure 6 and Figure 7 depict the County’s reserve fund balances through the forecast period.

**Figure 6: Operating Reserve Fund (Year-End Cash Balances)**



**Figure 7: PAYGO Fund (Year-End Cash Balances)**



# 6. Cost Allocations

Once the financial plan has been established, the cost allocations and cost of service analyses can be performed. Using key inputs from the financial plan, the revenue requirements and units of service forecasts, Raftelis performed a cost of service analysis consistent with guidelines published by the AWWA and WEF.

## 6.1. Cost of Service Overview

The basic goal for setting cost of service rates is to achieve general fairness in the recovery of costs from various classes of customers. Costs have been allocated between customer classes based on their estimated demand requirements and recognizing the different costs associated with serving different customer classes.

The first step in the cost allocation process was allocating water and sewer costs between the two respective utilities. Once revenue requirements were identified for each utility, Raftelis then allocated these costs proportionately to water and sewer customers based on how they use the system.

## 6.2. Cost Allocation between Utilities

A portion of the County's O&M budget categories are already clearly allocated to water or sewer. The Water Purchases, and the Water System Operations, Construction & Maintenance accounts, were allocated entirely to water, while the WPCP and Sewer System Construction & Maintenance accounts were allocated entirely to sewer. However, the remaining accounts in the County's budget are not allocated to water or sewer, so Raftelis developed allocation factors to assign costs to water and sewer in a reasonable manner.

In addition to separating the utility's operating costs, Raftelis also reviewed and allocated the utility's capital costs. Raftelis relied on the utility's projected capital spending in FY 2022 to allocate cash-financed capital costs between utilities. Debt service was allocated between the utilities based on the amount of original principal for each issuance applicable to water and sewer. Finally, revenue offsets were allocated between water and sewer based on allocation factors specific to each revenue type. The allocation factors and final allocations for each revenue requirement category are shown in Exhibit 18 and Exhibit 19, respectively.

### Exhibit 18: Allocation Factors

Allocation of Revenue Requirements	Water (%)	Sewer (%)	Allocation Methodology
42001 - DES Water Sewer Engineering	39%	61%	CIP Composite
44108 - Customer Service Office	50%	50%	Customer Accounts
44109 - Water Purchase-Washington Aqueduct	100%	0%	Water-Only
44201 - WPCP General	0%	100%	Sewer-Only
44301 - DES Operations Support	68%	32%	WSS O&M Composite
44302 - DES Water System Operations	100%	0%	Water-Only
44303 - DES Water System Construction & Maintenance	100%	0%	Water-Only
44304 - DES Meter Readers	50%	50%	Customer Accounts
44305 - DES Sanitary Sewer Systems	0%	100%	Sewer-Only
44306 - DES WSS Engineering	68%	32%	WSS O&M Composite
44402 - DES Non-Debt/Other	68%	32%	WSS O&M Composite
Existing Debt	4%	96%	Per Issuance
Proposed Debt	-	-	Per CIP
Rate Funded Capital (PAYGO)	54%	46%	Per CIP

### Exhibit 19: FY 2022 Revenue Requirements by Service

Allocation of Revenue Requirements	Water (\$)	Sewer (\$)
42001 - DES Water Sewer Engineering	298,121	468,795
44108 - Customer Service Office	889,513	873,226
44109 - Water Purchase-Washington Aqueduct	9,351,961	-
44201 - WPCP General	-	25,632,268
44301 - DES Operations Support	565,283	261,092
44302 - DES Water System Operations	3,713,440	-
44303 - DES Water System Construction & Maintenance	7,049,746	-
44304 - DES Meter Readers	1,074,046	1,054,380
44305 - DES Sanitary Sewer Systems	-	4,412,973
44306 - DES WSS Engineering	1,165,643	538,384
44402 - DES Non-Debt/Other	3,749,175	1,731,181
Existing Debt	355,734	29,208,793
Proposed Debt	-	-
Rate Funded Capital (PAYGO)	7,250,000	7,050,000
Transfer to Reserves	-	-
<b>Total</b>	<b>\$35,461,626</b>	<b>\$71,231,092</b>

### 6.3. Functional Cost Centers

Once the revenue requirements were developed by utility for the Test Year (FY 2022), Raftelis performed cost of service analyses for each utility. The appropriate level of detail required for a cost of service analysis is contingent on utility pricing objectives, system characteristics, and the accuracy and availability of data. Based on discussions with County staff, as well as consideration for the County’s pricing objectives, it was determined that water and sewer operating costs should be allocated into functional components consistent with the most significant cost-causative characteristics of the customer base. The water components included source of supply/treatment (Aqueduct purchases), pumping, storage, transmission, distribution, billing/meter reading, customer service, general infrastructure, and other. The sewer components included treatment, lift stations & pumping, conveyance, collection, billing/meter reading, customer service, general infrastructure, and other. The functional cost allocation process is presented in more detail in the Appendix B.

### 6.4. Cost Classifications

#### 6.4.1. WATER

Once water costs were functionalized, they were allocated to their cost components in accordance with how the County’s facilities are designed. For this Study, water cost components included volume-based allocations (i.e. base, max-day, and max-hour) and customer-and meter-based allocations (i.e. billing, meter reading, and customer service). This approach allocates a portion of functionalized costs to serving a base level of demand, maximum-day level of demand, and maximum-hour level of demand. Raftelis worked closely with County staff to determine reasonable allocation factors for each of these components, which were consistent with industry standards and practices and utilized water purchase demand statistics. Exhibit 20 shows a summary of the allocation factors used to allocate functional costs to rate components. Appendix B includes a detailed breakdown of the cost allocation process.

**Exhibit 20: Allocation of Water Functional Costs to Cost Components**

Revenue Requirements	Allocation Methodology	Base	Max Day	Max Hour	Customer Service	Billing / Meter Reading
O&M Costs						
Source of Supply / Treatment	Base	62.6%	37.4%	0.0%	0.0%	0.0%
Pumping	Maximum Day	62.6%	37.4%	0.0%	0.0%	0.0%
Storage	Maximum Hour	45.5%	27.2%	27.3%	0.0%	0.0%
Transmission	Maximum Day	62.6%	37.4%	0.0%	0.0%	0.0%
Distribution	Maximum Hour	45.5%	27.2%	27.3%	0.0%	0.0%
Billing / Meter Reading	Billing	0.0%	0.0%	0.0%	0.0%	100.0%
Customer Service	Meters	0.0%	0.0%	0.0%	100.0%	0.0%
Capital Costs	O&M Composite	50.5%	30.2%	19.3%	0.0%	0.0%
Revenue Offsets	Total Composite	51.6%	30.8%	9.3%	3.6%	4.8%

#### 6.4.2. SEWER

Sewer cost components included volume-based allocations (i.e. treatment and conveyance) and customer and meter-based allocations (i.e. billing/meter reading and customer service). The volumetric components were used to calculate volume rates and the meter components were used to determine fixed costs to be recovered from each customer class. The most challenging aspect of sewer cost allocations relates to the appropriate recovery of wet

weather costs, and in particular, Infiltration and Inflow (I&I). The EPA, through use of the 1972 Water Pollution Control Act (Clean Water Act), issued guidelines stating that wet weather costs can be recovered from customers in proportion to sewer volume produced, number of connections, land area, property valuations, or in some combination of these factors. The most common approaches used are through a combination of contributed sewer volumes and number of connections. Ultimately, the appropriate level of wet weather cost recovery on a fixed versus volumetric basis is contingent on the utility’s pricing objectives. For the purposes of this analysis, and based on discussions with County staff, it was determined that all wet weather costs would be allocated to the volume-based component.

Exhibit 21 shows a summary of the allocation factors used to allocate costs to rate components. Additional detail is included in Appendix B.

**Exhibit 21: Allocation of Sewer Costs to Cost Components**

Revenue Requirements	Allocation Methodology	Billed Volume	Customer Service	Billing/Meter Reading	I&I (1)
O&M Costs					
Treatment	Volume	100.0%	0.0%	0.0%	0.0%
Lift Stations & Pumping	Volume	100.0%	0.0%	0.0%	0.0%
Conveyance	Volume	100.0%	0.0%	0.0%	0.0%
Collection	Volume	100.0%	0.0%	0.0%	0.0%
Billing / Meter Reading	Billing / Meter Reading	0.0%	0.0%	100.0%	0.0%
Customer Service	Customer Service	0.0%	100.0%	0.0%	0.0%
Capital Costs	Billed Volume	100.0%	0.0%	0.0%	0.0%
Revenue Offsets	Total Composite	94.2%	2.5%	3.3%	0.0%

1) For the purpose of this cost of service analysis, no costs were allocated to a wet weather / I&I component.

## 6.5. Units of Service

Units of service for each cost component must be determined to allocate costs to customer classes. The demand projections developed in Section 5 serve as the baseline for the units of service. Base costs are allocated using average day customer demand. For maximum-day and maximum-hour cost components, the cost of service also relies on peaking information by customer class. The maximum-month-to-average-month (MM:AM) ratios are presented in Exhibit 22 by customer class.

**Exhibit 22: Peaking Factors by Customer Class**

Customer Class	MM:AM
Commercial	1.36
County Agency	1.28
Residential	1.22
Apartments	1.22
Fort Myer	1.37

## 6.6. Cost of Service Results

Once costs are allocated to cost components, the unit cost of service for each component is determined by dividing the cost component revenue requirements by the corresponding units of service. For example, base costs are divided by the Test Year projected water sales volume required to meet the retail classes' average day demand to arrive at the unit cost to meet average day demand. The unit costs are then multiplied by each customer class' projected units of service to arrive at the revenue requirements to be recovered from each class. The results of the cost of service are shown in Exhibit 23 and Exhibit 24. Detailed schedules documenting the entire cost allocation process are provided in the Appendix B.

**Exhibit 23: Water Class Cost of Service Results**

Customer Class	Revenue at Existing Rates	Cost of Service	Difference (%)	Difference (\$)
Commercial	\$9,999,152	\$9,957,442	-0.4%	\$(41,710)
County Agency	759,651	749,665	-1.3%	(9,986)
Residential	9,113,307	10,355,379	13.6%	1,242,073
Apartments	13,763,182	12,575,517	-8.6%	(1,187,665)
Fort Myer	602,026	599,314	-0.5%	(2,712)
<b>Total System</b>	<b>\$34,237,318</b>	<b>\$34,237,318</b>	<b>0.0%</b>	<b>\$(0)</b>

**Exhibit 24: Sewer Class Cost of Service Results**

Customer Class	Revenue at Existing Rates	Cost of Service	Difference (%)	Difference (\$)
Commercial	\$17,303,176	\$16,985,380	-1.8%	\$(317,796)
County Agency	1,155,043	1,125,078	-2.6%	(29,964)
Residential	17,258,744	18,245,545	5.7%	986,801
Apartments	26,253,383	25,710,645	-2.1%	(542,738)
MWAA	1,382,318	1,346,547	-2.6%	(35,771)
Pentagon	1,191,519	1,160,697	-2.6%	(30,822)
Fort Myer	1,062,053	1,034,591	-2.6%	(27,463)
Marina	7,779	7,666	-1.5%	(113)
Cavalier APT	85,690	83,556	-2.5%	(2,134)
<b>Total System</b>	<b>\$65,699,704</b>	<b>\$65,699,704</b>	<b>0.0%</b>	<b>\$(0)</b>

As shown above, the cost of service analysis indicates a shift of revenue recovery from non-residential and multifamily customers to single-family residential customers for both water and sewer, when compared against revenues at existing rates. The reason for this shift is predominately related to the current rate structure's lack of fixed charges in the County's existing structure, as well as the lack of differentiation between rates between customer categories. Billing/Meter Reading costs are allocated to customer classes on a per account basis since the cost of providing this service is not related to how much water a customer uses. Because the vast majority of accounts are single-family residential, these costs should be recovered proportionally by single-family residential customers, which results in the costs shifts shown in Exhibit 23 and Exhibit 24.

Raftelis prepared water and sewer rate options in an attempt to balance the County's core values and align the County's rates closer to the calculated customer class cost of service, discussed in Section 7.

## 6.7. High-Strength Surcharges

Another component of the comprehensive water and sewer cost of service study was evaluating the County’s ability to recover the cost of providing high-strength wastewater treatment. The County does not currently assess high-strength surcharges to any monitored customers since it does not have a significant industrial load. Specifically, the County estimates that a high-strength surcharge program would only capture around 10 customers, which would include the airport and “light” industrial customers (i.e. breweries, distilleries, etc.). Given the low industrial load in the County, the implementation of high-strength surcharges may not generate significant incremental revenue, making the impact on core user charges relatively small. However, in order to provide the County with maximum flexibility, Raftelis calculated the cost to treat high-strength waste; the process and recommendation is described in the following section.

Raftelis utilizes a systematic approach for determining surcharges for monitored customers based on guidance in the WEF Manual of Practice No. 27. First, costs were allocated to wastewater treatment plant treatment functions. Once the costs were functionalized, they were allocated to strength treatment parameters: Biological Oxygen Demand (BOD), Total Suspended Solids (TSS), Phosphorous (Phos), Nitrogen (TKN), or Flow. Units of service, or total discharge loadings, were used to calculate a unit cost for each strength treatment parameter. Units of service were calculated by taking a three-year average (FY 2017 – FY 2019) from monthly reports provided by County staff. Taking a three-year average mitigates the likelihood of a one-year anomaly being used in the calculation, which would yield a surcharge either insufficient to recover all necessary revenue requirements, or conversely, overly sufficient and recovering more revenues than needed to adequately fund all necessary revenue requirements.

Total discharge loadings are then divided into the allocated revenue requirements by parameter to determine a unit cost of treating each discharge parameter. A summary of the unit cost of treating each parameter are shown in Exhibit 25. Additional detail for the determination of high-strength surcharges is provided in Appendix B.

**Exhibit 25: High-Strength Treatment Surcharges**

Customer Class	BOD	TSS	Phos	TKN	Flow
Allocated Revenue Requirement	\$4,250,895	\$5,540,570	\$2,803,496	\$3,006,338	\$10,014,200
Units of Service (lbs.)	13,289,074	16,049,209	193,014	3,095,681	
<b>Total Cost per Pound</b>	<b>\$0.320</b>	<b>\$0.345</b>	<b>\$14.525</b>	<b>\$0.971</b>	

Raftelis recommends that the County use the surcharges calculated in this report to prepare a business case for whether or not to implement a high-strength surcharge program. This would require the County to perform testing to determine the unique high-strength loads that each potential program participant places on the system that is above the load characteristics of domestic wastewater. Annualized high-strength loading information can then be multiplied by these surcharges to estimate annual revenues. Revenues should be compared against the costs of administering the program (i.e. additional labor, supplies, materials, etc.) to ensure that 1) the program is self-sufficient and 2) that monitored customers contribute equitably to the unique costs they put on the treatment system.



# 7. Rate Options & Customer Impacts

The following sections identify the proposed rates and rate structure adjustments of the Study. Raftelis believes that these adjustments improve both the cost justification of the various user rates and charges and the equity among the utility customers, while also achieving revenue sufficiency. In addition, the proposed rates and rate structure adjustments address affordability, revenue stability, and conservation concerns, which were identified as top core values. These objectives will be discussed in further detail in the following sections.

## 7.1. Existing Rates

The process to develop water and sewer rates began with reviewing the County’s existing rate structure. The County’s customers are currently charged for water and sewer service based on a rate structure with uniform volumetric rates based on the quantity of water consumed.

The water rate structure includes a uniform volumetric rate of \$4.91 per thousand gallons (TG) for all levels of consumption, regardless of customer class. Similarly, the sewer rate is also a single volumetric uniform rate of \$9.29 per TG which is billed based on 100% of water consumption. Exhibit 26 shows the existing rate structure for FY 2021 and County-proposed for FY 2022.

**Exhibit 26: Existing Rates**

Volume Rate (per 1,000 gal)	Water	Sewer
FY 2021	\$4.91	\$9.29
FY 2022	\$4.91	\$9.44

The main benefit of the County’s existing structure is simplicity; it is easy understand, implement, and administer. While simplicity is an important pricing objective, it was not highlighted as one of the most important rate-setting community core values. The current structure does not incentivize affordability nor conservation by making essential usage more costly than discretionary usage. Since all customer categories pay the same rate, revenue recovery is not aligned with the manner in which customer categories place demands on the system. Finally, the lack of a fixed component means the structure provides no revenue stability which increases revenue recovery risks.

## 7.2. Rate Structure Options

Based on the core values identified by County stakeholders and during the kick-off meeting, Raftelis recommends the following adjustments to the County’s water and sewer rate structures.

### 7.2.1. AFFORDABILITY AND CONSERVATION

The County wanted to ensure that customer rates promote both affordability and conservation. Raftelis modeled rate options that add an inclining block to the single-family residential rate structure to align the first block with the costs of providing baseline, or non-discretionary, water service. Raftelis believes that adding this “Lifeline Rate” would be an effective means of achieving the County’s core values, as it promotes customer affordability by establishing a

lower rate for small- and average-volume customers, in addition to promoting conservation by establishing a higher rate for large-volume customers.

### 7.2.1.1. Lifeline Rate

Based on Raftelis’ experience and discussion with County staff, 9 TG was chosen because it is a reasonable representation of a core, or necessary amount of water, to be used for non-discretionary purposes (e.g. cooking, cleaning, bathing). Specifically, the AWWA Handbook of Water Use and Conservation provides detailed information on residential water use as seen in Exhibit 27.

**Exhibit 27: Efficient Residential Water Use**

Type of Use	Gallons Per Capita	Percentage of Total Daily Use
Showers	8.8	19.5%
Clothes Washers	10.0	22.1%
Toilets	8.2	18.0%
Dishwashers	0.7	1.5%
Baths	1.2	2.7%
Leaks	4.0	8.8%
Faucets	10.8	23.9%
Other Domestic Uses	1.6	3.4%
<b>Total</b>	<b>45.3</b>	<b>100%</b>

The United States Census Bureau<sup>3</sup> indicates there are 2.18 persons per household living in Arlington County. Thus, an assumed efficient household in the County uses 8,888 gallons of water per quarter (2.18 x 45.3 x 90 (days) = 8,888), or 8.9 TG. This value was rounded to 9 TG of quarterly water consumption.

An important consideration in establishing a lifeline rate is that it applies only to single-family residential customers. Multi-family residential customers would be billed based on a uniform rate for their respective class. Most multi-family residential customers are billed through a master meter and are effectively indirect customers of the system. Due to the variability of water consumption existing within the multi-family residential customer class (e.g. 20 unit apartment complex vs. 250 unit apartment complex), establishing a tiered structure for this class presents numerous challenges. To do so, the County would need to gather information on the number of housing units within multi-family properties, which is not currently available in the customer information system. If this type of information becomes available in the future, the County may wish to examine this option.

### 7.2.1.2. Affordability

In addition to considering rate structure affordability, the County also considered ways that the water and sewer fund could expand affordability options. The County requested that Raftelis perform affordability analyses to evaluate the affordability of water and sewer service to residents.

In April of 2019, AWWA, WEF, and the National Association of Clean Water Agencies (NACWA) developed recommendations for the US EPA on new methodology and guidelines for assessing household affordability and financial capability. These recommendations were published in a document titled “*New Framework for Household Affordability and Financial Capability Assessment.*” This guidance, and especially the proposed “Household Burden Indicator,” served as the basis for analyzing water and sewer service affordability in Arlington.

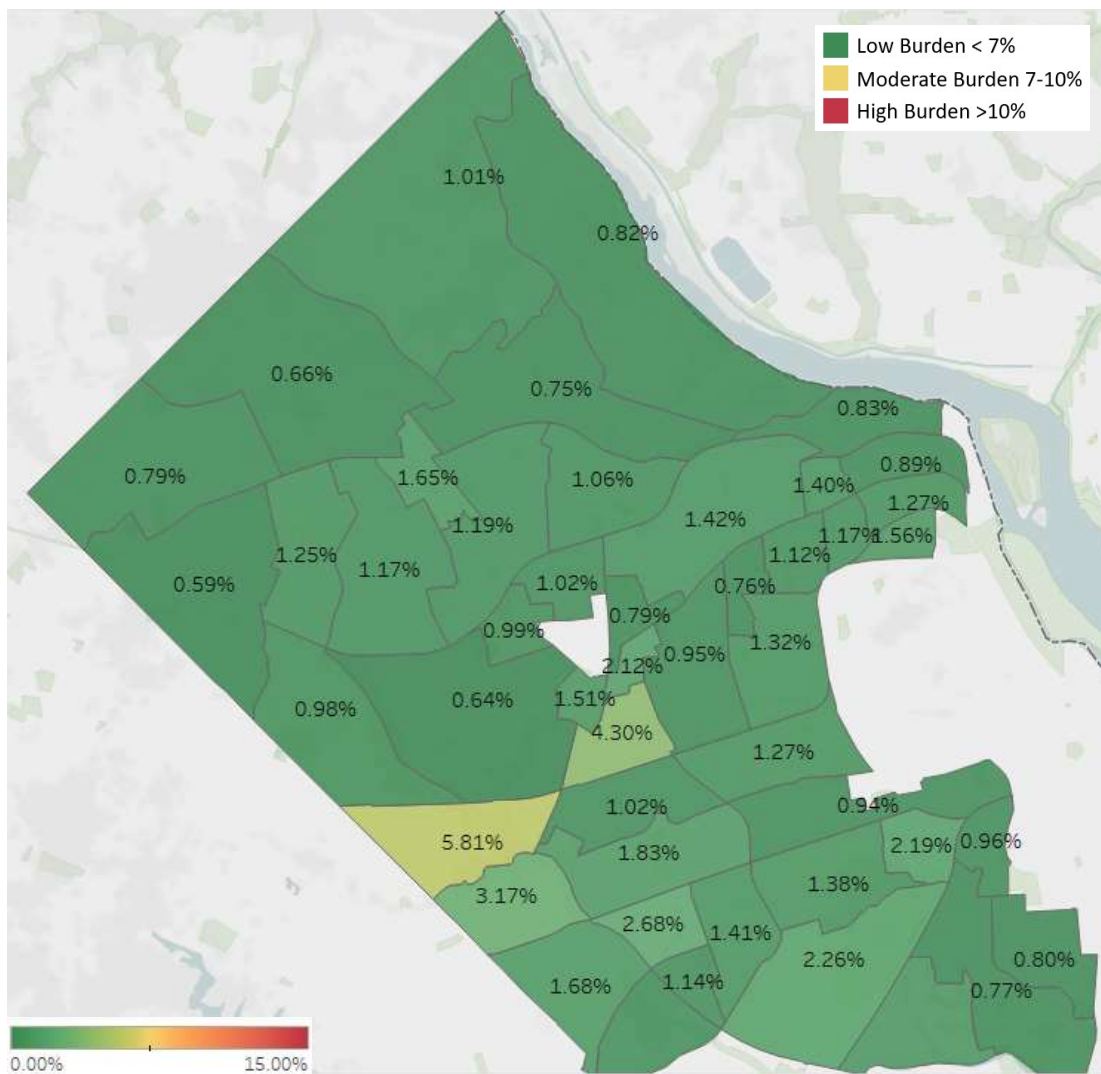
<sup>3</sup> United States Census - Quick Facts. Arlington County, Virginia.

The 2019 Framework proposes two measures of household affordability for the primary financial capability evaluation for a permittee. These measures are defined to be:

1. The Household Burden Indicator (HBI), defined as basic water service costs (combined) as a percent of the 20th percentile household income (i.e., the Lowest Quintile of Income (LQI) for the Service Area); plus
2. The Poverty Prevalence Indicator (PPI), defined as the percentage of community households at or below 200% of Federal Poverty Level (FPL).

To analyze household burdens across the County, Raftelis geocoded (mapped) each single-family residential customers' location using detailed billing information. Raftelis calculated an average combined water and sewer bill for every customer location. Raftelis assigned household income data at the census-tract level from the American Community Survey (ACS) to each customer location. The combination of actual usage information and assigned income information provided HBI for each of the County's customers. These indicators were averaged for each census tract to determine the HBI by census tract. The results are shown on the map in Figure 8.

**Figure 8: HBI by Census Tract in Arlington County**



The analysis indicates no systemic affordability challenges in Arlington among single-family residential customers. However, averages by census tract do not reflect every customer's individual experience, and there are likely some

single-family customers who struggle to pay water and sewer bills. Further discussion and analysis with County staff and stakeholders revealed that the majority of the County's at-need population is in multi-family housing. This issue presents a unique set of challenges, given that multi-family residents are "indirect" customers of the County's water and sewer system.

The Study considered the implementation of a formal affordability program, which could include a bill discount program or other forms of assistance for income-eligible customers. However, per Virginia's current legal construct, the County is limited in how it can provide direct assistance to at risk customers using revenues generated through its Enterprise Fund from water and sewer user rates and charges.

After discussing and investigating several affordability programs, including a bill round-up program and various measures to support at need residents, the County elected not to implement any new affordability programs at this time. Instead, the recommendation is to continue to support this population through existing support provided by Arlington County Department of Human Services and community aid organizations, many of which receive substantial funding from Arlington County. The County will continue evaluating affordability options for water and sewer customers.

### **7.2.2. EQUITY AMONG CHARGES AND CUSTOMERS**

Equity among user charges and customer classes was among the top 3 values identified during the County's public engagement campaign. In this context, equity means that customer categories are responsible for the unique burden placed on the system by each category. As previously mentioned, the County's current rate schedule applies the same rate to all customers, so some customer classes may not be appropriately paying for the costs that they impose on the system. Though the County's uniform volumetric rate structure is easy to implement and understand, it does not promote a more equitable cost recovery. Raftelis recommends implementing separate water rates for each customer class and a two-tiered single-family residential rate, which would allow the utility to recover costs in a way that aligns more closely with cost of service principles.

### **7.2.3. REVENUE STABILITY**

One of the County's top core values was to increase revenue stability. The most effective way to do this is through the establishment of fixed charges, or charges that do not vary based on consumption. Currently, the County does not assess a fixed charge. While the current rate structure is simple and easy to understand, it neglects to recognize the fixed costs associated with providing service to all customers. A fixed charge helps recover the costs that are uniform for all customers and, at a minimum, includes costs such as customer service, meter reading, and billing and collection. It can also be justifiable to allocate additional costs for recovery through a fixed charge. For example, many utilities will allocate a portion of other fixed costs (e.g. debt service) since a utility must provide service 24 hours a day, 365 days a year regardless of whether any water is purchased; this concept is called readiness to serve.

Because the County does not have a fixed charge and implementing a large base charge could cause rate shock for customers, Raftelis recommends that the new base charges should only recover customer service, meter reading, and billing and collection costs. Raftelis has developed rate options that include the implementation of a uniform base charge for all customer classes. This increases the revenue stability of the water and sewer utilities and ensures that customers are contributing to the costs associated with providing service in a more equitable manner.

### **7.2.4. NON-SEWER WATER USAGE**

In addition to affordability and conservation, another issue that was consistently raised by County customers during stakeholder engagement was the methodology for assessing sewer charges for single-family residential customers, especially as it relates to outdoor and/or irrigation uses. Since sewer meters are nonstandard and impractical for residential customers, sewer usage across the industry is typically estimated in one of the following four manners:

- 1) Percentage of water usage (return factor)
- 2) Water usage that is capped at a fixed level
- 3) Percentage of usage during a defined winter period
- 4) Using winter period usage as a cap

Currently the County bills sewer usage based on 100% of water usage. The proposed rate structure alternatives examined changes to this policy and considered three of the billing methodologies listed above. The recommended rate option includes billing single-family residential sewer using Average Winter Consumption (AWC) as a cap. The primary advantage of this option is that it accounts for water being used by residential customers that is likely not being returned to the sewer system.

In addition to residential, the Study also considered non-sewer water usage for non-residential customers, in particular water used for cooling purposes in commercial cooling towers. Typically, a portion of this water usage is not returned to the sewer system. Raftelis gathered data from neighboring water and sewer providers to understand how peer utilities approach this issue. The findings were generally inconsistent with some utilities administering complex deduct and/or credit program while others were silent on the issue. Ultimately, after presenting benchmarking findings and discussing considerations with the RSCAG, the Project Team concluded that the administrative burden of administering a program may outweigh the benefits of implementing a separate rate or rate structure for non-residential customers in FY 2022.

## **7.3. Rate Recommendation**

Raftelis prepared multiple FY 2022 rate options for the County's consideration. Section 7.3.1 highlights the changes examined by the Project Team and presented to the County for consideration. Section 7.3.2 describes the recommended rate structure in detail.

### **7.3.1. RATE OPTIONS EXAMINED**

Raftelis examined several rate modifications to better align the County's rate structure with the core values identified. Exhibit 28 presents the rate options with a brief description of the water and sewer structural modifications considered.

### Exhibit 28: Rate Options Considered

	Water	Sewer
<b>Option 1 (Status Quo)</b>	Existing Structure	Existing Structure
<b>Option 2</b>	<ul style="list-style-type: none"> <li>• Implement Base Charge</li> <li>• Uniform Rates by Class</li> </ul>	<ul style="list-style-type: none"> <li>• Implement Base Charge</li> <li>• Uniform Rate for All Classes</li> </ul>
<b>Option 3</b>	<ul style="list-style-type: none"> <li>• Implement Base Charge</li> <li>• Uniform Rates by Class</li> <li>• 2-Tier SFR Rate</li> </ul>	<ul style="list-style-type: none"> <li>• Implement Base Charge</li> <li>• Uniform Rate</li> <li>• 90% return factor for SFR</li> </ul>
<b>Option 4</b>	<ul style="list-style-type: none"> <li>• Implement Base Charge</li> <li>• Uniform Rates by Class</li> <li>• 3-Tier SFR Rate</li> </ul>	<ul style="list-style-type: none"> <li>• Implement Base Charge</li> <li>• Uniform Rate</li> <li>• 90% return factor for SFR</li> </ul>
<b>Option 5</b>	<ul style="list-style-type: none"> <li>• Uniform Rates by Class</li> <li>• 2-Tier SFR Rate</li> </ul>	<ul style="list-style-type: none"> <li>• Uniform Rate for All Classes</li> </ul>
<b>Option 6</b>	<ul style="list-style-type: none"> <li>• Implement Base Charge</li> <li>• Uniform Rates by Class</li> <li>• 2-Tier SFR Rate</li> </ul>	<ul style="list-style-type: none"> <li>• Implement Base Charge</li> <li>• Uniform Rate</li> <li>• Implement Average Winter Consumption Billing for SFR</li> </ul>

## 7.3.2. RECOMMENDED RATE STRUCTURE

The County elected to move forward with Option 6. For water, this structure includes a base charge and volumetric rates by class, with a two-tiered inclining block structure for single-family residential customers. For sewer, Option 6 includes a base charge and a uniform sewer rate with single-family residential customers billed for sewer based on the lesser of actual water usage or usage during the winter quarter. Exhibit 29 presents the recommended rates.

### Exhibit 29: Recommended Rates

Description	Water	Sewer
Base Charge – Quarterly	\$ 13.26	\$ 10.76
Base Charge – Monthly	\$ 9.10	\$ 7.42
<u>Volume Charges</u>		
Single-Family Residential		
Tier 1 (0-9 TG)	\$ 3.71	\$ 9.61 (*)
Tier 2 (> 9 TG)	\$ 5.94	\$ 9.61 (*)
Multi-Family (All Usage)		
Commercial (All Usage)	\$ 4.42	\$ 9.61
	\$ 4.79	\$ 9.61

(\*) Single-family residential customers will be billed for sewer on the lesser of actual water usage or winter period use.

## 7.4. Customer Impacts

The bill impacts from the proposed rate structure adjustment for sample customers from each customer class are shown in Exhibit 30.

### Exhibit 30: Customer Impacts

Customer	Annual Usage	Winter Quarter Usage	Existing Bill (2022)	Proposed Bill (2022)	\$ Increase	% Increase
Residential (10 <sup>th</sup> Percentile)	21 TG	5 TG	\$ 301.35	\$ 366.19	\$ 64.84	21.5%
Residential (25 <sup>th</sup> Percentile)	32 TG	8 TG	459.20	522.32	63.12	13.7%
Residential (Median)	48 TG	10 TG	688.80	704.54	15.74	2.3%
Residential (75 <sup>th</sup> Percentile)	77 TG	17 TG	1,104.95	1,088.22	(16.73)	-1.5%
Residential (90 <sup>th</sup> Percentile)	91 TG	28 TG	1,305.85	1,421.24	115.39	8.8%
Multi-Family (Average)	137 TG	n/a	1,965.95	1,938.63	(27.32)	-1.4%
Commercial (Average)	113 TG	n/a	1,621.55	1,643.72	22.17	1.4%

In general, single-family residential customers will see cost increases driven mostly by the implementation of a quarterly fixed charge. However, those with significantly more water usage during non-winter billing periods (presumed to be outdoor usage and non-sewer generating water usage) will benefit from the new rate structure. Multi-family customers will generally experience minor bill decreases while Commercial customers will generally see small bill increases. It is important to note that customer impacts will vary, sometimes significantly, among individual customers based on their customer class and water usage characteristics. In February 2021, the County published a “Water and Wastewater Bill Calculator” tool to the County’s website where customers can enter account information and review a potential bill under the new rate structure based on their calendar year 2020 usage statistics.

# 8. Infrastructure Availability Fees

Infrastructure availability fees are one-time charges assessed to new customers for their use of system capacity. They serve as an equitable method of recovering up-front system capacity costs from those using the capacity. In the County, these fees are used exclusively to fund capital infrastructure improvements. As part of the Study, Raftelis calculated cost-justified infrastructure availability fees for the County.

Appropriate infrastructure availability fees must comply with the Rational Nexus test established in court cases. The Rational Nexus test requires that: 1) the need for capacity charges is a result of new growth; 2) the amount of the charge does not exceed the reasonable cost to provide capacity to accommodate growth; and 3) the funds collected must be adequately earmarked for the sufficient benefit of the new customers required to pay the fee.

There are two main approaches for calculating infrastructure availability fees that are recognized in the industry as cost-justified, meeting the requirements of the Rational Nexus test. The two approaches are the System Buy-In Approach and the Marginal Incremental Approach. A combination of these two approaches may also be used under certain circumstances.

- *System Buy-In Method* – This approach calculates a fee based upon the proportional cost of each user’s share of existing system capacity. It is most appropriate in cases where the existing system assets provide adequate capacity to provide service to new customers.
- *Incremental Cost Method* – This method focuses on the cost of adding additional facilities to serve new customers. It is most appropriate when existing facilities do not have adequate capacity to provide service to new customers, and the cost for new capacity can be tied to an approved CIP.
- *Combined Method* – This method is a combination of the buy-in and incremental cost approaches.

## 8.1. Summary of Approach and Results

The Buy-In Approach was selected and utilized during the prior rate study and was re-affirmed in this study as the method to calculate the infrastructure availability fees for the County, since the County’s existing water and sewer systems have the capacity to accommodate the anticipated growth through the 2040 planning horizon.

During the previous study, performed in early 2004 and 2005, Raftelis created a model for calculating the infrastructure availability fees in a manner similar to that previously used by Arthur Young<sup>4</sup>. For the current rate study, Raftelis relied on a similar methodology, updating the model with information from FY 2020. Raftelis noted two key observations from the FY 2020 data:

- The fixed asset data provided by the County only contains data from 1979 to 2020. It is likely that a batch of assets was entered in 1979 that accounts for all assets put into service before 1979.
- The County uses a composite depreciation rate of 75 years to depreciate all water and sewer assets. While a 75-year useful life may be appropriate for water and sewer lines, assets such as plants, pumps, and tanks are typically depreciated over a shorter useful life (i.e., 50 or 25 years). Raftelis noted that using the County’s 75-year useful life may overstate the functional value of the assets. As such, Raftelis made other depreciation assumptions for non-linear assets which are described in this section.

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<sup>4</sup> Arthur Young Water – Sewer Hook-up Fee Study dated April 5, 1985.



For this study, Raftelis updated the asset information through FY 2020. The County provided the totals for the assets added each year segmented by the five primary asset categories used in previous studies: water mains, water reservoirs and pumping, sewer mains, sewer pumping, and WPCP. The County provided enough information such that assets contributed by developers could be identified and excluded from the analysis.

The next step was to escalate the original cost of the assets to reflect their replacement cost, less depreciation. As in the previous studies, the Handy-Whitman Index was used to escalate the original cost and depreciation values to current replacement values. The Raftelis methodology for determining accumulated depreciation differs from that used by Arthur Young in previous studies or in the County's fixed asset records. The replacement cost calculations for each of the five categories of assets are contained in Appendix C at the end of this report. Useful lives for water and sewer line assets were assumed to be 75 years, while other assets would be depreciated over a 50-year useful life.

After calculating replacement cost less depreciation for each category of assets, Raftelis subtracted the value of construction work in progress and outstanding debt. The construction work in progress amounts were taken from the FY 2020 asset information provided by County staff. In previous studies, expansion and non-expansion CIP project costs were included in the determination of infrastructure availability fees. Since the majority of the County's CIP is for repair, rehabilitation, and replacement of existing assets, Raftelis and the County agreed to exclude those costs from this analysis such that the analysis was a true "buy-in" approach. Next, the debt credit was determined. A debt credit is appropriate because bonds issued to pay for capital additions will be paid from the County's water and sewer rates, so a new customer will pay for their share of the debt service through their water and sewer rates. The method used for this Study credits the total outstanding debt against the total assets. The amount of debt outstanding was provided by County staff. The details of the total system value calculations are shown in Appendix C.

Raftelis determined the total number of drainage fixture units ("DFUs") that could be served by each of the systems by starting with overall system capacity. In the previous studies, the capacity used for the water system was 32 MGD and the capacity used for the sewer system was 40 MGD. After discussions with County staff, it appears that these values are still reasonable. However, the new calculations reduce the value for the sewer system by 6.8 MGD to account for the portion of the sewer plant capital that is being paid for by the IJ partners. Raftelis divided total system capacity by the usage per Equivalent Residential Connection (ERC) and the number of DFUs per ERC to determine the number of DFUs that can be served by each system.

In the 2004-2005 study, the usage by residential customers over a three-year period (FY 2001 through FY 2003) and 200 gallons per day (GPD) was used as the average usage per ERC. By reviewing customer billing information from FY 2015 – FY 2019, Raftelis determined that an average usage per ERC of 150 GPD is appropriate. This figure was adjusted based on the characteristics of the water and sewer systems. For the water system, the average usage per ERC was multiplied by the system peaking factor calculated in the Water and Sewer Rate Study (1.6), resulting in an adjusted usage of 240 GPD. For the sewer system, the average usage per ERC was increased by 10% to account for each new customer's share of inflow and infiltration, resulting in an adjusted average usage of 165 GPD. In the previous studies, the number of DFUs per ERC was 24, and this figure was also used in this study. The calculations for number of DFUs that can be served by each system are shown in Appendix C.

## 8.2. Assessment Methodology

The net asset values for each system are divided by the number of DFUs that can be served by each system to determine the cost per DFU for the infrastructure availability fee. A summary of these calculations for the water and sewer infrastructure availability fees are shown in Exhibit 31. The analysis provides a maximum cost-justified level of infrastructure availability fees that can be assessed by the County.

### Exhibit 31: Infrastructure Availability Fee Calculation

Description	Water	Sewer
Net System Cost	\$ 395,837,264	\$ 906,657,408
Total DFUs that can be Served	3,200,000	4,829,061
Calculated Fee per DFU	<b>\$ 123.70</b>	<b>\$ 187.75</b>
<i>Existing Fee per DFU</i>	\$ 85.00	\$ 115.00
Calculated Fee per ERC (24 DFU)	<b>\$ 2,969</b>	<b>\$ 4,506</b>
<i>Existing Fee per ERC (24 DFU)</i>	\$ 2,040	\$ 2,760
<i>% Difference</i>	43%	63%

The County may elect to charge a cost per DFU that is less than the maximum cost-justified charge documented in this report. If the County elects to charge a fee that is less, all customers must be treated equally, meaning the same reduced cost per DFU must be used for all customers. In order to mitigate the significant increases to the infrastructure availability fees, the County has elected to incrementally increase the existing fees over a three-year period. For 2022, the County has proposed fees of \$95 for water and \$135 for sewer, which result in \$10 and \$20 increases for water and sewer, respectively. A three-year phase-in plan is illustrated in Exhibit 32. Raftelis recommends that the County update these fees every three-to-five years, consistent with industry best practice.

### Exhibit 32: Infrastructure Availability Fee Phase-In

Description	FY 2021 Existing	FY 2022 Projected	FY 2023 Forecast	FY 2024 Forecast
Water	\$85.00	\$95.00	\$105.00	\$120.00
Sewer	\$115.00	\$135.00	\$160.00	\$185.00
<b>Total</b>	<b>\$200.00</b>	<b>\$230.00</b>	<b>\$265.00</b>	<b>\$305.00</b>
<i>% Change</i>		15%	15%	15%

## 9. Miscellaneous Fees

The County currently assesses and collects a number of miscellaneous fees and charges which are used to offset revenue requirements and reduce revenues to be recovered through user rates and charges. The types of miscellaneous fees charged by the County are similar to other public water and sewer utilities and include new account fees, reactivation fees, connection fees, and other fees.

The County requested that Raftelis review and benchmark certain fees and recommend adjustments to recover the costs of providing ancillary services. The County's most recent cost of service study (2004 - 2005) recommended changes to several of these miscellaneous fees. County staff specifically requested that Raftelis review calculations for fees that had not been reviewed during that study to assess the effectiveness of each fee.

County staff calculated the costs associated with connection fees and meter installation fees with Raftelis providing general support and review. Since these services connections solely benefit individual customers, it was determined that these fees should continue to be calculated on a full cost recovery basis. The water service connection work typically includes excavation to access the water main in the street, a connection to the water main, installation of pipe from the connection to a meter box or vault, and provision of a water meter and restoration to the pavement, curb, gutter, sidewalk, and utility strip. This portion of the water service is publicly owned. Private owners connect to a pipe left stubbed out of the meter box or vault.

Before County staff installs these services, Water Connection Service Charges are collected to cover the installation cost. Large water services (typically 3-inch and greater service connection size) typically serve developments such as multi-family residential and multi-story commercial buildings. Due to their complexity and variability, price quotes would be provided upon request should a developer opt to have the County install these connections. Developers do have the option to install the connections themselves and only require a meter installation from the County. After the services pass inspection by the County, County staff will install the water meter and charge a meter installation fee. The labor, equipment, and material costs vary with the size of the connection. These fees are intended only to recover the County's costs for the installation of water services.

To determine the cost of providing each of these services, County staff used a "bottom-up" approach (or activity-based costing), meaning costs for each service were developed based on labor and material costs to provide each service. For labor costs, staff provided the time required to conduct each service and the type of personnel involved in completing each service. Wage rates for each type of personnel were provided by staff based on existing labor costs. For material costs, staff relied upon historical material cost estimates. For equipment costs, staff relied on published Federal Emergency Management Agency (FEMA) equipment rates. The labor, material and equipment costs for each service were then totaled to determine the collective cost to provide each type of service.

The existing and proposed miscellaneous fees are shown below in Exhibit 33.

### Exhibit 33: Existing and Proposed Miscellaneous Fees

Miscellaneous Fees	Existing	Proposed
New Account Fee	\$25	\$25
Reactivation Fee	\$25	\$25
Discontinuation Fee	\$500	\$500
Flow Test Fee	\$300	\$300
Drainage Fixture Unit (DFU) Credit Inspection Fee	\$175; \$275/>25 fixtures	\$175; \$275/>25 fixtures
Utility Marking Fee	\$45	\$45
Hazardous Household Material Fee	\$20/television; 15/monitor	\$20/television; 15/monitor
Meter Installation Charge		
¾"	\$100	\$270
1 ½"	\$300	\$842
2"	\$600	\$1,075
3"	\$1,800	\$2,846
4"	\$2,000	\$3,892
6"	\$2,200	\$5,040
8"	\$3,000	\$8,063
Connection Fees		
1"	\$3,200	\$4,349
1 ½"	\$4,600	\$5,710
2"	\$4,800	\$6,601
3"	\$19,800	At Cost
4"	\$21,200	At Cost
6"	\$23,200	At Cost
8"	\$25,300	At Cost

The fees shown in this report represent a *maximum cost-justified* fee level. As shown, increases are warranted for Meter Installation Charges and Connection Fees. Should the “Proposed” fees not be implemented in-full, the County can programmatically phase in increases, but the phased-in charges may not recover the full cost of providing each service.

# 10. Findings & Conclusion

The cost of service results indicate that the County's rates and charges are consistent with commonly accepted rate-making principles, and that the rates provide equitable revenue recovery. If the County elects to change the rate structure, there are several pricing mechanisms that can improve the structure's alignment with the County's core values and pricing objectives. Raftelis recommends the following actions upon completion of the Study.

1. The County should adopt the recommended rate structure, described in Section 7.3.2, effective January 2022, which allows appropriate time for implementation and testing.
  - a. The County Board adopted the proposed rate structure, effective January 1, 2022, on April 20, 2021.
2. After the new rate structure is implemented, for future years, the County should continue programmatic, inflationary revenue increases that fully achieve system revenue requirements in alignment with the rate Model provided by Raftelis in conjunction with the annual budget process.
3. Raftelis recommends that the County adopt miscellaneous fees and infrastructure availability fees consistent with those calculated in this Study. Note that many of the fees calculated in this Study represent a *maximum cost-justified* fee level. The County has the flexibility to charge fees that are less than the fees calculated in this Study and to implement fee increases programmatically. Raftelis recommends the County revisit these fees every three-to-five years.
  - a. In addition to the proposed user charge structure, the County Board approved increases to water connection and meter installation charges in a two-step phase in. Infrastructure availability fees were also approved in a three-step phase in.

Finally, it is important to note that there are often differences between forecast and actual results because events and circumstances frequently do not occur as expected, and those differences may be material. We recommend that the County continually monitor the five-year financial plan to maintain their proactive approach to financial planning and rate setting. In the near-term, particular emphasis should be placed on monitoring any potential impacts associated with the COVID-19 pandemic. Upon completion of the Study, Raftelis will provide County staff with the final Model. The Model was developed in Microsoft Excel, built and designed specifically for the County, and is designed for continued use by County staff as a financial planning tool. The Model provides the flexibility to analyze various financial operating and capital scenarios and their impacts on utility rates.

# Appendix A

PUBLIC ENGAGEMENT

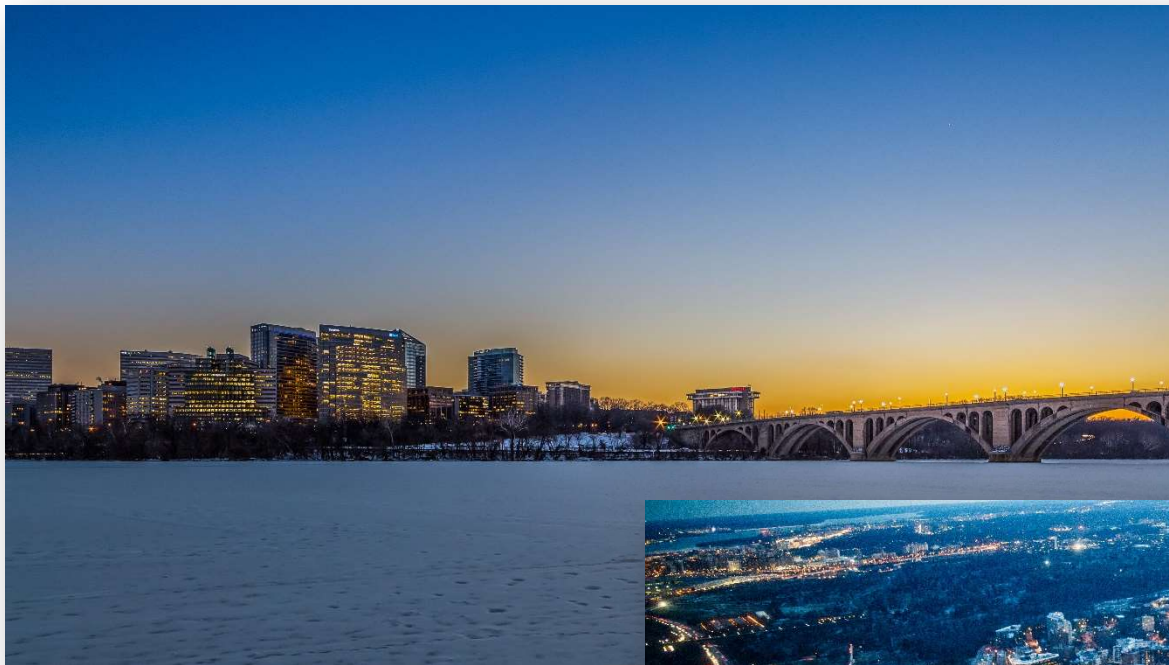


Arlington County Department of Environmental Services

# Water and Wastewater Rate Study

## Public and Stakeholder Involvement Process

### Engagement Summary



*Photo Credit: Josh Gruber*



*Photo Credit: Dennis Dimick*



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*Prepared by Kearns & West*

*Jason Gershowitz and Samantha Ramsey*





## I. Introduction

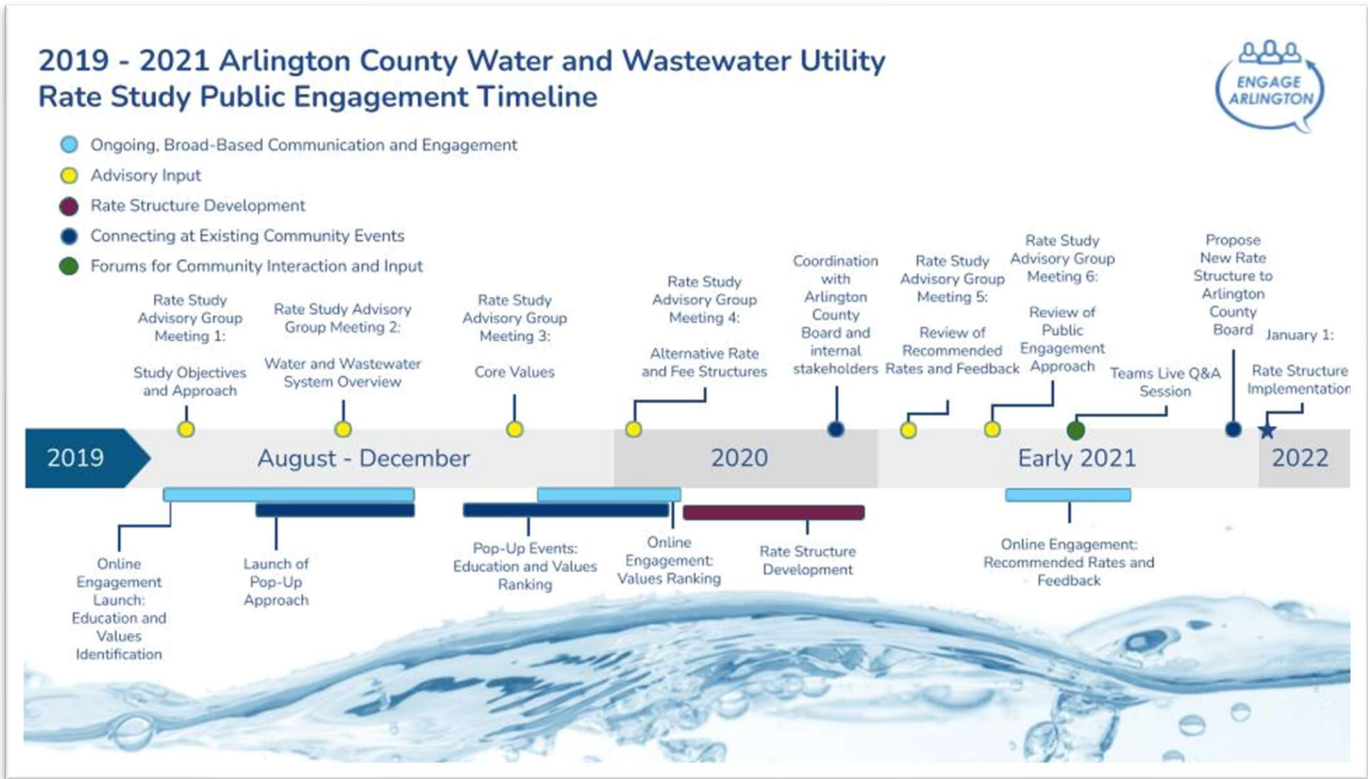
Between 2019 – 2021, Arlington County Department of Environmental Services (DES) engaged Raftelis Financial Consultants, Inc (Raftelis), to perform a comprehensive Water and Sewer Cost of Service and Rate Study (Study). This study is the County’s first since 2004, and it is a best practice to conduct this analysis regularly to ensure continued alignment of cost-of-service principles and community values. The Study assessed the existing rate and fee structures and modeled rate structure alternatives. Ultimately, the Study provided a multi-year financial plan and rate structure recommendations to serve County financial objectives, address evolving needs, and align with the priorities and values of the community.

As part of this analysis, the County engaged with utility customers from a broad and representative range of backgrounds and interests, including residents, businesses, government, commissions, local civic associations, and others to gather feedback and input regarding the community values which informed the rate structure recommendation. These efforts aligned with the County’s core set of public engagement values, which serve as the cornerstone of building a structure of trust and accountability between the County and its constituents. These values include:

- Inclusion and Mutual Respect
- Early Involvement and Timely Communication
- Transparency and Accountability
- Clear and Accessible Communication
- Open, Two-way Communication
- Fiscal Sustainability
- Continuous Improvement

In all engagement efforts, Arlington County sought to manage an inclusive, transparent process through which it could educate the public about the existing rate structure and potential alternatives while offering avenues for community members to share their input and perspectives on the community values, priorities, and rate structure alternatives. Key components of the public involvement process for the Study were the Rate Study Community Advisory Group (RSCAG), broader community outreach, and focused outreach to additional stakeholder communities, organizations, and agencies.

The public involvement process was integrated into the technical Study to create an iterative process that was informed by research and analysis and productive conversations between technical experts and key community stakeholders. Robust public engagement and feedback have been critical to the success of the Study. The



engagement process will help the County develop community-informed rates that support safe, reliable, and environmentally-sound water and wastewater service.

## II. Rate Study Community Advisory Group

In support of the engagement and Rate Study process, the County convened a Rate Study Community Advisory Group (RSCAG) to serve in a representative and advisory capacity. RSCAG members were selected to represent various segments of the County’s water and wastewater utility customer base, including single-family and multi-family residential, commercial, low-to-moderate income and senior populations, environmental, fiscal matters, and the development community.

### a) Role in the Study

The RSCAG was charged with representing the interests and views of their respective interest groups; communicating regularly with their interest group to liaise with and convey the opinions of the interest group to the project team; and, working collaboratively with each



*The first meeting of the Rate Study Community Advisory Group in the Arlington Central Library.*



other, County staff, and consultants to inform the development of the Study and effectively balance the needs and interests of all stakeholders.

The RSCAG convened six times throughout the Study to offer feedback on the Study as it progressed, prioritize community values, and inform the broader public engagement process. RSCAG meetings were facilitated by Kearns & West, a neutral stakeholder engagement firm, to ensure an open process where RSCAG interests, opinions, and views were heard and thoughtfully considered. The section below summarizes the purpose of each RSCAG meeting.

- i. **RSCAG Meeting 1:** The purpose of this meeting was to share an overview of Arlington County’s Water and Wastewater Utility Rate Study background and purpose, gain a deeper understanding of the rate structure and scope, and learn about the County’s approaches to public engagement. View the meeting minutes from RSCAG Meeting 1 [here](#).<sup>1</sup>
- ii. **RSCAG Meeting 2:** In this meeting the RSCAG was introduced to core values and how they inform the rate setting process, followed by a presentation of alternative rate designs. County staff also presented a utilities financial overview offering insight on the utilities fund and operating budget. View the meeting minutes from RSCAG Meeting 2 [here](#).<sup>2</sup>
- iii. **RSCAG Meeting 3:** RSCAG members participated in a values prioritization activity to provide feedback on the core community values that should be prioritized when developing the rate structure. Conservation and Affordability were the most highly prioritized values amongst the RSCAG. Utility Financial Stability and Rate Stability were the second prioritized values. Members offered detailed explanations to support how they prioritized the values. During this meeting, RSCAG members also reviewed summary results and feedback from the online Community Values questionnaires. View the meeting minutes from RSCAG Meeting 3 [here](#).<sup>3</sup>
- iv. **RSCAG Meeting 4:** The purpose of this meeting was to address special topics that had been highlighted by the RSCAG and gather insights on how to incorporate them into the rate structure. The special topics



Rate Study Community  
Advisory Group Members  
with representative group  
noted

**Regina Boston**, Development  
Community

**Lily Duran**, Residential – Vulnerable  
Population (Lower-income)

**Matt Gerber**, Commercial Customers  
(Large)

**Heitham Ghariani**, Residential –  
Multi-family Dwelling (Condo)

**Kathleen Harrison**, Residential –  
Single-Family/Townhome Dwelling

**Herschel Kanter**, Residential –  
Vulnerable Population (Senior)

**Daniel Logan**, Commercial Customers  
(Small)

**Michael Mesmer**, Environmental

**Bob Orttung**, Residential – Single-  
Family/Townhome Dwelling

**Nora Palmatier**, Environmental

**Peter Robertson**, Fiscal Affairs  
Advisory Commission (FAAC)

**Rafael Sampayo**, Residential – Multi-  
Family Dwelling



<sup>1</sup> [https://arlingtonva.s3.amazonaws.com/wp-content/uploads/sites/4/2019/11/RSCAG-Meeting1-Minutes\\_FINAL.pdf](https://arlingtonva.s3.amazonaws.com/wp-content/uploads/sites/4/2019/11/RSCAG-Meeting1-Minutes_FINAL.pdf)

<sup>2</sup> <https://arlingtonva.s3.amazonaws.com/wp-content/uploads/sites/4/2019/11/RSCAG-Meeting-2-Summary-FINAL-112519.pdf>

<sup>3</sup> <https://arlingtonva.s3.amazonaws.com/wp-content/uploads/sites/4/2020/02/RSCAG-Meeting-3-FINAL-021120.pdf>



addressed included affordability, outdoor use (irrigation) and wastewater billing, cooling towers, and water that leaks into the ground. View the meeting minutes from RSCAG Meeting 4 [here](#).<sup>4</sup>

- v. **RSCAG Meeting 5:** The RSCAG was convened in this meeting to review the proposed rate structure and to provide feedback to the project team on how the community values were incorporated into the structure. The County also reviewed the process and timeline of proposing the new structure to the County Board and reviewed the public engagement timeline. View the meeting minutes from RSCAG Meeting 5 [here](#).<sup>5</sup>
- vi. **RSCAG Meeting 6:** The purpose of this meeting was to hear feedback from the RSCAG on the County’s public outreach plan and learn how to best conduct outreach to their affiliated interest groups or communities. View the meeting minutes from RSCAG Meeting 6 [here](#).<sup>6</sup>

#### *b) Core Values*

One of the early contributions of the RSCAG was the prioritization of community values to guide the Study’s analysis and recommendations. The prioritization exercise was conducted during the third meeting and moderated by Kearns & West in an interactive and informal activity. Each RSCAG member was given three circular stickers: two red and one green. The green stickers were used to identify RSCAG members’ first value choice, while the red stickers were used to show members’ secondary choices.

Conservation and Affordability were the most highly prioritized values amongst RSCAG members during this activity. Conservation received two top priority stickers and four secondary priority stickers and Affordability received two top priority stickers and three-second priority stickers. Utility Financial Stability and Rate Stability were the second highest-rated values. Conversely, Economic Development did not receive any stickers from RSCAG members during the prioritization activity. A complete summary of the exercise to include RSCAG reactions and comments on the prioritized values can be found in the RSCAG Meeting 3 summary [here](#).<sup>7</sup>

#### *c) Letter of Support*

At the end of the Water and Wastewater Rate Study process, the RSCAG drafted a Letter of Support to the Arlington County Board to share feedback on the engagement process and share their support for the Rate Study process. Two RSCAG members shared the quotes below to be included within the letter.



*RSCAG members touring the Water Pollution Control Plant in Arlington, VA.*

<sup>4</sup> [https://arlingtonva.s3.amazonaws.com/wp-content/uploads/sites/4/2020/03/RSCAG-Meeting-4\\_MinutesFINAL.pdf](https://arlingtonva.s3.amazonaws.com/wp-content/uploads/sites/4/2020/03/RSCAG-Meeting-4_MinutesFINAL.pdf)

<sup>5</sup> <https://water.arlingtonva.us/wp-content/uploads/sites/4/2021/01/RSCAG-Meeting-5-Meeting-Summary-FINAL.pdf>

<sup>6</sup> [https://water.arlingtonva.us/wp-content/uploads/sites/4/2021/03/RSCAG-Meeting-6\\_Meeting-SummaryFINAL.pdf](https://water.arlingtonva.us/wp-content/uploads/sites/4/2021/03/RSCAG-Meeting-6_Meeting-SummaryFINAL.pdf)

<sup>7</sup> <https://arlingtonva.s3.amazonaws.com/wp-content/uploads/sites/4/2020/02/RSCAG-Meeting-3-FINAL-021120.pdf>



*“I think the community values of Conservation and Affordability are well reflected in the rate structure. Using the winter time use for determining fees meets the issue of not penalizing those who water their trees and that was the concern of the Urban Forestry Commission.” – Nora Palmatier*

*“The County Water and Wastewater Rate Study was conducted in a clear and transparent manner with an engagement process which persisted through COVID related challenges. The RSCAG quickly went online to continue its business and reach a broader community audience.” – Rafael Sampayo*

The full letter of support can be found [here](#).<sup>8</sup>

### III. Community Outreach and Engagement

The second component of the outreach program was a focused investment in the broader engagement of the Arlington County community. The priority of this engagement effort was to solicit input from the wider scope of County constituents and use the input to inform core recommendations for the Study. Significant attention was given to creating numerous paths to involvement in and education of the Study so that residents in varying demographics with varying levels of knowledge could participate.

#### *a) Stakeholder Interviews*

Arlington County conducted 12 interviews with County officials and key stakeholders who work directly with populations across Arlington. Interviewees were selected based upon their experience working with or alongside members of the Arlington County community. Those interviews provided important background into the needs and challenges associated with effectively reaching a diverse and representative cross-section of the Arlington community, proven tools and technologies for informing the public about major Arlington County initiatives, and community partners and civic organizations well versed in interacting with Arlington residents. Findings and insights into these interviews informed the Public Engagement Plan for the Study.

#### *b) Pop-up Events*

Throughout the first year of the Study, Arlington County participated in a series of pop-ups or appearances at existing community and neighborhood events. These pop-up events offered education about the Study, water and wastewater utility services in Arlington County and solicited feedback on community values associated with the Study. Additionally, they served as valuable opportunities to interact with community members and build awareness about the overall Study and engagement effort.

Pop-Up Events

- The Latino American Festival, Oct 4, 2019**
- Immunization Clinics at Department of Human Services, Oct 22 & Nov 5, 2019**
- Community Progress Network Roundtables, Oct 17, 2019**
- Arlington Economic Development’s Arlington Premiere, Dec 4, 2019**

<sup>8</sup> <https://water.arlingtonva.us/wp-content/uploads/sites/4/2021/04/RSCAG-Letter-of-Support-to-County-Board-4.9.21.pdf>



As the Study evolved, pop-up engagements transitioned to educating community members on community values and how they inform a rate structure. During all pop-up events, the County employed a variety of informative materials and engagement methods, including educational information, questionnaires, self-guided engagement activities and interactions with County technical experts.

*c) Community Organization and Association Briefings*

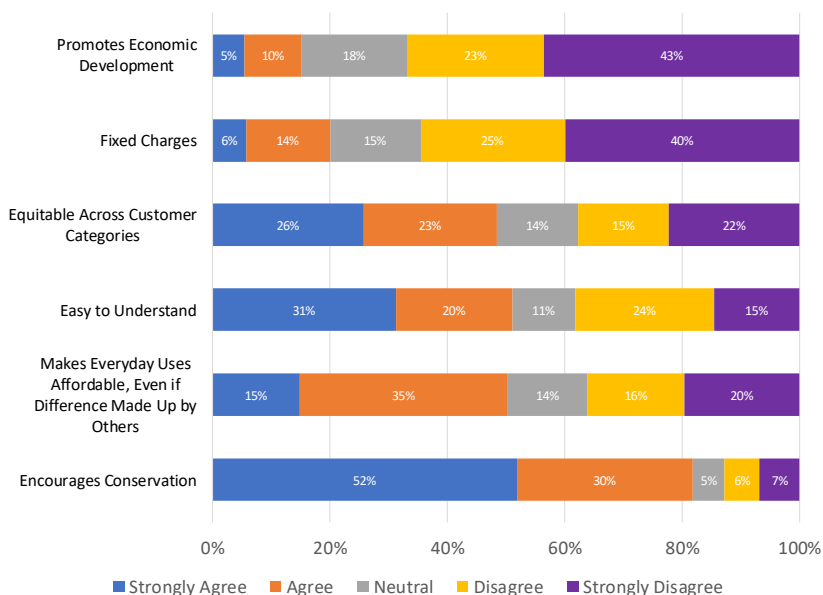
Staff were available to brief interest groups and community organizations throughout the project. Project updates were communicated to civic association leaders via email updates. Prior to COVID restrictions, staff presented in-person at the Barcroft Neighborhood Association on March 5, 2020. These engagement activities were a means to keep the community informed of the study and its outcomes as the project progressed.



*Arlington County participating in pop-up events at local community events.*

*d) County-Wide Digital Engagement*

There were two community-wide digital engagement initiatives during the Study. The first was launched through Engage Arlington and solicited community feedback on core values that should be prioritized when developing a rate structure. The site launched on December 16, 2019 and remained open until January 17, 2020 and contained “Community Values” questionnaires, as well as an educational water trivia page.



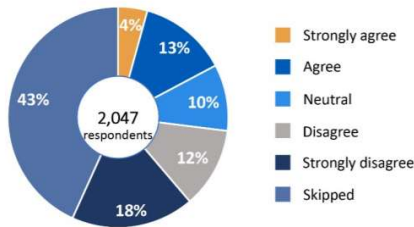
*Respondents' values feedback*

From a provided list of community values, the site allowed respondents to prioritize their top values and provided an opportunity to submit comments about other concerns and issues. In total 2,329 submissions were made to the values questionnaires. Respondents rated conservation and affordability as top values. This chart shows the degree to which respondents agree or disagree that each community value should be a top priority in the development of a rate structure. Respondents could also provide comments through an open-ended text



field. This feature highlighted an overwhelming need to include non-wastewater water usage as a priority in the rate structure development. A full summary of findings can be found on the [project page](#).<sup>9</sup>

Do you agree that the proposed rate structure is aligned with the community's prioritized values of conservation, affordability, equity across customer categories and revenue stability?



*Respondents' feedback on the proposed rate structure*

The second community-wide engagement occurred following the development of the proposed alternative water and wastewater rates and fees. This engagement effort was originally intended to be an in-person community workshop, however, the pandemic necessitated a virtual format. The engagement launched on February 10, 2021 and closed on February 28, 2021. A total of 2047

responses were received. This initiative offered respondents the opportunity to learn about the proposed rate structure, explore its impact using an interactive bill calculator, and provide feedback through an online questionnaire. As part of this engagement effort, the County hosted a live virtual community forum (February 17, 2021) which included a presentation on the proposed rate structure and a Q&A session to address concerns from the community and to collect feedback. A recording of the forum can be found [here](#).<sup>10</sup> A summary report and comments from the online questionnaire on the proposed rate structure can be found [here](#).<sup>11</sup>

#### IV. Outreach Materials

Well-crafted, branded informational materials developed throughout this project contributed to productive public and stakeholder involvement. Print materials, infographics and digital tools, were utilized through the public engagement process, both in-person and virtually, to aid in public participation and understanding of the Study. These materials were used to educate the public about the County's water and wastewater services and communicate the Study's community values, proposed rate structure alternatives, and the timeline for engagement and possible implementation.

##### *a) Print Materials*

Print materials were developed during the Study to educate community members on the Study and promote in-person and virtual engagement. A variety of handouts were used during the pop-up events to educate community members on the County's water and wastewater utility and the Study's community values.

<sup>9</sup> <https://water.arlingtonva.us/water-and-wastewater-utility-rate-study/>

<sup>10</sup> <https://www.youtube.com/watch?v=EZ-eCuZqYvY>

<sup>11</sup> [https://water.arlingtonva.us/wp-content/uploads/sites/4/2021/03/ProposedRateStructure\\_SurveySummary\\_033021.pdf](https://water.arlingtonva.us/wp-content/uploads/sites/4/2021/03/ProposedRateStructure_SurveySummary_033021.pdf)



The County also developed postcard mailers to promote the second community-wide survey and inform residents of the public webinar to review the proposed rate structure. This postcard mailer was sent to the entire customer base with a distribution of approximately 37,600.

**FACT SHEET:**  
**Water and Wastewater Utility Rate Study**  
 September 2019

**Summary**  
 Arlington County is conducting a utility rate study that will review the costs associated with water and wastewater services. This is the first study of this type since 2004 and will involve selection of a rate structure to meet the long term costs of supporting the delivery of safe, high-quality and reliable water services and the collection and treatment of wastewater.

**Project Overview**  
 Arlington County provides potable water and wastewater service to residential and commercial customers and collects rates and charges to pay for the cost of these services. Water and wastewater rates and charges fund all operating and capital needs, including the purchase of water from the Washington Aqueduct, operation and maintenance of our water distribution system, wastewater collection and treatment, customer service and billing, and infrastructure rehabilitation and replacement.

**What goes into the rate structure?**  
 Rates for water and wastewater services are based directly on the number of gallons of water used by residents and businesses.

**Water usage is measured by a water meter installed either to each residence or business. Wastewater services are charged based on the amount of water used as determined by the water meter readings.**

The County is beginning a Water and Wastewater Utility Cost of Service and Rate Design Study to help ensure that sufficient revenues are recovered through our rates and that the rate and fee structure are aligned with the County's financial objectives and community values.

The Study process will include:

- Educating the Arlington community on the study's objectives; conducting a cost of service and revenue analysis which includes historical data and forecast for future consumption/usage and gathering feedback from the community on core values that should inform the rate. This will include significant input from a Rate Study Community Advisory Group (RSCAG), which will serve in an advisory capacity to represent the diverse utility and customer base in Arlington. Broader public engagement will continue in parallel to the RSCAG.
- Development of rate alternatives. The analyses will consist of rates necessary to generate sufficient revenues, identification of rate components applicable to each customer class and its impacts.

**Next Steps**  
 The Utility Rate Study's public process is augmented through the convening of a Rate Study Stakeholder Advisory Group, as well as broader community engagement opportunities through traditional and non-traditional methods (public workshops, pop-ups and online feedback forms). These activities will occur in the fall of 2019 through winter 2019-2020.

These activities will culminate with a proposed rate structure alternative that will be taken to the County Board for consideration.

\*Arlington will be a diverse and inclusive world-class urban community and ensure effective residential and commercial neighborhoods where people unite to learn, create, innovate, and prosper. Sustainability, community and urban form are important.

**Share Your Thoughts on the County's Proposed Water and Wastewater Utility Rate Structure**

Arlington County has completed a review of the current rate structure for water and wastewater services. Our project team has incorporated feedback we received from our customers and stakeholders into a proposed rate structure that reflects the prioritized values and concerns of our community. Now, we're interested in hearing your thoughts!

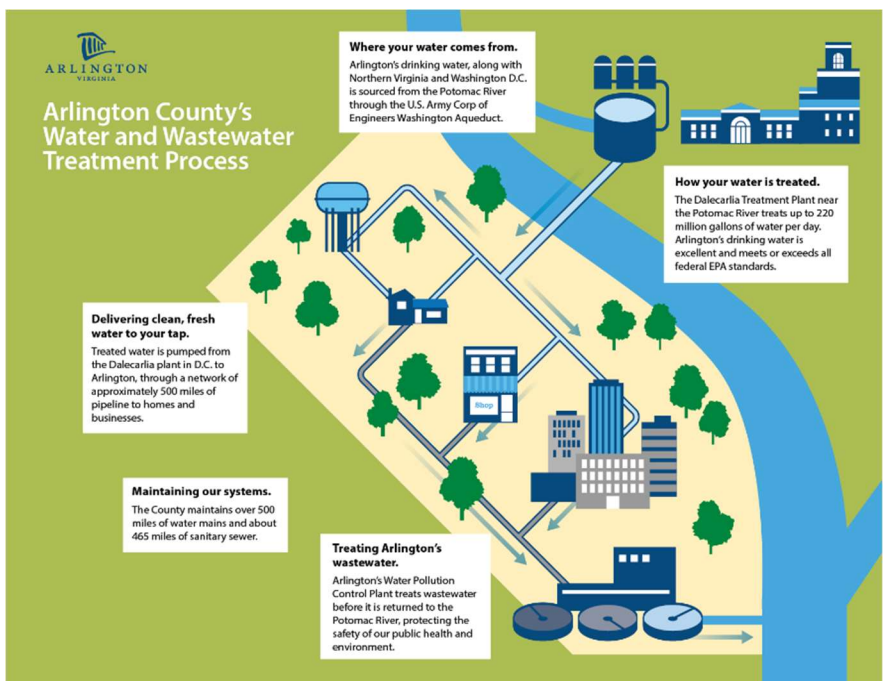
**Learn more and get involved today! ¡Aprenda más e involúcrese hoy!**  
[water.arlingtonva.us/water-and-wastewater-utility-rate-study/](http://water.arlingtonva.us/water-and-wastewater-utility-rate-study/)

**Comparta sus opiniones sobre la estructura de tarifas de servicios públicos de agua y aguas residuales propuesta**

El condado de Arlington ha terminado la revisión de la estructura de tarifas actual para los servicios de agua y aguas residuales. Nuestro equipo de proyecto ha incorporado los comentarios que recibimos de nuestros clientes y nuestras partes interesadas en una estructura de tarifas propuesta que refleja las inquietudes y los valores prioritarios de nuestra comunidad. Ahora estamos interesados en escuchar sus opiniones.

*b) Infographics*

The project team developed an Arlington County Water Infographic to detail the County's water and wastewater treatment process. This graphic was used throughout the public engagement process to educate residents on where drinking water comes from, how wastewater is treated and the infrastructure that sustains this system for the County.

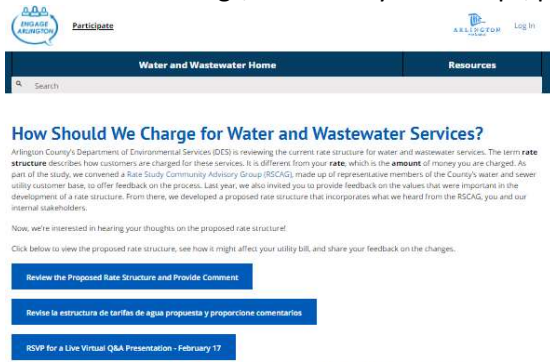






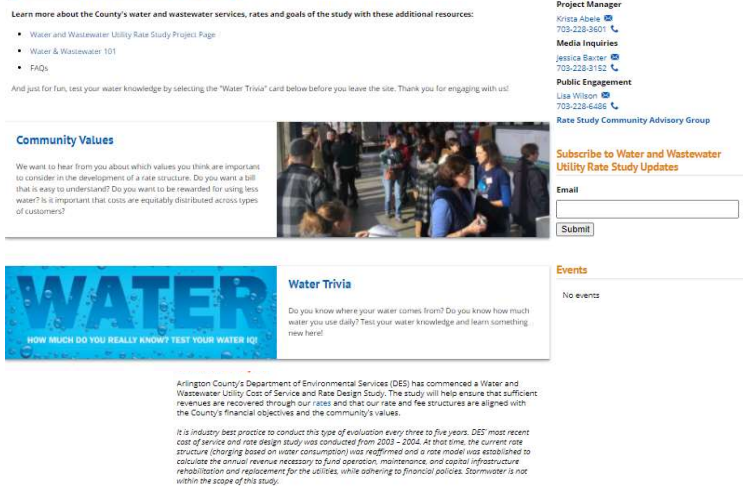
c) Digital

i. **Project Page (Arlington County Website):** A project webpage, hosted on Arlington County’s website serves as a one-stop-shop for project updates, information about hosted events, and accessing resources related to the project. Throughout the project, the webpage was regularly updated and serves as a document repository with resources from Rate Study Community Advisory Group meetings, community workshops, pop-events, briefings, and outcomes from online engagements. The



webpage clearly defined the scope of the Study, public engagement events, and background resources on Arlington County’s utilities fund. The site offered contact information for project leads, as well as a registration link to subscribe to Study updates which were distributed via email during the project. Importantly, the project webpage also offered multi-lingual resources with content translated into Spanish.

ii. **Engage Arlington:** The project utilized the County’s 76 Engage public engagement platform as an interactive tool for accessing information about the Study, participating in online feedback, and learning more about water services within Arlington County through interactive trivia games and video. Participants of the first community-wide digital engagement prioritized community values that should be considered in the development of the rate structure by opting in to complete one or more questionnaires around values that resonated with them.



ii. **Survey Monkey:** Arlington County utilized the Survey Monkey platform to host the second community-wide engagement initiative. The virtual engagement offered residents the opportunity to view the proposed rate structure in the context of their customer class, as a single-family resident, commercial business owner, or multi-family property owner or manager, explore the impacts on their utility bill, and share feedback in a questionnaire. A text field in the questionnaire provided an opportunity for respondents to provide open comments on the proposed rate structure.



iv. **Interactive Rate Structure Documents:** As part of the second community-wide engagement initiative, interactive documents for each customer class were developed to educate participants on the new components of the proposed rate structure and how they align with the community’s prioritized values and concerns. By selecting icons, users could learn more about each component through more detailed text or video. The document also provided a comparison between the existing rate structure and the proposed rate structure. View the Interactive Rate Structure Documents here: [Single-Family Residential Proposed Rate Structure](#),<sup>12</sup> [Commercial Proposed Rate Structure](#),<sup>13</sup> [Multi-Family Proposed Rate Structure](#).<sup>14</sup>

### Explore the Proposed Single-Family Residential Rate Structure

The single-family residential rate structure applies to any residential account that is individually metered by the County, to include detached homes and most townhomes and duplexes.

#### How it works:

Explore the proposed rate structure by clicking the icons to learn more.

- Learn more about new components of the rate structure
- Watch to learn more about the new rate structure

Currently the County has a simple rate structure, meaning all customers pay the same rate for the volume of water used. In the proposed rate structure, different classes of customers would pay different rates based on the demand each places on the water system, addressing the value of **equity among customer classes**. Customers can be classified as residential, commercial or multi-family.

In addition, the proposed rate structure for single-family residents introduces a base rate, tiered water consumption and average winter quarter billing for sewer. Click the icons below to see how the new components align with the prioritized values.

#### Existing Structure

(per Thousand Gallons (TG) metered usage)

FY 2021	Quarterly Rates		
	Water	Sewer	Total
All Customers*	\$4.91	\$9.29	\$14.20
FY 2022*			
All Customers	\$5.08	\$9.62	\$14.70

\*This rate is for illustrative purposes only. The County is finalizing the proposed FY 2022 budget and proposed water/sewer rate.

#### Proposed Structure

(per Thousand Gallons (TG) metered usage, base charge per quarter)

FY 2022	Quarterly Rates		
	Water	Sewer	Total
Base Charge (per quarter)	\$13.47	\$11.09	\$24.56
<b>Water Volume/Consumption</b>			
Tier 1 (0-9 TG)	\$3.84	\$9.78	\$13.62
Tier 2 (>9 TG)	\$6.14	\$9.78	\$15.92
<b>Sewer Billing</b>			
Average Winter Consumption			



v. **Water Bill Calculator:** As part of the engagement process, the project team developed a Water Bill Calculator. Through this feature, residents were able to enter specific information, such as their account number, to pull up their water bill and see how the proposed rate structure might impact their bill. Customers also had the ability to overwrite their consumption to understand how their quarterly bill would be impacted if they increased or decreased their water consumption patterns. Explore the impacts of the proposed rate structure using the Water Bill Calculator [here](#).<sup>15</sup>

### Arlington Water and Wastewater Bill Calculator

To calculate your utility bill, enter your Account Number & Address Number:

Account Number (0987654321000):   
 Address Number (101 Main St):

**Note:** This calculator tool is designed to demonstrate how the proposed water/wastewater rate structure changes may affect your future water/wastewater bill. It is based on calendar year 2020 water consumption and Fiscal Year (FY) 2021 rates, and compares charges under the existing rate structure with charges under the proposed rate structure. Actual costs incurred will be dependent upon actual use and the specific rates the County Board adopts as part of the FY22 budget process.

If you have trouble finding your account information, select the "Forgot Account Number" button below. This will populate the tool with data for a typical residential customer. You can also modify the consumption fields to view different scenarios and bill impacts. If you wish to access your account information, please visit: [My Utilities](#). If you need further assistance with this tool, contact Customer Service at 703-228-5000, 7am-7pm, Mon-Fri.

Your Account Information			
Account Number	SAMPLE BILL		
Address			
Customer Type	Residential		
Median Quarterly Usage (TG or 1,000 gal)	12		
Winter Quarterly Usage (TG)	10		
<input type="button" value="Re-Calculate Bill"/>			
Your Quarterly Bill			
	Existing	Proposed	Change
<b>Water Charges</b>			
Quarterly Base Charge (Dues)	\$0.00	\$12.98	\$12.98
Volume Charge (per TG)			
All Usage	\$58.92		
Tier One (0-9 TG)		\$33.48	
Tier Two (>9 TG)		\$17.85	
<b>Total Water Bill</b>	\$58.92	\$64.31	\$5.39
<b>Wastewater Charges</b>			
Quarterly Base Charge (Dues)	\$0.00	\$10.62	\$10.62
Volume Charge (per TG)			
All Usage	\$111.48		
Winter Period Use		\$94.50	
<b>Total Wastewater Bill</b>	\$111.48	\$105.12	(\$6.36)
<b>Total Quarterly Bill</b>	\$170.40	\$169.43	(\$0.97)

<sup>12</sup> <https://indd.adobe.com/view/54ce0132-46cd-42d4-8995-c0317ac4752f>

<sup>13</sup> <https://indd.adobe.com/view/db49cbca-0725-48d3-89c3-7a1be4d8a069>

<sup>14</sup> <https://indd.adobe.com/view/c040abc9-8f8f-4aa7-834d-9fa0e748afe2>

<sup>15</sup> <https://waterbillcalculator.arlingtonva.us/>



## V. Conclusion

Arlington County would like to thank the public and the RSCAG for their role in supporting and advancing the Water and Wastewater Rate Study. The community input shared represents great opportunities to coalesce around prioritized community values for water use and align rate structure components for each customer class.

The County would also like to thank Raftelis for their support in the technical process and Kearns & West for their support in the engagement process.

For additional information, please contact Lisa Wilson at [llwilson@arlingtonva.us](mailto:llwilson@arlingtonva.us).

# **Appendix B**

COST OF SERVICE SCHEDULES



Arlington County  
 2020 Financial Planning & Rate Model  
 Water COS Summary

2. Water Revenue Requirement Functionalization

	Test Year	Source of Supply / Treatment	Pumping	Storage	Transmission	Distribution	Billing / Meter Reading	Customer Service	General Infrastructure	All Other
Customer Service	\$ 889,513						5.6%	94.4%		
Water Pollution Control Plant	-									100.0%
Water Sewer Engineering	298,121								100.0%	
DES Operations Support	565,283				29.2%	70.8%				
DES Water System Operations	3,713,440		11.0%	5.0%	24.5%	59.5%				
DES Water Construction & Maintenance	7,049,746				29.2%	70.8%				
DES Meter Readers	1,074,046						100.0%			
DES Sanitary Sewer Systems	-									100.0%
DES WSS Engineering	1,165,643								100.0%	
Water Purchases	9,351,961	100.0%								
Other Operating Expenses	3,748,139									100.0%
Inter-Agency Charges	-									100.0%
<b>Total: Water O&amp;M Expenses</b>	<b>\$ 27,855,892</b>	<b>\$ 9,351,961</b>	<b>\$ 408,478</b>	<b>\$ 185,672</b>	<b>\$ 3,129,288</b>	<b>\$ 7,605,031</b>	<b>\$ 1,123,499</b>	<b>\$ 840,060</b>	<b>\$ 1,463,764</b>	<b>\$ 3,748,139</b>

3. Summary O&M Expense Functional Category Allocations

	Test Year	Source of Supply / Treatment	Pumping	Storage	Transmission	Distribution	Billing / Meter Reading	Customer Service	General Infrastructure	All Other
Total Allocation	\$ 27,855,892	\$ 9,351,961	\$ 408,478	\$ 185,672	\$ 3,129,288	\$ 7,605,031	\$ 1,123,499	\$ 840,060	\$ 1,463,764	\$ 3,748,139
All Other Infrastructure Reallocation	100.0%	45.2%	2.0%	0.9%	15.1%	36.8%				
<b>Total All Other Infrastructure</b>	<b>\$ 1,463,764</b>	<b>661,933</b>	<b>28,912</b>	<b>13,142</b>	<b>221,491</b>	<b>538,285</b>				
All Other General Reallocation	100.0%	41.5%	1.8%	0.8%	13.9%	33.8%	4.7%	3.5%		
<b>Total Reallocated All Other General</b>	<b>\$ 3,748,139</b>	<b>1,556,904</b>	<b>68,003</b>	<b>30,910</b>	<b>520,960</b>	<b>1,266,077</b>	<b>174,675</b>	<b>130,608</b>		
<b>Total After Reallocation</b>	<b>\$ 27,855,892</b>	<b>\$ 11,570,799</b>	<b>\$ 505,394</b>	<b>\$ 229,724</b>	<b>\$ 3,871,740</b>	<b>\$ 9,409,393</b>	<b>\$ 1,298,174</b>	<b>\$ 970,668</b>		
Allocation %		41.5%	1.8%	0.8%	13.9%	33.8%	4.7%	3.5%		

4. Capital Cost Allocation to Functional Categories

	Test Year	Source of Supply / Treatment	Pumping	Storage	Transmission	Distribution	Billing / Meter Reading	Customer Service	General Infrastructure	All Other
Existing Debt	\$ 355,734		0.5%	0.5%	28.9%	70.1%				
Proposed Debt	-		0.5%	0.5%	28.9%	70.1%				
AWT Debt	-		0.5%	0.5%	28.9%	70.1%				
Rate Funded Capital (PAYGO)	7,250,000		0.5%	0.5%	28.9%	70.1%				
Transfer to Operating Reserve	-		0.5%	0.5%	28.9%	70.1%				
Transfer to Capital Reserve	-		0.5%	0.5%	28.9%	70.1%				
<b>Total: Water O&amp;M Expenses</b>	<b>\$ 7,605,734</b>	<b>\$ -</b>	<b>\$ 37,980</b>	<b>\$ 37,980</b>	<b>\$ 2,195,093</b>	<b>\$ 5,334,680</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>







**Arlington County**  
 2020 Financial Planning & Rate Model  
 Water COS Summary

**9. Cost of Service by Customer Class**

	Base	Max Day	Max Hour	Customer Service	Billing / Meter Reading	Private Fire	Total
<b>Unit Costs of Service</b>	\$ 2.52	\$ 527.89	\$ 92.02	\$ 24.99	\$ 7.02	n/a	
Commercial							
Unit Costs (\$/unit)	\$ 2.52	\$ 527.89	\$ 92.02	\$ 24.99	\$ 7.02	\$ -	
Units of Service	2,036,487	6,416	13,670	1,631	19,572	-	
Cost of Service	5,134,285	3,387,138	1,257,939	40,752	137,328	-	9,957,442
County Agency							
Unit Costs (\$/unit)	\$ 2.52	\$ 527.89	\$ 92.02	\$ 24.99	\$ 7.02	\$ -	
Units of Service	154,715	445	975	320	3,840	-	
Cost of Service	390,060	234,950	89,717	7,995	26,944	-	749,665
Residential							
Unit Costs (\$/unit)	\$ 2.52	\$ 527.89	\$ 92.02	\$ 24.99	\$ 7.02	\$ -	
Units of Service	1,856,071	5,339	11,696	33,571	134,285	-	
Cost of Service	4,679,428	2,818,624	1,076,302	838,807	942,218	-	10,355,379
Apartments							
Unit Costs (\$/unit)	\$ 2.52	\$ 527.89	\$ 92.02	\$ 24.99	\$ 7.02	\$ -	
Units of Service	2,803,092	7,296	16,127	1,585	19,017	-	
Cost of Service	7,067,009	3,851,361	1,484,119	39,596	133,432	-	12,575,517
Fort Myer							
Unit Costs (\$/unit)	\$ 2.52	\$ 527.89	\$ 92.02	\$ 24.99	\$ 7.02	\$ -	
Units of Service	122,612	403	840	1	12	-	
Cost of Service	309,124	212,798	77,283	25	84	-	599,314
<b>Total</b>	<b>\$ 17,579,905</b>	<b>\$ 10,504,871</b>	<b>\$ 3,985,360</b>	<b>\$ 927,175</b>	<b>\$ 1,240,007</b>	<b>\$ -</b>	<b>\$ 34,237,318</b>

**10. COS vs. Revenue at Existing Rates**

Customer Classes	Revenue @ Existing Rates	Cost of Service	Difference (%)	Difference (\$)
Commercial	\$ 9,999,152	\$ 9,957,442	-0.4%	\$ (41,710)
County Agency	759,651	749,665	-1.3%	(9,986)
Residential	9,113,307	10,355,379	13.6%	1,242,073
Apartments	13,763,182	12,575,517	-8.6%	(1,187,665)
Fort Myer	602,026	599,314	-0.5%	(2,712)
<b>Total System</b>	<b>\$ 34,237,318</b>	<b>\$ 34,237,318</b>	<b>0.0%</b>	<b>\$ (0)</b>

**Arlington County**  
 2020 Financial Planning & Rate Model  
 Water Determination of Peaking Factors by Class

**Treatment Statistics: Washington Aqueduct**  
**Max Day (MGD)**

CY 2017	32.37
CY 2018	33.71
CY 2019	36.96

**Treatment Statistics: Washington Aqueduct**  
**Average Day (MGD)**

CY 2017	21.48
CY 2018	21.42
CY 2019	21.59

**Max Day to Average Day Ratio**  
**Washington Aqueduct**

CY 2017	1.51
CY 2018	1.57
CY 2019	1.71
3-Year Average	1.60

Billing Data by Month	July	August	September	October	November	December	January	February	March	April	May	June	Max	Average	MM/AM Factor
<b>Use Per Account</b>															
<u>Apartment</u>															
FY 2018	152.8	157.7	150.6	174.0	138.7	141.5	134.0	140.6	136.7	118.9	147.0	140.3	174.0	144.4	1.20
FY 2019	157.5	150.9	176.8	156.7	134.3	149.0	125.5	134.8	145.2	124.2	140.9	113.5	176.8	142.4	1.24
<u>Commercial</u>															
FY 2018	120.0	140.6	117.5	136.6	116.2	92.7	90.8	86.3	89.3	77.1	100.0	110.9	140.6	106.5	1.32
FY 2019	122.1	132.2	142.3	121.0	101.5	101.9	75.9	77.3	87.4	79.2	100.7	81.3	142.3	101.9	1.40
<u>County Agencies</u>															
FY 2018	54.0	53.4	46.5	54.6	51.0	35.4	31.7	38.1	37.5	31.3	36.6	49.8	54.6	43.3	1.26
FY 2019	58.6	48.0	59.1	58.6	45.4	45.1	35.9	32.9	40.3	37.6	41.2	39.3	59.1	45.2	1.31
<u>Residential</u>															
FY 2018	13.1	13.4	16.4	14.6	13.7	15.0	13.5	12.2	13.2	12.3	11.1	12.5	16.4	13.4	1.22
FY 2019	12.9	12.5	15.5	13.9	12.4	13.9	12.2	11.7	13.0	12.4	11.4	12.5	15.5	12.9	1.21
<u>Fort Myers</u>															
FY 2018	7,150.0	6,540.0	6,289.0	6,260.0	5,567.0	7,696.0	8,190.0	10,711.0	9,742.0	8,784.0	12,855.0	8,437.0	12,855.0	8,185.1	1.57
FY 2019	10,241.0	11,998.0	9,758.0	10,799.0	11,914.0	11,452.0	12,711.0	12,344.0	13,172.0	12,488.0	14,102.0	14,102.0	14,102.0	12,090.1	1.17

Peaking Factor Development	MM:AM	MM:MQ	System MD:MM	Max Day Factor	Estimated MH:MD	Max Hour Factor
Commercial	1.36	1.00	1.60	2.15	1.60	3.45
County Agency	1.28	1.00	1.60	2.05	1.60	3.30
Residential (1)	1.22	1.06	1.60	2.05	1.60	3.30
Apartments	1.22	1.00	1.60	1.95	1.60	3.10
Fort Myer	1.37	1.00	1.60	2.20	1.60	3.50

(1) Includes a Max-Month-to-Max-Quarter adjustment to normalize quarterly billing.

**Water Units of Service Detail**

Meter Detail	Commercial	County Agency	Residential	Apartments	Fort Myer	Total
Total Bills	19,572	3,840	134,285	19,017	12	176,726
Total Accounts	1,631	320	33,571	1,585	1	37,108

**Arlington County**  
 2020 Financial Planning & Rate Model  
 Proposed Water Rates

<b>Retail Rate Calculation</b>		<b>FY 2022</b>	<b>Reallocation</b>	<b>Net Fixed</b>	<b>Units of</b>
<u>Fixed Charge Calculation</u>		<b>Allocated COS</b>	<b>(To)/From Vol</b>	<b>Costs</b>	<b>Service</b>
Fixed Costs					
Customer Service	\$	927,175	\$ -	\$ 927,175	37,108 Connections
Billing / Meter Reading		1,240,007	-	1,240,007	176,726 Bills
Private Fire		-	-	-	n/a
<b>Total</b>	<b>\$</b>	<b>2,167,182</b>	<b>\$ -</b>	<b>\$ 2,167,182</b>	

	<b>Customer Service</b>	<b>Billing / Meter Reading</b>	<b>Total</b>
Fixed Charge Development			
Quarterly	\$ 6.25	\$ 7.02	\$ 13.26
Monthly	2.08	7.02	9.10

	<b>FY 2022</b>	<b>Less: Revenue</b>	<b>Net Volume</b>	<b>Units of</b>	<b>Unit</b>
<u>Volume Charge Calculation</u>	<b>Total COS</b>	<b>From Base</b>	<b>COS</b>	<b>Service (Kgal)</b>	<b>Rate</b>
Commercial	\$ 9,957,442	\$ (178,080)	\$ 9,779,362	2,036,487	
County Agency	749,665	(34,939)	714,726	154,715	
Residential	10,355,379	(1,781,025)	8,574,354	1,856,071	
Apartments	12,575,517	(173,028)	12,402,489	2,803,092	
Fort Myer	599,314	(109)	599,205	122,612	
<b>Total</b>	<b>\$ 34,237,318</b>	<b>\$ (2,167,182)</b>	<b>\$ 32,070,136</b>	<b>6,972,977</b>	<b>\$ 4.60</b>

<b>Rate Design</b>	<b>Existing</b>			<b>Proposed</b>					
	<b>Status Quo Rates (2022)</b>	<b>Test Year Units</b>	<b>Revenue</b>	<b>Upper Limit (Kgal)</b>	<b>Differential</b>	<b>% Use in Tier</b>	<b>Usage in Tier</b>	<b>Calculated Rate</b>	<b>Revenue Check</b>
<u>Residential</u>									
Tier 1	\$ 4.91	1,856,071	\$ 9,113,307	9.0	1.00	59.4%	1,102,649	\$ 3.71	\$ 4,096,186
Tier 2				9,999,999.0	1.60	40.6%	753,422	5.94	4,478,168
<b>Totals</b>		<b>1,856,071</b>	<b>\$ 9,113,307</b>			<b>100%</b>	<b>1,856,071</b>		<b>\$ 8,574,354</b>
<u>Multi Family</u>									
All Usage	\$ 4.91	2,803,092	\$ 13,763,182	n/a	n/a	n/a	2,803,092	\$ 4.42	\$ 12,402,489
<u>Non-Residential</u>									
Commercial	\$ 4.91	2,036,487	\$ 9,999,152	n/a	n/a	n/a	2,036,487	\$ 4.79	\$ 9,763,682
County Agency	4.91	154,715	759,651	n/a	n/a	n/a	154,715	4.79	741,762
Fort Myer	4.91	122,612	602,026	n/a	n/a	n/a	122,612	4.79	587,849
Combined		2,313,815	\$ 11,360,830				2,313,815	\$ 4.79	\$ 11,093,294

Arlington County  
 2020 Financial Planning & Rate Model  
 Sewer COS Summary



1. Summary of Revenue Requirements

	Operating Expense	Capital Expense	Total
Revenue Requirements			
Operating & Maintenance Expense	34,972,299		34,972,299
Debt Service - Existing		41,436	41,436
Debt Service - Proposed		-	-
AWT Debt		29,167,356	29,167,356
Rate Funded Capital (PAYGO)		7,050,000	7,050,000
Transfer to Operating Reserve Fund		-	-
Transfer to Capital Reserve		-	-
<b>Total Revenue Requirements</b>	34,972,299	36,258,793	71,231,092
Revenue Requirement Adjustments			
Miscellaneous Revenue (Excl. Priv. Fire)	(5,580,430)		(5,580,430)
Transfer From Capital Fund			-
Operating Surplus / (Deficit)		49,042	49,042
<b>Total Adjustments</b>	(5,580,430)	49,042	(5,531,388)
<b>Total: Net Revenue Requirement</b>	29,391,870	36,307,834	65,699,704





**Arlington County**  
 2020 Financial Planning & Rate Model  
 Sewer COS Summary



**7. Units of Service**

	Sewer Usage		Customer	
	Annual Use	Equivalent Usage	Bills	Capacity Equivalent
Combined Service				
Commercial	1,832,964	1,832,964	17,676	1,473
County Agency	122,356	122,356	2,052	-
Residential	1,828,257	1,828,257	133,352	33,338
Apartments	2,781,079	2,781,079	18,653	1,554
<i>Total Combined Service</i>	<u>6,564,655</u>	<u>6,564,655</u>	<u>171,733</u>	<u>36,365</u>
 Large-Sewer-Only Customers				
MWAA	146,432	146,432	12	1
Pentagon	126,220	126,220	12	1
Fort Myer	112,506	112,506	12	1
Marina	824	824	12	1
Cavalier APT	9,077	9,077	12	1
<i>Total Large Sewer-Only Customers</i>	<u>395,059</u>	<u>395,059</u>	<u>60</u>	<u>5</u>
<b>Total Units of Service</b>	<b>6,959,714</b>	<b>6,959,714</b>	<b>171,793</b>	<b>36,370</b>

**8. Unit Costs of Service**

	Billed Volume	Customer Service	Billing / Meter Reading	I&I	Total
<b>Cost of Service</b>					
O&M Expenses	\$ 27,687,476	\$ 729,183	\$ 975,211	\$ -	\$ 29,391,870
Capital Costs	36,307,834	-	-	-	36,307,834
<b>Total: Cost of Service</b>	<u>\$ 63,995,311</u>	<u>\$ 729,183</u>	<u>\$ 975,211</u>	<u>\$ -</u>	<u>\$ 65,699,704</u>
 Units of Service	6,959,714	36,370	171,793	36,370	
<i>Units</i>	<i>Kgal</i>	<i>Meters</i>	<i>Bills</i>	<i>I&amp;I</i>	
<b>Unit Costs of Service</b>	<b>\$ 9.20</b>	<b>\$ 20.05</b>	<b>\$ 5.68</b>	<b>\$ -</b>	







**Arlington County**  
 2020 Financial Planning & Rate Model  
 Sewer Determination of Peaking Factors by Class

Treatment Statistics: Inflow & Infiltration Factor	Billed Consumption (TG)	Effluent Flow (TG)	Inflow & Infiltration Factor
2017	7,295,891	7,870,900	0.93
2018	7,021,443	8,021,700	0.88
2019	6,892,201	9,371,880	0.74
Average	7,069,845	8,421,493	0.85

Treatment Statistics: Annual Strength Averages	Total Annual BOD (lbs)	TSS (mg/L)	Phosphorus	Nitrogen	BOD lbs Removed	TSS lbs Removed	Phosphorus lbs Removed	Nitrogen lbs Removed
2017	22,653,126	698,034	412,734	2,892,655	12,162,169	14,506,020	188,026	2,892,655
2018	24,458,830	786,887	404,961	3,212,874	13,982,176	16,698,436	187,594	3,212,874
2019	25,019,345	842,749	464,987	3,181,514	13,722,877	16,943,171	203,422	3,181,514
Average	24,043,767	775,890	427,560	3,095,681	13,289,074	16,049,209	193,014	3,095,681

Sewer Meter Detail	Combined Service				Large Sewer-Only Customers					Total
	Commercial	County Agency	Residential	Apartments	MWAA	Pentagon	Fort Myer	Marina	Cavalier APT	
<b>Total Bills</b>	17,676	2,052	133,352	18,653	12	12	12	12	12	171,793
<b>Capacity-Equivalent</b>	1,473	171	33,338	1,554	1	1	1	1	1	36,541

**Arlington County**  
 2020 Financial Planning & Rate Model  
 Proposed Sewer Rates

<b>Retail Rate Calculation</b>	<b>FY 2022 Allocated COS</b>	<b>Reallocation (To)/From Vol</b>	<b>Net Fixed Costs</b>	<b>Units of Service</b>	
<u>Fixed Charge Calculation</u>					
Fixed Costs					
Customer Service	\$ 729,183	\$ -	\$ 729,183	36,370	Connections
Billing / Meter Reading	975,211	-	975,211	169,741	Bills
I&I	-	-	-		n/a
<b>Total</b>	<b>\$ 1,704,393</b>	<b>\$ -</b>	<b>\$ 1,704,393</b>		

	<b>Customer Service</b>	<b>Billing / Meter Reading</b>	<b>I&amp;I</b>	<b>Total</b>
Fixed Charge Development				
Quarterly	\$ 5.01	\$ 5.75	n/a	\$ 10.76
Monthly	1.67	5.75	n/a	7.42

	<b>FY 2022 Total COS</b>	<b>Less: Revenue From Base</b>	<b>Net Volume COS</b>	<b>Units of Service (Kgal)</b>	<b>Unit Rate</b>
<u>Volume Charge Calculation</u>					
Commercial	\$ 16,984,028	\$ (131,156)	\$ 16,852,872	1,832,964	
County Agency	1,140,139	(15,226)	1,124,913	122,356	
Residential (1)	18,233,266	(1,434,863)	16,798,403	1,530,467	
Apartments	25,709,219	(138,406)	25,570,813	2,781,079	
MWAA	1,346,546	(89)	1,346,457	146,432	
Pentagon	1,160,696	(89)	1,160,607	126,220	
Fort Myer	1,034,590	(89)	1,034,501	112,506	
Marina	7,665	(89)	7,576	824	
Cavalier APT	83,555	(89)	83,466	9,077	
<b>Total</b>	<b>\$ 65,699,704</b>	<b>\$ (1,720,096)</b>	<b>\$ 63,979,608</b>	<b>6,661,925</b>	<b>\$ 9.61</b>

(1) Residential usage adjusted for winter period billing.

Rate Design	Existing			Proposed		
	Rates	Test Year Units	Revenue	Billable Usage	Calculated Rate	Revenue Check
<u>Residential</u>						
All Usage	\$ 9.44	1,828,257	\$ 17,258,744	1,530,467	\$ 9.61	\$ 14,707,791
<u>Multi Family</u>						
All Usage	\$ 9.44	2,781,079	\$ 26,253,383	2,781,079	\$ 9.61	\$ 26,726,166
<u>Non-Residential</u>						
Commercial	\$ 9.44	1,832,964	\$ 17,303,176	1,832,964	\$ 9.61	\$ 17,614,780
County Agency	9.44	122,356	1,155,043	122,356	9.61	1,175,843
MWAA	9.44	146,432	1,382,318	146,432	9.61	1,407,212
Pentagon	9.44	126,220	1,191,519	126,220	9.61	1,212,976
Fort Myer	9.44	112,506	1,062,053	112,506	9.61	1,081,179
Marina	9.44	824	7,779	824	9.61	7,919
Cavalier APT	9.44	9,077	85,690	9,077	9.61	87,233
Combined		2,350,379	\$ 22,187,578	2,350,379	\$ 9.61	\$ 22,587,142

**Arlington County**  
 2020 Financial Planning & Rate Model  
 Surcharge Calculation

		Water Pollution Control Plant	2022 Test Year	Grit or Screen Chamber	Primary Treatment	Aeration	Secondary Treatment	Nutrient Removal	Disinfection	Sludge Dewatering & Disposal	Lab	General Plant
<b>Operating Expenses</b>												
44201 349720	349720 Work For Others	\$ (184,000)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
<i>Subtotal: 349720 Work For Others</i>		-	-	-	-	-	-	-	-	-	-	(184,000)
<b>Personnel Services</b>												
44201 410210	410210 Base Pay - Permanent (410210)	\$ 7,389,664	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 410220	410220 Base Pay - Temporary (410220)	15,045	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 410300	410300 Overtime Pay (410300)	941,025	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 410305	410305 Overtime Pay - Callback (410305)	15,498	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 410400	410400 Special Pay (410400)	-	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 410401	410401 Salary Adjustments - BUDGET ONLY (410401)	77,505	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 410500	410500 Unused Leave Payout (410500)	-	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 411325	411325 Overtime Pay - Holiday Premium (411325)	138,751	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 412195	412195 Work By Others (412195)	42,300	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 412199	412199 Credit For Turnover (412199)	(229,592)	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
<i>Subtotal: Personnel Services</i>		8,390,196	528,582	1,250,139	427,900	880,971	570,533	780,288	1,778,722	889,361	1,283,700	
<b>Employee Benefits</b>												
44201 420200	420200 Fringe Benefits - Employer Retirement (420200)	1,384,580	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 420201	420201 Retirement - BUDGET ONLY (420201)	56,779	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 420500	420500 Fringe Benefits - Employer FICA (420500)	562,222	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 420501	420501 FICA - BUDGET ONLY (420501)	2,263	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 420800	420800 Fringe Benefits - Employer Health/Dental Insurance (420800)	55,603	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 420801	420801 Cigna Health Insurance (420801)	689,212	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 420802	420802 Kaiser Permanente Health (420802)	270,425	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 420300	420300 Employee Benefit - Mass Transit (420300)	20,332	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 420310	420310 Employee Benefit - Location Pay (420310)	1,044	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 420315	420315 Walk/Bike To Work (420315)	650	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 420318	420318 Dependent Care FSA ER Match (420318)	1,004	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 420805	420805 Fringe Benefits - Employer Life Insurance (420805)	11,704	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
44201 420816	420816 401a ARP ER (420816)	-	6.3%	14.9%	5.1%	10.5%	6.8%	9.3%	21.2%	10.6%	15.3%	15.3%
<i>Subtotal: Employee Benefits</i>		3,055,818	192,517	455,317	155,847	320,861	207,796	284,191	647,833	323,917	467,540	
<b>Repair and Maintenance</b>												
44201 437100	437100 Repair Building (437100)	500,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 437200	437200 Repair Equipment (437200)	200,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
<i>Subtotal: Repair and Maintenance</i>		700,000	-	-	-	-	-	-	-	-	-	700,000
<b>Outside Services</b>												
44201 437405	437405 Contracted Services (437405)	1,937,758	0.0%	0.0%	0.0%	12.0%	1.0%	0.0%	0.0%	0.0%	0.0%	87.0%
44201 437420	437420 Security Systems (437420)	15,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 437422	437422 Software Maintenance (437422)	55,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 437423	437423 Software License (437423)	40,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 437430	437430 Janitorial (437430)	115,436	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 437476	437476 Hazardous Waste Program (437476)	187,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
<i>Subtotal: Outside Services</i>		2,350,194	-	-	-	232,531	19,378	-	-	-	-	2,098,285

Arlington County  
 2020 Financial Planning & Rate Model  
 Surcharge Calculation

Water Pollution Control Plant		2022 Test Year	Grit or Screen Chamber	Primary Treatment	Aeration	Secondary Treatment	Nutrient Removal	Disinfection	Sludge Dewatering & Disposal	Lab	General Plant
<u>Contractual Services</u>											
44201 431004	431004 Special Telephone Charges (431004)	141,392	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 431100	431100 Telephone & Communications (431100)	56,756	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 431200	431200 Postage (431200)	2,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 431600	431600 Travel (431600)	50,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 432100	432100 Electricity (432100)	1,942,000	5.0%	10.0%	50.0%	5.0%	5.0%	10.0%	0.0%	0.0%	15.0%
44201 432200	432200 Gas (432200)	100,164	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 432300	432300 Water (432300)	173,573	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 432900	432900 Landfill Charges (432900)	96,705	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
44201 433500	433500 Printing - Outside Shop (433500)	2,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 433900	433900 Food (433900)	5,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 434000	434000 Unclassified Services (434000)	11,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 435000	435000 County Publications (435000)	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 435500	435500 Departmental Subscriptions/Books (435500)	1,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 435600	435600 Memberships (435600)	130,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 436200	436200 Rental Of Operating Equipment (436200)	30,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 436500	436500 Rental Privately Owned Vehicles (436500)	1,823,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
44201 438200	438200 Consultants (438200)	800,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 438300	438300 Employee Training (438300)	121,647	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 438400	438400 Recruitment (438400)	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 438500	438500 Safety (438500)	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 438700	438700 Employment Agency Temporaries (438700)	20,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 438900	438900 Insurance Claims (438900)	240,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
<i>Subtotal: Contractual Services</i>		5,746,237	193,805	194,200	971,000	97,100	97,100	194,200	1,823,000	-	2,175,832
<u>Internal Services</u>											
44201 444100	444100 Phone Moves Adds & Changes (444100)	1,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 444300	444300 Rental County Owned Vehicles (444300)	163,183	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 444400	444400 Print Shop Charges (444400)	5,757	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 444500	444500 Fuel Charges Intra County (444500)	25,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
<i>Subtotal: Internal Services</i>		194,940	-	-	-	-	-	-	-	-	194,940
<u>Materials &amp; Supplies</u>											
44201 461600	461600 Automotive Fuel Purchases (461600)	40,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 461800	461800 Maintenance Supplies (461800)	2,280,147	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	99.0%
44201 464000	464000 Office Supplies (464000)	35,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 464200	464200 Operating Supplies (464200)	140,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	60.0%	40.0%
44201 464211	464211 Defoamant Process (464211)	15,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 464212	464212 Ferric Chloride (464212)	825,000	0.0%	50.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%
44201 464213	464213 Lime (464213)	360,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
44201 464214	464214 Misc Chemicals (464214)	4,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 464215	464215 Polymer (464215)	300,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
44201 464216	464216 Hydrochloric Acid (464216)	5,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 464217	464217 Sodium Bisulfate (464217)	180,000	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
44201 464218	464218 Sodium Hypo Chlorite (464218)	340,000	0.0%	0.0%	0.0%	0.0%	0.0%	85.0%	0.0%	0.0%	15.0%
44201 464219	464219 Safety Supplies (464219)	20,767	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 464220	464220 Methanol (464220)	480,000	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
44201 464221	464221 Sodium Hydroxide (464221)	15,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
44201 466000	466000 Wearing Apparel (466000)	100,200	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
<i>Subtotal: Materials &amp; Supplies</i>		5,140,114	-	412,500	-	412,500	480,000	469,000	660,000	106,801	2,599,313
44201 483010	483010 Operating Equipment (483010)	222,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
<b>Total Expenses</b>											
		<b>\$ 25,615,499</b>	<b>\$ 914,904</b>	<b>\$ 2,312,156</b>	<b>\$ 1,554,747</b>	<b>\$ 1,943,962</b>	<b>\$ 1,374,807</b>	<b>\$ 1,727,679</b>	<b>\$ 4,909,555</b>	<b>\$ 1,320,079</b>	<b>\$ 9,557,610</b>



# Appendix C

INFRASTRUCTURE AVAILABILITY FEES &  
OTHER MISCELLANEOUS FEES SCHEDULES







SEWER SYSTEM  
MAINS

YEAR	Original Cost	Cost Index Number (per H-W)	2020 Cost Index (per H-W)	Esc. Factor	Replacement Cost	Accumulated Depreciation Per Books	Accumulated Depreciation Escalated (Books)	RCNLD Calculated (Books)	Useful Life (years)	Age (years)	Accumulated Depreciation Escalated (Calc)	RCNLD Calculated
1979	28,170,328	189	801	4.24	119,388,533	21,188,154	89,797,416	29,591,117	75	41	65,265,731	54,122,802
1980	567,593	206	801	3.89	2,207,000	306,498	1,191,772	1,015,228	75	40	1,177,067	1,029,933
1981	328,815	223	801	3.59	1,181,080	173,172	622,020	559,059	75	39	614,162	566,918
1982	1,444,232	230	801	3.48	5,029,695	741,362	2,581,873	2,447,822	75	38	2,548,379	2,481,316
1983	313,373	236	801	3.39	1,063,609	156,682	531,790	531,820	75	37	524,714	538,895
1984	552,400	236	801	3.39	1,874,883	268,829	912,424	962,459	75	36	899,944	974,939
1985	1,494,663	241	801	3.32	4,967,739	707,461	2,351,355	2,616,384	75	35	2,318,278	2,649,461
1986	1,172,639	237	801	3.38	3,963,223	539,406	1,823,056	2,140,167	75	34	1,796,661	2,166,562
1987	553,790	244	801	3.28	1,817,975	247,357	812,021	1,005,953	75	33	799,909	1,018,066
1988	1,028,834	250	801	3.20	3,296,384	445,820	1,428,408	1,867,976	75	32	1,406,457	1,889,927
1989	1,200,574	268	801	2.99	3,588,283	504,235	1,507,060	2,081,123	75	31	1,483,157	2,105,126
1990	594,322	275	801	2.91	1,731,098	241,687	703,969	1,027,129	75	30	692,439	1,038,659
1991	1,063,627	273	801	2.93	3,120,752	418,355	1,227,481	1,893,270	75	29	1,206,691	1,914,061
1992	458,200	269	801	2.98	1,364,380	177,168	527,553	836,826	75	28	509,369	855,011
1993	408,377	275	801	2.91	1,189,491	149,736	436,141	753,350	75	27	428,217	761,274
1994	4,619,907	281	801	2.85	13,169,200	1,632,352	4,653,073	8,516,127	75	26	4,565,323	8,603,878
1995	328,284	287	801	2.79	916,222	111,615	311,512	604,710	75	25	305,407	610,814
1996	824,674	286	801	2.80	2,309,663	269,391	754,484	1,555,180	75	24	739,092	1,570,571
1997	26,141,344	295	801	2.72	70,980,395	8,190,893	22,240,358	48,740,037	75	23	21,767,321	49,213,074
1998	207,450	300	801	2.67	553,892	62,235	166,166	387,725	75	22	162,475	391,417
1999	899,853	312	801	2.57	2,310,199	257,956	662,253	1,647,946	75	21	646,856	1,663,344
2000	460,740	308	801	2.60	1,198,223	125,935	327,513	870,711	75	20	319,526	878,697
2001	1,735,079	323	801	2.48	4,302,781	451,119	1,118,719	3,184,062	75	19	1,090,038	3,212,743
2002	297,310	331	801	2.42	719,472	73,336	177,469	542,003	75	18	172,673	546,799
2003	2,200,967	340	801	2.36	5,185,219	513,557	1,209,880	3,975,339	75	17	1,175,316	4,009,902
2004	10,751,905	350	801	2.29	24,606,502	2,430,079	5,561,408	19,045,093	75	16	5,249,387	19,357,115
2005	5,113,761	393	801	2.04	10,422,704	1,056,843	2,154,023	8,268,680	75	15	2,084,541	8,338,163
2006	7,904,723	418	801	1.92	15,147,568	1,468,699	2,814,421	12,333,147	75	14	2,827,546	12,320,022
2007	1,831,865	461	801	1.74	3,182,914	317,532	551,721	2,631,193	75	13	551,705	2,631,209
2008	1,417,808	475	801	1.69	2,390,871	225,722	380,639	2,010,232	75	12	382,539	2,008,332
2009	10,269,095	554	801	1.45	14,847,554	1,521,044	2,199,198	12,648,356	75	11	2,177,641	12,669,913
2010	4,382,871	547	801	1.46	6,418,062	584,246	855,541	5,562,521	75	10	855,742	5,562,320
2011	5,209,090	552	801	1.45	7,558,843	628,322	911,750	6,647,092	75	9	907,061	6,651,781
2012	6,289,709	593	801	1.35	8,495,880	661,795	893,926	7,601,954	75	8	906,227	7,589,653
2013	9,512,052	630	801	1.27	12,093,895	888,741	1,129,971	10,963,924	75	7	1,128,764	10,965,132
2014	27,597,797	658	801	1.22	33,595,494	2,125,325	2,587,212	31,008,282	75	6	2,687,640	30,907,854
2015	3,333,250	664	801	1.21	4,020,984	218,650	263,763	3,757,221	75	5	268,066	3,752,918
2016	9,287,141	669	801	1.20	11,119,581	467,004	559,149	10,560,433	75	4	593,044	10,526,537
2017	3,745,146	705	801	1.14	4,255,123	150,513	171,009	4,084,115	75	3	170,205	4,084,918
2018	10,806,145	719	801	1.11	12,038,557	304,528	339,259	11,699,298	75	2	321,028	11,717,529
2019	3,884,557	752	801	1.07	4,137,673	55,912	59,555	4,078,117	75	1	55,169	4,082,504
2020	916,700	801	801	1.00	916,700	170	170	916,530	75	0	0	916,700
2021			801	0.00	0	0	0	0	0	0	0	0
<b>TOTALS</b>	<b>\$ 199,320,988</b>				<b>\$ 432,678,295</b>	<b>\$ 51,059,439</b>	<b>\$ 159,508,483</b>	<b>\$ 273,169,812</b>			<b>\$ 133,781,506</b>	<b>\$ 298,896,790</b>

Notes:  
For the Cost Index, the Handy-Whitman category used is line 34-Mains-Average All Types



SEWER SYSTEM  
 WASTEWATER TREATMENT

YEAR	Original Cost	Cost Index Number (per H-W)	2020 Cost Index (per H-W)	Esc. Factor	Replacement Cost	Accumulated Depreciation Per Books	Accumulated Depreciation Escalated (Books)	RCNLD Calculated (Books)	Useful Life (years)	Age (years)	Accumulated Depreciation Escalated (Calc)	RCNLD Calculated
1979	17,488,294	164	616	3.76	65,687,738	11,589,168	43,530,046	22,157,692	50	41	53,863,946	11,823,793
1980	744,412	179	616	3.44	2,561,775	401,971	1,383,320	1,178,455	50	40	2,049,420	512,355
1981	17,589,897	191	616	3.23	56,729,720	9,263,815	29,877,017	26,852,704	50	39	44,249,182	12,480,538
1982	227,380	195	616	3.16	718,288	116,722	368,722	349,565	50	38	545,899	172,389
1983	11,945,410	201	616	3.06	36,608,819	5,969,578	18,294,827	18,313,992	50	37	27,090,526	9,518,293
1984		208	616	2.96	0	0	0	0	50	36	0	0
1985	40,522,987	214	616	2.88	116,645,607	19,180,481	55,211,105	61,434,503	50	35	81,651,925	34,993,682
1986	67,360	217	616	2.84	191,215	30,984	87,954	103,262	50	34	130,027	61,189
1987	303,489	219	616	2.81	853,649	135,553	381,282	472,367	50	33	563,409	290,241
1988	1,425,649	221	616	2.79	3,973,755	617,767	1,721,921	2,251,834	50	32	2,543,203	1,430,552
1989		227	616	2.71	0	0	0	0	50	31	0	0
1990		237	616	2.60	0	0	0	0	50	30	0	0
1991		232	616	2.66	0	0	0	0	50	29	0	0
1992		230	616	2.68	0	0	0	0	50	28	0	0
1993		243	616	2.53	0	0	0	0	50	27	0	0
1994		253	616	2.43	0	0	0	0	50	26	0	0
1995		265	616	2.32	0	0	0	0	50	25	0	0
1996	191,956	269	616	2.29	439,572	62,705	143,592	295,980	50	24	210,994	228,577
1997		276	616	2.23	0	0	0	0	50	23	0	0
1998		281	616	2.19	0	0	0	0	50	22	0	0
1999	17,259,696	289	616	2.13	36,788,834	4,947,751	10,546,071	26,242,763	50	21	15,451,310	21,337,524
2000	13,252,588	295	616	2.09	27,673,200	3,622,356	7,563,971	20,109,229	50	20	11,069,280	16,603,920
2001	292,762	313	616	1.97	576,170	76,118	149,804	426,367	50	19	218,945	357,226
2002	1,061,395	319	616	1.93	2,049,590	261,809	505,563	1,544,027	50	18	737,852	1,311,737
2003	45,151,473	326	616	1.89	85,316,893	10,535,101	19,906,816	65,410,077	50	17	29,007,744	56,309,149
2004		339	616	1.82	0	0	0	0	50	16	0	0
2005	4,190	370	616	1.66	6,975	838	1,395	5,580	50	15	2,093	4,883
2006	7,960,608	382	616	1.61	12,837,002	1,483,846	2,392,799	10,444,203	50	14	3,594,361	9,242,642
2007	785,313	407	616	1.51	1,188,582	135,763	205,479	983,103	50	13	309,031	879,551
2008	35,042,702	427	616	1.44	50,553,406	5,924,996	8,547,536	42,005,870	50	12	12,132,817	38,420,588
2009	5,744,960	460	616	1.34	7,693,251	845,054	1,131,638	6,561,614	50	11	1,692,515	6,000,736
2010	141,277,625	452	616	1.36	192,537,648	17,830,382	24,299,812	168,237,836	50	10	38,507,530	154,030,119
2011	292,894,325	466	616	1.32	387,173,615	34,771,959	45,964,650	341,208,965	50	9	69,691,251	317,482,364
2012	18,103,043	492	616	1.25	22,665,598	1,908,717	2,389,776	20,275,822	50	8	3,626,496	19,039,102
2013	9,248,273	514	616	1.20	11,083,534	938,589	1,124,847	9,958,687	50	7	1,551,695	9,531,839
2014	1,530,385	512	616	1.20	1,841,245	122,027	146,814	1,694,431	50	6	220,949	1,620,295
2015	78,590,633	531	616	1.16	91,171,055	5,590,007	6,484,830	84,686,225	50	5	9,117,105	82,053,949
2016	59,316	541	616	1.14	67,539	3,452	3,930	63,609	50	4	5,403	62,136
2017	74,358	557	616	1.11	82,234	2,974	3,289	78,945	50	3	4,934	77,300
2018	11,026,639	570	616	1.08	11,916,508	293,461	317,143	11,599,365	50	2	476,660	11,439,848
2019	343,899	602	616	1.02	351,896	4,767	4,878	347,018	50	1	7,038	344,858
2020	1,332,885	616	616	1.00	1,332,885	334	334	1,332,551	50	0	0	1,332,885
2021			616	0.00	0	0	0	0	0	0		
<b>TOTALS</b>	<b>\$ 771,543,903</b>				<b>\$ 1,229,317,801</b>	<b>\$ 136,669,048</b>	<b>\$ 282,691,161</b>	<b>\$ 946,626,640</b>			<b>\$ 410,323,539</b>	<b>\$ 818,994,262</b>

Notes:  
 For the Cost Index, the Handy-Whitman category used is line 34-Mains-Average All Types

**Arlington County**  
*Infrastructure Availability Fee Model*  
 Calculated IAFs

	(+)	(+)	(=)	(-)	(=)	(/)	(=)	(=)		
	Replacement Cost	WIP	Total System Cost	Outstanding Debt	Net System Cost	Total DFU's that can be Served	Cost per DFU	Cost per EDU (Assuming 1 ERC = 24 DFU)	Current Charge per DFU	Percent Increase / (Decrease)
<b><u>Water System</u></b>										
Mains	\$ 361,272,304									
Reservoirs and Pumping	31,785,584									
<b>Water System Totals</b>	<b>\$ 393,057,889</b>	<b>\$ 5,858,436</b>	<b>\$ 398,916,325</b>	<b>\$ 3,079,061</b>	<b>\$ 395,837,264</b>	<b>3,200,000</b>	<b>\$ 123.70</b>	<b>\$ 2,969</b>	<b>\$ 85.00</b>	<b>45.53%</b>
<b><u>Sewer System</u></b>										
Mains	\$ 273,169,812									
Pumping	14,121,163									
Treatment Plant	818,994,262									
<b>Sewer System Totals</b>	<b>\$ 1,106,285,237</b>	<b>\$ 7,647,288</b>	<b>\$ 1,113,932,525</b>	<b>\$ 207,275,117</b>	<b>\$ 906,657,408</b>	<b>4,829,091</b>	<b>\$ 187.75</b>	<b>\$ 4,506</b>	<b>\$ 115.00</b>	<b>63.26%</b>
<b>Total Cost for Water &amp; Sewer</b>	<b>\$ 1,499,343,126</b>	<b>\$ 13,505,724</b>	<b>\$ 1,512,848,850</b>	<b>\$ 210,354,178</b>	<b>\$ 1,302,494,672</b>		<b>\$ 311.45</b>	<b>\$ 7,475</b>	<b>\$ 200.00</b>	<b>55.73%</b>

**Arlington County**  
*Infrastructure Availability Fee Model*  
 Determination of total system DFU's

**Water System**

Total System Capacity	32,000,000 GPD
Average Consumption per ERC	150 GPD
Maximum Day Peaking Factor	1.60
Adjusted Consumption per ERC	240 GPD
Total ERCs that can be served by the system	133,333
Number of DFUs per ERC	24
Total DFUs that can be served by the system	3,200,000

**Sewer System**

Total System Capacity	33,200,000 GPD
Average Usage per ERC	150 GPD
Inflow & Infiltration Allowance	10%
Adjusted Average Usage per ERC	165 GPD
Total ERCs that can be served by the system	201,212
Number of DFUs per ERC	24
Total DFUs that can be served by the system	4,829,091

**Arlington County**  
2020 Miscellaneous Fees Model  
Benchmarking Analysis

	<u>New Account Fee</u>	<u>Reactivation Fee</u>	<u>Discontinuation Fee</u>	<u>Flow Test Fee</u>	<u>Drainage Fixture Unit (DFU) Credit Inspection Fee</u>	<u>Utility Marking Fee</u>	<u>Hazardous Household Material Fee</u>
<b>Arlington County</b>	\$25 per account	\$25 per account	\$500	\$300	\$175 for inspections of 1-24 fixtures; \$275 for 25 plus fixtures	\$45	\$20/television; \$15/monitor
<b>Alex Renew</b>	\$15 per account	\$45 per account		\$0	N/A	No fee	N/A
<b>DC Water</b>	\$50 per account	\$50 per account	\$400 (2" less diam)	\$300	N/A	No fee	N/A
<b>Prince William County SA</b>	\$35 per account	\$35 per account	\$50 per account	\$0	N/A	No fee	Authority does not handle waste
<b>WSSC</b>	\$0	\$97 per account		\$693	\$44 per fixture	No fee	N/A
<b>Loudoun Water</b>	\$30 per account	\$30 per account	\$0	\$350 for new tests	No set policy	No fee	Authority does not handle waste
<b>Fairfax Water</b>	\$40 per account	\$49 per account	\$250	N/A	N/A	No fee	N/A
<b>Fairfax County</b>	\$40 per account	\$49 per account	\$250	N/A	N/A	No fee	Free for Residents
<b>VA American Water (Alexandria)</b>	\$25 per account	\$25 per account	\$0	To respond in 3 business days	N/A	No fee	N/A
<b>Industry Benchmark Median (1)</b>	\$50	\$50	N/A	N/A	N/A	N/A	N/A

(1) Edmunds GovTech 2019 Utility Fee Survey





**Arlington County**  
*2020 Miscellaneous Fees Model*  
Meter Installation Charges (1)

<b>3/4 ,1.5, 2 inch Meters</b>				
<b>Labor</b>	<b>Average hours</b>	<b>\$/hr</b>	<b>Cost/hr (3/4)</b>	<b>Cost/hr (1.5 &amp; 2)</b>
Senior Tech	0.50	\$ 40.86	\$ 20.43	\$ 20.43
Meter Tech.	2.00	40.86	40.86	81.72
Meter Tech.	2.00	40.86	-	81.72
ESA / USO	1.00	49.00	49.00	49.00
<i>Subtotal</i>			<b>110.29</b>	<b>232.87</b>
<b>Equipment</b>	<b>Average hours</b>	<b>\$/hr</b>	<b>Cost</b>	
Meter Services Truck	2.00	11.50	23.00	11.50
<i>Subtotal</i>			<b>23.00</b>	<b>11.50</b>
<b>Materials</b>	<b>Quantity</b>	<b>3/4inch Meter</b>	<b>1.5inch Meter</b>	<b>2inch Meter</b>
Meter	1	82.95	521.20	753.97
100W ERT	1	65.00	65.00	65.00
<i>Subtotal</i>		<b>147.95</b>	<b>586.20</b>	<b>818.97</b>
<b>TOTAL COST</b>		<b>\$ 269.74</b>	<b>\$ 842.07</b>	<b>\$ 1,074.84</b>

(1) Cost estimates provided by Arlington County Staff and reviewed by Raftelis









**Arlington County**  
 2020 Miscellaneous Fees Model  
 Connection Fees (1)

<b>3/4 inch Meter</b>
-----------------------

<b>Last Name</b>	<b>Average hours</b>	<b>\$/hr</b>	<b>Cost</b>
TML	2.00	\$ 60.86	\$ 121.72
Operator	8.00	40.86	326.88
Senior Tech	8.00	40.86	326.88
Tech V	8.00	40.86	326.88
Tech IV	8.00	40.86	326.88
Tech II	8.00	40.86	326.88
Tech III	8.00	40.86	326.88
ESA	3.00	49.00	147.00
			<b>2,230.00</b>

<b>Description</b>	<b>Average hours</b>	<b>\$/hr</b>	<b>Cost</b>
Backhoe	8.00	14.46	115.68
Medium Dump Truck	8.00	10.27	82.17
Service Truck	8.00	11.50	92.00
Hoe Ram	8.00	14.46	115.68
Large Dump Truck	8.00	17.30	138.40
			<b>543.93</b>

<b>Description</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Cost</b>
CLAMP 6X1" SERVICE SADDLE	1.00	99.67	99.67
1" BRASS CORPORATION STOP	1.00	83.68	83.68
18" FRAME AND COVER MB	1.00	31.25	31.25
METER BOX 18 INCH X 30 INCH	1.00	106.75	106.75
COPPER TUBING 1 INCH X 60 FOOT	20.00	5.56	111.22
YOKE 1 INCH COPPER X 3/4 INCH METER	1.00	155.34	155.34
3/4" meter	1.00	62.95	62.95
100W ERT	1.00	65.00	65.00
			<b>715.86</b>

**Total Cost \$ 3,489.78**

(1) Cost estimates provided by Arlington County Staff and reviewed by Raftelis

Note: The estimate cost includes install, remove/discontinue and asphalt restoration cost

**Arlington County**  
 2020 Miscellaneous Fees Model  
 Connection Fees (1)

<b>1 inch Meter</b>
---------------------

<b>Last Name</b>	<b>Average hours</b>	<b>\$/hr</b>	<b>Cost/hr</b>
TML	2.00	\$ 60.86	\$ 121.72
Operator	8.00	40.86	326.88
Senior Tech	8.00	40.86	326.88
Tech V	8.00	40.86	326.88
Tech IV	8.00	40.86	326.88
Tech II	8.00	40.86	326.88
Tech III	8.00	40.86	326.88
ESA	3.00	49.00	147.00
			<b>2,230.00</b>

<b>Description</b>	<b>Average hours</b>	<b>\$/hr</b>	<b>Cost</b>
Backhoe	8.00	14.46	115.68
Medium Dump Truck	8.00	10.27	82.17
Service Truck	8.00	11.50	92.00
Hoe Ram	8.00	14.46	115.68
Large Dump Truck	8.00	17.30	138.40
			<b>543.93</b>

<b>Description</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Cost</b>
CLAMP 6X1.5" SERVICE SADDLE	1.00	118.03	118.03
1.5" BRASS CORPORATION STOP	1.00	169.10	169.10
FRAME AND COVER 24 X 40 INCH MB	1.00	273.11	273.11
METER BOX 36 INCH X 36INCH	1.00	403.54	403.54
COPPER TUBING 1.5 INCH X 20 FOOT	20.00	9.04	180.71
VALVE 1.5 INCH ANGEL BRASS	2.00	282.84	565.68
21A / 57 Stone	10.00	37.00	370.00
Asphalt	8.00	60.00	480.00
1.5" meter	1.00	310.95	310.95
100W ERT	1.00	65.00	65.00
			<b>2,936.12</b>

**Total Cost \$ 5,710.05**

(1) Cost estimates provided by Arlington County Staff and reviewed by Raftelis

Note: The estimate cost includes install, remove/discontinue and asphalt restoration cost

**Arlington County**  
 2020 Miscellaneous Fees Model  
 Connection Fees (1)

<b>2 inch Meter</b>
---------------------

<b>Last Name</b>	<b>Average hours</b>	<b>\$/hr</b>	<b>Cost/hr</b>
TML	2.00	\$ 60.86	\$ 121.72
Operator	8.00	40.86	326.88
Senior Tech	8.00	40.86	326.88
Tech V	8.00	40.86	326.88
Tech IV	8.00	40.86	326.88
Tech II	8.00	40.86	326.88
Tech III	8.00	40.86	326.88
ESA	3.00	49.00	147.00
<i>Subtotal</i>			<b>2,230.00</b>

<b>Description</b>	<b>Average hours</b>	<b>\$/hr</b>	<b>Cost</b>
Backhoe	8.00	14.46	115.68
Medium Dump Truck	8.00	10.27	82.17
Service Truck	8.00	11.50	92.00
Hoe Ram	8.00	14.46	115.68
Large Dump Truck	8.00	17.30	138.40
<i>Subtotal</i>			<b>543.93</b>

<b>Description</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Cost</b>
CLAMP 6X2" SERVICE SADDLE	1.00	72.39	72.39
2" BRASS CORPORATION STOP	1.00	273.88	273.88
FRAME AND COVER 24 X 40 INCH MB	1.00	273.11	273.11
METER BOX 36 INCH X 36 INCH	1.00	403.54	403.54
COPPER TUBING 2 INCH	20.00	12.76	255.20
VALVE - 2 INCH ANGEL BRASS	2.00	439.90	879.80
21A / 57 Stone	10.00	37.00	370.00
Asphalt	8.00	60.00	480.00
2 inch meter	1.00	753.97	753.97
100W ERT	1.00	65.00	65.00
<i>Subtotal</i>			<b>3,826.89</b>

**Total Cost \$ 6,600.82**

(1) Cost estimates provided by Arlington County Staff and reviewed by Raftelis  
 Note: The estimate cost includes install, remove/discontinue and asphalt restoration cost