Stantec

Loudoun Water

Water and Sewer Rate Study - Final Report

October 22, 2021

Stantec

October 22, 2021

Mr. Brian Carnes
Director of Finance
Loudoun Water
44865 Loudoun Water Way
Ashburn, VA 20147

Re: Water and Sewer Rate Study - Final Report

Dear Mr. Carnes,

Stantec is pleased to present this Final Report on the Water and Sewer Rate Study (Study) that was conducted for Loudoun Water. We appreciate the professional assistance provided by you and all of the members of Loudoun Water who participated in the study.

If you or others at Loudoun Water have any questions, please do not hesitate to call us at (202) 585-6391 or email me at David.Hyder@stantec.com. We appreciate the opportunity to be of service to Loudoun Water, and we look forward to the possibility of doing so again in the near future.

Sincerely,

David A. Hyder
Senior Principal

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Washington DC 20005
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Enclosure

TABLE OF CONTENTS

EXECUTIVE SUMMARY

E.1 INTRODUCTION

This Executive Summary presents an overview of the results of the Comprehensive Water and Sewer Rate Study (Study) that was conducted for Loudoun Water by Stantec Consulting Services (Stantec). While the Executive Summary presents the primary conclusions and recommendations developed during the study, the full report outlines all of the key assumptions and detailed analysis completed to arrive at the results of the Study and should be consulted to gain a full understanding of the analysis.

E.2 SCOPE OF WORK

The principal components of the Comprehensive Water and Sewer Rate Study are as follows:

Revenue Sufficiency Analysis and Financial Plan – Develop a three-year financial plan for Loudoun Water's water and sewer systems that will determine the level of annual revenue required to satisfy projected annual operating, debt service, and capital cost requirements as well as the maintenance of adequate reserves. The financial plan is designed to support the short and long-term needs of Loudoun Water in an effort to provide fiscal sustainability while minimizing customer impacts.

Reclaimed Water Rate Analysis – Evaluate the cost of providing reclaimed water service to determine if adjustments to the reclaimed water rates are warranted in light of the cost of service and forecasted changes in reclaimed water system demands within the Loudoun Water service area.

Availability Charge Analysis – Evaluate the level of the water and sewer availability charges assessed by Loudoun Water and recommend modifications if appropriate. Develop a forecast of availability charges based on the cost of providing water and sewer system capacity to new customers joining the Loudoun Water systems.

Developer Fee Analysis – Review the current developer fees and charges assessed by Loudoun Water to determine if the fees are set at a level that recovers the cost of providing development services and recommend modifications to the fees and charges if they are set below the cost of service.

Benchmarking and Customer Impacts – Benchmark Loudoun Water's rates, fees and charges with comparable and local utilities. Demonstrate the impacts of any recommended changes to rates, fees and charges on customers of the systems in the form of customer bill impact comparisons.

Based on the completion of the scope of work, Stantec has developed several conclusions and recommendations for Loudoun Water's consideration. The key conclusions and recommendations are outlined herein.

E.3 REVENUE SUFFICIENCY ANALYSIS AND FINANCIAL PLAN

A revenue sufficiency analysis was completed for a ten-year period covering 2022 to 2031. The revenue sufficiency analysis was used to determine if Loudoun Water's current rates, fees and charges will be adequate to meet the system revenue requirements (operating expenditures, debt service and capital investments) over the planning period. The revenue requirements were developed based on Loudoun Water's budget documents, capital improvement program and assumed cost escalation factors. The following conclusions and recommendations are provided based on the revenue sufficiency analysis.

- The revenue sufficiency analysis developed for the planning period, reveals that Loudoun Water's revenues generated from current rates and fees will not be sufficient to meet the annual revenue requirements of the water and sewer system. If additional revenues are not generated over the planning period, Loudoun Water will not be able to provide adequate funds to meet the revenue requirements and will draw the cash balance below the minimum balance requirement established by Loudoun Water.
- The required adjustments to water and sewer revenues are consistent with prior financial planning completed for Loudoun Water, including the 2018 Water and Sewer Rate Study. The primary drivers for the increases in revenue requirements over the planning period include the following key items:
    - The costs of providing water and sewer service continue to increase due to inflationary increases in the costs associated with personnel, utilities, and general operating costs. The increases in costs are consistent with prior forecasts but necessitate adjustments in rates to ensure revenues remain in-line with expenditures
    - In 2018, DC Water began charging Loudoun Water an additional $1.5 million per year for wastewater treatment services. These costs have continued over the past several years and will likely increase annually at an inflationary level.
    - Loudoun Water continues to invest significant funds to expand the water and sewer services to meet the requirements of new demand placed on the water and sewer systems, while at the same time funding the ongoing repair and replacement of the systems.
- To address the funding requirements of the system, we recommend that Loudoun Water adopt a three-year financial plan that will adjust water and sewer rates by 3.0% in 2022, 2023 and 2024, respectively. The financial management plan will allow Loudoun Water to provide adequate and sustainable funds for the operation, maintenance and replacement of the water and sewer systems, while minimizing the impacts on its water and sewer customers. The recommended rates under the financial plan are shown in the following tables.

Table E-1 Recommended Water Rates

	Current	Jan 1, 2022	Jan 1, 2023	Jan 1, 2024
Residential Rates				
Basic Charge	$36.74	$37.84	$38.98	$40.15
Tier 1: 0 - 25,000 Gallons	$2.69	$2.77	$2.85	$2.94
Tier 2: 25,001 - 50,000 Gallons	$7.47	$7.69	$7.92	$8.16
Tier 3: Over 50,000 Gallons	$10.00	$10.30	$10.61	$10.93
Commercial Rates				
Basic Charge				
5/8”	$36.74	$37.84	$38.98	$40.15
3/4"	$51.74	$56.76	$58.47	$60.23
1"	$108.79	$113.52	$116.94	$120.45
1 1/2"	$171.85	$245.96	$253.37	$260.98
2"	$276.93	$454.08	$467.76	$481.80
3"	$457.07	$1,002.76	$1,032.97	$1,063.98
4"	$757.30	$1,835.24	$1,890.53	$1,947.28
6"	$1,507.90	$2,573.12	$2,650.64	$2,730.20
Tier 1: Up to Purchased Capacity	$3.53	$3.64	$3.75	$3.86
Tier 2: Over Purchased Capacity	$6.07	$6.25	$6.44	$6.63
All Other Uses*	$7.47	$7.69	$7.92	$8.16

** Includes, but not limited to, fire hydrant special use, construction water for which an availability charge has not been paid and irrigation and irrigation submeters.*

Table E-2 Recommended Sewer Rates

	Current	Jan 1, 2022	Jan 1, 2023	Jan 1, 2024
Residential Rates				
Basic Charge	$36.71	$37.81	$38.94	$40.11
Usage Rate per 1,000 gallons*	$5.27	$5.43	$5.59	$5.76
Commercial Rates				
Basic Charge				
5/8”	$36.71	$37.81	$38.94	$40.11
3/4"	$52.50	$56.72	$58.41	$60.17
1"	$112.67	$113.43	$116.82	$120.33
1 1/2"	$179.12	$245.77	$253.11	$260.72
2"	$289.89	$453.72	$467.28	$481.32
3"	$479.79	$1,001.97	$1,031.91	$1,062.92
4"	$796.28	$1,833.79	$1,888.59	$1,945.34
6"	$1,587.50	$2,571.08	$2,647.92	$2,727.48
Usage Rate per 1,000 gallons	$5.27	$5.43	$5.59	$5.76

**Usage capped at winter quarter average consumption plus 3,000 gallons, residential only*

- The recommended adjustments to water and sewer rates will result in the continued health and stability of the water and sewer systems, and will accomplish the following:
    - Ensure that the debt service coverage requirements are met during the projection period.

- Allow Loudoun Water to fund at least 50% of annual depreciation on the water and sewer system assets in the form of funding of annual replacement projects or contributions to the repair and replacement reserve.
- Maintain unrestricted net asset balances within the target range over the projection period.

- The basic charges for commercial customers are currently scaled by meter size. As part of the Study, the current scaling factors were evaluated and determined to differ from the scaling factors associated with availability charges assessed by Loudoun Water. We recommend that the basic charges be updated to match the scaling for availability charges to reflect the capacity associated with each meter size. Tables E1 and E2 reflect the updated scaling beginning with the January 1, 2022 charges. The scaling factors are discussed in detail in Section 3 of the report.

E.4 RECLAIMED WATER RATE ANALYSIS

A cost of service analysis was completed for Loudoun Water's reclaimed water operations to determine the appropriate pricing for reclaimed water service over the projection period. Based on our analysis of the reclaimed water system we have developed the following conclusions and recommendations.

- The cost of providing reclaimed water service is closely linked with the operations of Loudoun Water's Broad Run Water Reclamation Facility (WRF), and therefore costs are anticipated to trend with the cost of operating and maintaining the WRF.
- The current reclaimed water rates are not sufficient to meet the annual revenue requirements of the reclaimed system in the near term. Given the shortfall in revenues compared to expenses, and the linkage between the WRF and the cost of providing reclaimed water service, we recommend that Loudoun Water increase the reclaimed water rates at 3.0% per year for the next three years, consistent with the adjustments to sewer user rates over the same period. The recommended rates are presented in the following table.

Table E-3 Recommended Reclaimed Water Rates

	Current	Jan 1, 2022	Jan 1, 2023	Jan 1, 2024
Usage Rate per 1,000 gallons	$1.65	$1.70	$1.75	$1.80

E.5 AVAILABILITY CHARGE ANALYSIS

Loudoun Water currently collects water and sewer availability charges from new customers joining the water and sewer system to recover the cost of providing system capacity. The Availability Charge is calculated for a residential connection, or equivalent resident connection (ERC). As part of the Study, the level of the current charges was evaluated. Based on our analysis, the following recommendations were developed during the course of the Study.

- We recommend that the availability charges be adopted for a three-year period to provide clarity within the community. The recommended availability charges are presented in the following table.

Table E-4 Recommended Water Availability Charges

Meter Size	Current	Jan 1, 2022	Jan 1, 2023	Jan 1, 2024
5/8"	$7,180	$7,395	$7,617	$7,846
3/4"	$10,770	$11,093	$11,426	$11,769
1"	$21,540	$22,185	$22,851	$23,538
1.5"	$46,671	$48,068	$49,511	$50,999
2"	$86,162	$88,740	$91,404	$94,152
% Change		*3%*	*3%*	*3%*

Table E-5 Recommended Sewer Availability Charges

Meter Size	Current	Jan 1, 2022	Jan 1, 2023	Jan 1, 2024
5/8"	$8,711	$8,972	$9,241	$9,519
3/4"	$13,067	$13,459	$13,862	$14,279
1"	$26,134	$26,916	$27,723	$28,557
1.5"	$56,624	$58,318	$60,067	$61,874
2"	$104,537	$107,664	$110,892	$114,228
% Change		*3%*	*3%*	*3%*

E.6 DEVELOPER FEES AND CHARGES

Loudon Water charges developer fees and charges to applicants for extension of the water, reclaimed water and sewer system. These fees include plan review and inspection fees, connection charges, record drawing fees and CCTV fees. In 2020, Loudoun Water conducted a detailed study to evaluate the structure and level of the developer fees and charges and the updated fees were adopted and effective January 1, 2021. As part of the Study, the level of the fees were evaluated. The following conclusions and recommendations were developed during the course of the Study.

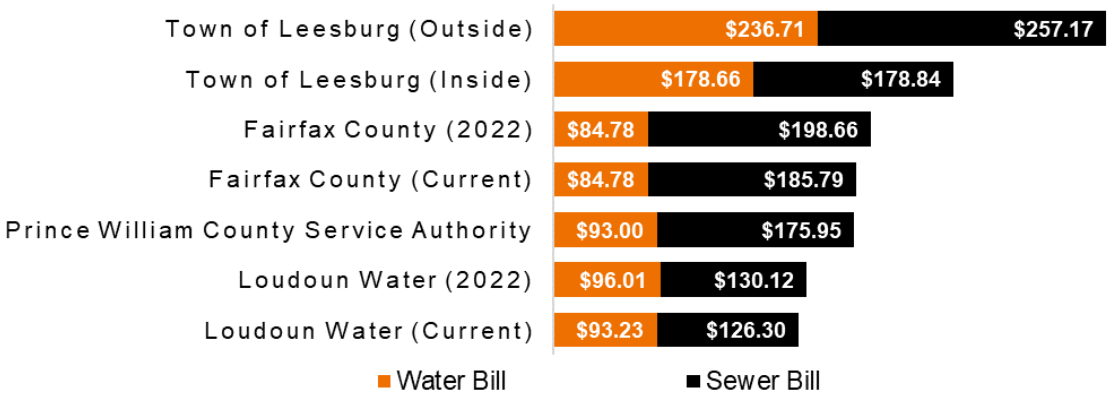
- The cost associated with providing the services related to the extension of utility service are based on materials and labor. These costs have and are expected to continue to increase over the coming years. As a result, we recommend that all developer fees and charges be increased by 3-percent in 2022, 2023 and 2024, effective January 1 of each year. The proposed fees and charge are documented in Section 8 of this report.

E.7 BENCHMARKING AND CUSTOMER IMPACTS

As part of the Study, benchmarking of comparable rates, fees and charges and resulting average customer water and sewer bill impacts were completed. The following findings and conclusions are provided based on the comparisons.

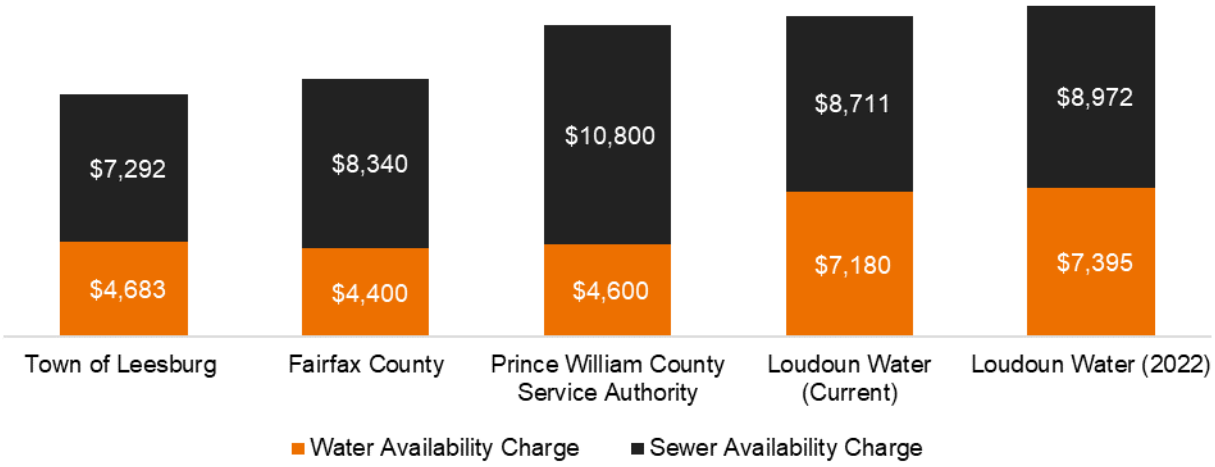
- Loudoun Water's average residential bill for 21,000 gallons per quarter was compared with neighboring and comparable jurisdictions. Based on the comparison, Loudoun Water's average bills remain among the lowest within the neighboring utilities. Given the modest adjustments recommended as part of this Study, Loudoun Water customers will continue to pay utility bills at the lower end of the scale. The figure on the following page demonstrates how Loudoun Water's current and proposed 2021 average water and sewer bill compares with those of surrounding jurisdictions. It is important to note that the bills for comparison utilities represent current bills and do not include likely future annual increases which are not yet publicly available. Additionally the sewer bill for Loudoun Water is capped at 17,000 gallons assuming a winter quarter average consumption of 14,000 gallons.

Figure E-1 Combined Water & Sewer Bill Comparison



- Availability charges were benchmarked against the same utilities. The following figure presents the comparison.

Figure E-2 Availability Charge Comparison



1. INTRODUCTION

Stantec has conducted a Comprehensive Water and Sewer Rate Study (Study) for the water, sewer and reclaimed water systems operated and maintained by Loudoun Water. This report presents the objectives, approach, methodologies, source data, assumptions, as well as the findings, conclusions and recommendations of the Study.

1.1 BACKGROUND

Loudoun Water was created by action of the Board of Supervisors of Loudoun County, VA under the Virginia Water and Wastewater Authorities Act and was chartered with the State Corporation Commission (SCC) in 1959. In accordance with the Charter, Loudoun Water is to provide water and wastewater service to the residents who live outside incorporated areas of Loudoun County. Loudoun Water is responsible for constructing, improving, and otherwise maintaining the water and sewer systems within portions of Loudoun County. The cost of operating and maintaining the water and sewer systems is fully funded by the rates, fees and charges collected by Loudoun Water from users of the systems.

The eastern portion of the water and wastewater system is considered the “Central System” and serves approximately 81,800 water and sewer accounts. Loudoun Water also owns and operates a number of community water and wastewater systems in the rural portion of the County. In 2016, Loudoun Water adopted a uniform rate for all metered customers.

The Loudoun Water Board is authorized to fix and revise rates, fees and other charges for water and sewer service by Section 15.2-5136 of the Virginia Code. Prior to action on proposed rates, Loudoun Water conducts a public hearing as required by the Virginia Code. After approval by the Loudoun Water Board, the rates become effective on the dates specified in the Board’s action and require no further review or approval. In 2018, Loudoun Water engaged a rate consultant to complete a comprehensive rate study. The Loudoun Water Board adopted the recommended rates developed during the study, and water and sewer rates have been adjusted annually per the plan over the last three years.

1.1.1 Water System

Loudoun Water delivers water to its customers through a water distribution system consisting of 1,285 miles of water mains and 8 storage tanks with a storage capacity of over 18 million gallons. Loudoun Water currently purchases the majority of its source water from Fairfax Water which supplies approximately 19 million gallons per day (MGD). The remainder of the water is supplied by the Trap Rock Water Treatment Plant. The treatment plant is part of Loudoun Water’s Potomac Water Supply Program (PWSP). This includes an intake on the Potomac River, transmission lines, quarry storage and the treatment plant. The new plant has the ability to produce up to 20 MGD. Trap Rock became fully operational in January 2019 and currently produces approximately 10 MGD. As demands on the Loudoun Water system increase, it is currently assumed that the additional water will be purchased from

Fairfax Water, as Loudoun Water anticipates continuing to operate Trap Rock at 10 MGD in the near future.

1.1.2 Wastewater System

Wastewater is treated at two different facilities. Loudoun Water owns, operates and maintains the Broad Run Water Reclamation Facility (BRWRF) which currently treats approximately 6 MGD of wastewater. The BRWRF has treatment capacity of 11 MGD. The remainder is treated by DC Water at their Blue Plains Wastewater Treatment Plant. Loudoun Water currently sends about 13.7 MGD to Blue Plains. Based on the current agreement, Loudoun Water has a maximum treatment capacity in the Blue Plains plant of 13.8 MGD. In addition to the WRF, Loudoun Water maintains over 900 miles of gravity wastewater mains and 49 miles of wastewater force mains.

1.1.3 Reclaimed Water System

Loudoun Water provides reclaimed water to commercial customers located within the Central System. The reclaimed water is produced at the WRF. The reclaimed water is distributed through a distribution system consisting of 14 miles of reclaimed mains. The reclaimed water system has delivered an average day amount of approximately 1.8 MGD of reclaimed water to 30 commercial customers during 2021.

1.1.4 Study Overview

Loudoun Water maintains a practice of completing a comprehensive water and sewer rate study at least every three years. Historically the rate studies have been used to establish rates, fees and charges for a three-year period. This practice allows Loudoun Water to ensure that the charges for service are sufficient, equitable and predictable within the service area. In January of 2021, Loudoun Water engaged Stantec to complete a comprehensive water, sewer and reclaimed water rate study consistent with Loudoun Water's practices. The scope of work for the study, established between Stantec and Loudoun Water includes several related tasks. The specific tasks are summarized below.

1) **Revenue Sufficiency Analysis and Financial Plan** – Develop a three-year financial plan for Loudoun Water's water and sewer systems that will determine the level of annual revenue required to satisfy projected annual operating expenses, debt service, and capital cost requirements as well as the maintenance of adequate reserves. The financial plan is designed to support the short and long-term needs of Loudoun Water in an effort to provide fiscal sustainability while minimizing customer impacts.
2) **Reclaimed Water Rate Analysis** – Evaluate the cost of providing reclaimed water service to determine if adjustments to the reclaimed water rates are warranted in light of the cost of service and forecasted changes in reclaimed water system demands within the Loudoun Water service area.
3) **Availability Charge Analysis** – Evaluate the current level of water and sewer availability charges and recommend modifications if appropriate. Develop a forecast of availability charges

based on the cost of providing water and sewer system capacity to new customers joining the Loudoun Water systems.

4) **Developer Fee Analysis –** Review the current developer fees and charges assessed by Loudoun Water to determine if the fees are set at a level that recovers the cost of providing these services and recommend modifications if the fees are set below the cost of service.

5) **Benchmarking and Customer Impacts** – Benchmark Loudoun Water's rates, fees and charges with comparable and local utilities. Demonstrate the impacts of any recommended changes to rates, fees and charges on customers of the systems in the form of customer bill impact comparisons.

The remaining sections of this report outline the analysis, assumptions, findings, conclusions and recommendations related to the completion of the scope of work.

2. REVENUE SUFFICIENCY ANALYSIS AND FINANCIAL PLAN

This section of the report presents the financial management plan and corresponding plan of water and sewer rate adjustments developed in the revenue sufficiency analysis (RSA) that was conducted as part of the Study. The following sub-sections of the report present a description of the approach, source data, assumptions and results of the RSA.

2.1 APPROACH

The Study was completed as a collaborative effort with Loudoun Water staff. During the Study, Stantec reviewed alternative multi-year financial management plans and corresponding water and sewer rate revenue adjustment plans through several interactive work sessions with Loudoun Water staff. During these work sessions, Stantec examined the impact of various inputs or assumptions upon key financial indicators by use of tabular and graphical output and extensive review of inputs, assumptions, and relationships between key variables. In this way, Stantec developed the recommended financial management plan and corresponding plan of annual water and sewer rate revenue adjustments presented in this report, which will allow Loudoun Water to fund its cost requirements throughout the planning period and meet its financial performance goals and objectives.

Loudoun Water provided historical and budgeted financial information regarding the operation of its water and sewer systems, as well as historical customer counts and volume data by class of customer. Loudoun Water also provided a multi-year capital improvement program (CIP), and documented current debt service obligations and covenants, relative to net income coverage requirements, reserves, etc. Following review of the data, we discussed with Loudoun Water staff key assumptions and policies that would affect the financial performance of the Utility, such as trends in demands, planned developments/customer growth, debt coverage levels, levels of reserves, capital funding sources, earnings on invested funds, escalation rates for operating costs, and purchased resources.

All of this information was entered into the financial module of our Financial Analysis and Management System interactive modeling system. The model is used to produce a 10-year projection of the sufficiency of the revenue provided by the current rates of the system to meet current and projected financial requirements and determined the level of rate revenue increases necessary in each year of the projection period to satisfy the system's annual financial requirements. While the model is developed for a ten-year period, the period shown in the main body of this report includes the next five years from 2022 to 2026.

2.2 SOURCE DATA

The following presents the key source data relied upon in conducting the Study:

2.2.1 Cash Balances

While Loudoun Water maintains a single fund to account for the operations of the utility, Loudoun Water maintains several internal accounts to track how the funds are generated and their intended use. The accounts used for tracking the funds and available balances include the following:

- Operating Account - The Operating Account serves as working capital reserve to provide for the potential lag between operating revenues and operating expenditures, fluctuations on budgets and unexpected minor expenses. The Operating Account is set to equal at least 3 months of operating expenses of the systems.
- Repair and Replacement Account - The Repair and Replacement Account serves to provide future funds for the repair and replacement of aging system assets. Rather than set a specific minimum target for the account, Loudoun Water has a goal maintained a practice of contributing to the account on an annual basis a minimum equivalent to 50-percent of annual depreciation expense on the system assets.
- Availability Charge Account - The Availability Charge Account serves as a funding mechanism for expansion related capital projects (cash funding and retirement of expansion related debt service).

Loudoun Water staff provided the cash balances within each of the accounts as of January 1, 2021. The account balances are shown in Table 2-1.

Table 2-1 Cash Balances as of January 2021

Account	Beginning Balance
Operating	$18,070,743
Repair and Replacement	$88,928,453
Availability Charge	$209,842,272
Total	**$316,841,467**

2.2.2 Revenues

The revenues utilized in the analysis reflect an evaluation of multiple years of historical results, 2020 actuals, and the 2021 Estimated Actuals. Revenues consist of fixed and commodity charges, availability charges, hydrant commodity charges, late payment penalty fees and miscellaneous service charges. Rate revenue is based upon 2021 estimated actual results, adjusted annually to reflect assumed customer growth and changes in demands. Projections of all other revenues reflect the amounts within the 2021 Estimated Actuals, excluding interest income, which was calculated annually based upon

projected average account balances and assumed interest rates. Revenue from availability charges is calculated based on the assumed growth in new accounts and current and projected availability charges.

2.2.3 Operating Expenditures

Loudoun Water's operating expenditures include all operating and maintenance (O&M) expenses and minor capital outlay. The Study based O&M expenditure projections on individual expense categories and expense amounts within Loudoun Water's 2021 budget, adjusted annually thereafter based upon assumed cost escalation factors. These were reviewed with Loudoun Water staff and outlined in the next section.

2.2.4 Debt Service

The annual debt service schedules for existing outstanding debt were provided by Loudoun Water. Loudoun Water currently has nine outstanding debt issues totaling approximately $310 million in outstanding principal and interest. Loudoun Water currently recovers 20% of annual principal payments on existing debt from user rates (existing customers) and the remaining 80% is recovered from availability charges (new customers). This allocation is based on the types of projects funded with bond proceeds. As part of the Study, the allocation of debt service between user rates and availability charges was reviewed in light of the capital projects funded with the outstanding bond proceeds. Based on this review we recommend that Loudoun Water transition to recovering 70% of principal from availability charges by 2023 (75% in 2022 and 70% by 2023). This transition will bring the funding sources in line with outstanding debt service. The interest on existing debt service is recovered from user rates. The existing debt payments (principal and interest) are shown in Table 2-2.

Table 2-2 Existing Debt Payments

System	2022	2023	2024	2025	2026
Water	$9,210,048	$8,470,283	$8,473,178	$8,465,853	$8,490,928
Sewer	10,459,488	11,202,904	11,197,633	11,205,533	11,183,209
Total	**$19,669,535**	**$19,673,186**	**$19,670,811**	**$19,671,386**	**$19,674,137**

The debt service reflect in Table 2-2 includes a refunding and new money borrowing that was completed earlier this year. As a result of this borrowing, Loudoun Water received $65 million in bond proceeds that will be applied to future sewer capital projects, discussed in the next section of the report.

2.2.5 Capital Improvement Program

Loudoun Water provided the multi-year capital improvement program (CIP) at the detailed project level for the period 2021 through 2030. A summary of the five-year capital improvement program by project category for the water system is presented in Table 2-3 followed by a summary for the sewer system in Table 2-4.

Table 2-3 Water Capital Improvement Program

Project Category	2022	2023	2024	2025	2026
Administrative	$3,311,000	$4,292,200	$1,238,600	$1,991,000	$3,236,200
Community Systems	1,460,000	1,095,000	1,295,000	3,750,000	3,850,000
Finance	4,710,000	4,610,000	4,510,000	4,410,000	4,310,000
Potomac Water Supply	17,500,000	34,260,000	40,860,000	16,160,000	250,000
Repair & Replacement	2,764,200	2,111,400	3,876,000	4,617,200	5,559,000
Other Water	5,365,800	4,098,600	7,524,000	8,962,800	10,791,000
Total	**$35,111,000**	**$50,467,200**	**$59,303,600**	**$39,891,000**	**$27,996,200**

Table 2-4 Sewer Capital Improvement Program

Project Category	2022	2023	2024	2025	2026
Administrative	$4,214,000	$5,462,800	$1,576,400	$2,534,000	$4,118,800
Broad Run WRF	39,455,000	32,030,000	7,490,000	5,030,000	5,220,000
Community Systems	2,230,000	5,945,000	5,515,000	6,550,000	6,650,000
Finance	12,780,000	8,780,000	10,410,000	11,000,000	10,990,000
Repair & Replacement	8,741,400	4,182,000	3,774,000	5,416,200	7,289,600
Reclaimed System	3,580,000	1,470,000	-	-	-
Other Sewer	16,968,600	8,118,000	7,326,000	10,513,800	14,150,400
Total	**$87,969,000**	**$65,987,800**	**$36,091,400**	**$41,044,000**	**$48,418,800**

As part of the Study, we worked with Loudoun Water staff to examine the specific funding for each of the capital projects included in the CIP. Loudoun Water staff identified which projects or portions of projects should be funded by existing users, and which projects were growth related and should be funded from availability charges. The use of bond proceeds and grants were also discussed. Table 2-5 presents Loudoun Water's anticipated capital spending by funding source over the next five years.

Table 2-5 Capital Improvement Summary by Funding Source

Funding Source	2022	2023	2024	2025	2026
Availability Charges	$48,930,000	$72,395,500	$61,128,500	$54,269,000	$49,425,500
User Rates	37,725,000	34,059,500	16,936,877	26,666,000	26,989,500
2021 Bond Proceeds	$36,430,000	-	-	-	-
Future Borrowing	-	-	17,329,623	-	-
Grants*	-	10,000,000	-	-	-
Total	**$123,080,000**	**$116,465,000**	**$95,395,000**	**$80,935,000**	**$76,415,000**

**Assumed FEMA grant for Quarry A project.*

As demonstrated in the table, approximately 40-percent of the five-year capital plan will be funded from user rates with the balance funded from availability charges, existing bond proceeds, future borrowing or grants. The specific funding for the capital improvements plan, including the issuance of debt to fund a portion of the CIP and the assumed execution rate for the projects are discussed in the next section of the report.

2.3 ASSUMPTIONS

The following presents the key assumptions utilized in the completion of the study.

2.3.1 Cost Escalation

Annual cost escalation factors for the various types of operating and maintenance expenses were developed based upon a review of historical trends, our industry experience, and detailed discussions with Loudoun Water staff. Table 2-6 presents a summary of the water and sewer system annual cost escalation factors used in the Study to forecast operating expenses for the period 2022 to 2031.

Table 2-6 O&M Cost Escalation Assumptions

Budget Category	Annual Inflation
Salaries and Wages	5.0%
Fringe Benefits	5.0%
Electric	3.0%
Contractual Services	3.0%
Repairs and Maintenance	3.0%
Operating Supplies	3.0%
Other Operating Expenses	3.0%
Wholesale Sewer*	3.5%
Purchased Water**	3.0%

**Assumed escalation in DC Water treatment expenses*
***Assumed escalation in purchased water costs from Fairfax Water*

Based on discussions with Loudoun Water staff and review of historical budget to actual operating and maintenance spending, an assumed execution rate of 97-percent of budget was used in the forecast of annual operating and maintenance expenses.

2.3.2 Interest Earnings

Interest Income throughout the projection period is calculated annually based upon projected average fund balances and assumed interest rates. The assumed interest rates are presented in Table 2-7.

Table 2-7 Interest Rates

Funding Source	2022	2023	2024	2025	2026
Interest Rate on Balances	1.00%	1.00%	1.50%	1.50%	1.50%

2.3.3 Customer Growth & Volume Forecast

The growth in new connections to the Loudoun Water systems was based on Loudoun County population projections. Historically, Loudoun Water has seen an average increase of approximately 3.0-percent in connections per year. The County projections provide growth forecasts that are consistent with this historical level of growth. The changes in water system demands are based on a combination of the increase in the number of ERCs and an assumed decrease in the per ERC usage of approximately 1.0-percent per year. The decrease in per account usage is based on historical trends demonstrated within Loudoun Water's customer usage patterns and is consistent with national trends. Table 2-8 presents the anticipated customer growth and incremental increases in system demand over the planning period.

Table 2-8 Water Connection Growth and Volume Forecast

Year	Increase in ERCs	% Change in ERCs	Increase in Demands[1]	% Change in Demands
2022	2,534	2.71%	143,741	1.68%
2023	3,015	3.14%	183,079	2.11%
2024	3,230	3.26%	197,606	2.23%
2025	3,232	3.16%	192,942	2.13%
2026	3,125	2.96%	178,881	1.93%
Total	**14,711**		**896,248**	

[1]*Thousand gallons, assumes declining per connection usage (-1.0% per year)*

Loudoun Water currently maintains a water rate structure with two customer classes (Residential and Commercial) with increasing water rates proportional to water usage. To accurately forecast future water rate revenues under the existing structure, it was necessary to determine the amount of consumption that falls within the current Residential and Commercial tiers.

Loudoun Water currently defines the Residential tiers for quarterly usage as:

Tier 1: 0 to 25,000 gallons
Tier 2: Over 25,001 to 50,000 gallons
Tier 3: Over 50,000 gallons

The current Commercial Tiers for quarterly usage are:

Tier 1: Consumption up to reserved capacity purchased with availability charge
Tier 2: Consumption in excess of the reserved capacity purchased

Table 2-9 shows the percentage breakdown of customers and consumption within the current rate structure. It should be noted that the percentages in Table 2-9 are based on annual numbers and therefore are influenced by seasonal variations.

Table 2-9 Consumption Usage Patterns in Current Water Rate Structure

	2018	2019	2020
Residential			
Tier 1: 0 – 25,000 gallons	88.8%	84.5%	85.8%
Tier 2: 25,001 – 50,000 gallons	8.7%	10.9%	10.7%
Tier 3: Over 50,000 gallons	2.6%	4.6%	3.5%
Commercial			
Tier 1: Up to purchased capacity	91.2%	89.4%	95.3%
Tier 2: Over purchased capacity	8.8%	10.6%	4.7%

Table 2-9 shows that there has been some fluctuation over the last three years in the usage by tier. The changes are most likely due to the amount of rainfall experienced each year (particularly 2018 and 2020) and 2020 is likely influenced by the Covid-19 Pandemic. Usage data is discussed in more detail in Section 3 of the report.

2.3.4 Cash Balance Guidelines

Loudoun Water maintains a policy that the total cash balance should be maintained within the range of two to three times the three-year rolling average of operating and maintenance expenses, and debt service.

Table 2-10 presents the calculated target range for each year over the next five years. The target range balance was used in the study to evaluate the sufficiency of current revenues to meet the minimum balance and to develop the financial plan discussed later in this section of the report.

Table 2-10 Unrestricted Balance Targets

	2022	2023	2024	2025	2026
Max (3 x O&M and Debt)	$266,581,959	$294,325,587	$303,995,636	$313,777,125	$323,970,415
Min (2 x O&M and Debt)	$177,721,306	$196,217,058	$202,663,757	$209,184,750	$215,980,277

2.3.5 Funding of the Capital Improvements Program

Based on discussions with Loudoun Water staff and utilizing the capital optimization function of the financial model, the capital improvements program (CIP) over the planning period will be funded from a combination of existing cash balances (from user rates and availability charges), annual revenues "pay-go" funding (from user rates and availability charges) and with long-term borrowing. Our financial analysis assumes that Loudoun Water will borrow approximately $17 million in 2024 to fund capital project needs, and that the remainder of the CIP will be funded from current revenues and available balances within the availability charge account and the repair and replacement account. The exact size and timing of the borrowing will depend on the specific funding requirements in future years.

Given the magnitude of the CIP, one of the key assumptions for the financial planning analysis is the anticipated execution rate of the capital projects. Historically the CIP has not fully executed on a year-to-year basis. However, based on discussions with Loudoun Water staff and review of historical capital spending and the current planned capital projects, the financial planning analysis assumes that Loudoun Water will fully execute the CIP at current planned amounts as shown in Table 2-11.

Table 2-11 Capital Improvement Summary at Execution

	2022	2023	2024	2025	2026
Total Planned CIP	$123,085,000	$106,455,000	$95,395,000	$80,935,000	$76,415,000
Assumed Execution Rate	100%	100%	100%	100%	100%
Total CIP Funded	**$123,085,000**	**$106,455,000**	**$95,395,000**	**$80,935,000**	**$76,415,000**

2.3.6 Funding of Repair and Replacement Account

Loudoun Water currently maintains a goal that approximately 50-percent of the annual depreciation expense on water and sewer system assets will be contributed to the Repair and Replacement Account on an annual basis. These contributions ensure that adequate funds are generated from user rates to fund at least a portion of the depreciation. While we recommend that Loudoun Water continue to follow this practice, it is important to recognize that as the system ages there will be years when the amount of required funding for repair and replacement will be significant. During these years, it may be unrealistic to fund contributions to the reserve account and fund current replacement projects at the same time. The most important factor is that user rates are set at a level that fund at least 50% of depreciation each and every year. In some years, the revenues may be used immediately to fund projects, and in other years they can be contributed to the Repair and Replacement Account. Table 2-12 presents the annual funding

of depreciation and shows that Loudoun Water will be funding above 50-percent of depreciation from user rates over the five-year planning period.

Table 2-12 Annual Funding of Depreciation

	2022	2023	2024	2025	2026
Cash Funded R&R Projects	$37,725,000	$34,059,500	$16,936,877	$26,666,000	$26,989,500
Contributions to R&R Fund	-	-	19,897,160	14,009,349	17,739,902
Total	**37,725,000**	**34,059,500**	**36,834,037**	**40,675,349**	**44,729,402**
% of Depreciation Funded from Rates	**70%**	**59%**	**60%**	**63%**	**66%**

2.3.7 Debt Service and Coverage

One of the most important covenants Loudoun Water makes relative to the issuance of debt is that its annual net revenues (revenues less operating expenses) will be at least 1.2 times greater than its senior lien debt service requirements. It is important to note that these revenue covenants (often referred to as debt service coverage requirements) represent minimum requirements established in Loudoun Water's bond covenants. Should Loudoun Water be unable to meet these requirements, it could be found in technical default. This would result in Loudoun Water facing a potential downgrade in its credit rating, which would affect the interest rate and terms of any future financing initiatives. As a policy decision, utilities often measure revenue sufficiency and set rates based upon a higher debt service coverage level, to ensure compliance with these type of covenants in the event future projections of revenue and expenses do not occur as predicted (due to extended drought conditions, unanticipated capital requirements or operating cost increases, natural disasters, etc.). In accordance with Loudoun Water policy, we have assumed that Loudoun Water will maintain debt service coverage of at least 1.5. This level of debt coverage is typical within the utility industry and will help to ensure water and sewer revenues are kept at a level that satisfies Loudoun Water's bond covenants.

2.4 REVENUE SUFFICIENCY AND FINANCIAL PLANNING RESULTS

To evaluate the sufficiency of existing rates, fees and charges to fund Loudoun Water's system revenue requirements over the planning period, a projection of system revenue requirements and revenues at current rates was developed. It is important to note that Loudoun Water's availability charges are determined based on the cost of providing system capacity as compared to annual cash requirements. As a result, the revenue sufficiency is focused on the revenues generated from user rates. The evaluation of availability charges is discussed in Section 4 of this Report. However, any changes in availability charges and reclaimed water rates are factored into the overall revenues of the utility.

2.4.1 Revenue Requirement Projection

Based on the data and assumptions outlined in the prior sections of this report, a forecast of the water and sewer system revenue requirements was developed. The forecasts for the water system and the sewer system are presented on the following page in Tables 2-13 and 2-14, respectively.

Table 2-13 Forecast of Annual Water Revenue Requirements

Expenditure Type	2022	2023	2024	2025	2026
Personnel	$16,247,000	$17,059,350	$17,912,317	$18,807,933	$19,748,330
Purchased Water	5,987,385	6,283,083	6,601,522	6,930,300	7,262,686
Other Operating	11,573,114	11,920,307	12,277,916	12,646,254	13,025,642
Total Operating	**33,807,498**	**35,262,740**	**36,791,756**	**38,384,487**	**40,036,658**
Existing Debt Service	9,210,048	8,470,283	8,473,178	8,465,853	8,490,928
Projected Debt Service[1]	-	-	296,856	460,685	409,283
Cash Funded Capital	37,425,864	38,668,200	37,067,286	42,760,600	39,513,400
Total Capital	**46,635,912**	**47,138,483**	**45,837,319**	**51,687,138**	**48,413,611**
Total Water Expenses	**$80,443,410**	**$82,401,223**	**$82,629,075**	**$90,071,625**	**$88,450,269**

[1] Assumes interest only payments in first year of new issue

Table 2-14 Forecast of Annual Sewer Revenue Requirements

Expenditure Type	2022	2023	2024	2025	2026
Personnel	$19,570,250	$20,548,762	$21,576,200	$22,655,010	$23,787,761
Sewage Disposal	8,976,000	9,155,520	9,338,630	9,525,403	9,715,911
Other Operating	13,784,994	14,197,754	14,622,535	15,060,091	15,511,017
Total Operating	**42,331,244**	**43,902,036**	**45,537,366**	**47,240,504**	**49,014,689**
Existing Debt Service	10,459,488	11,202,904	11,197,633	11,205,533	11,183,209
Projected Debt Service[1]	-	-	410,475	561,941	613,343
Cash Funded Capital	49,229,136	67,786,800	40,998,092	38,174,400	36,901,600
Total Capital	**59,688,624**	**78,989,704**	**52,606,200**	**49,941,874**	**48,698,152**
Total Sewer Expenses	**$102,019,867**	**$122,891,740**	**$98,143,566**	**$97,182,378**	**$97,712,841**

[1] Assumes interest only payments in first year new issue

As demonstrated in the tables above, there is a significant amount of fluctuation in the annual revenue requirements for the water and sewer systems over the projection period due primarily to the annual capital needs and how the specific capital projects are funded.

2.4.2 Revenue Projections at Current Rates and Cash Flow Projection

Based on the data and assumptions outlined above, a revenue forecast over the planning period was developed using the current rates, fees and charges. The revenue forecasts for the water and sewer system are presented in Tables 2-15 and 2-16, respectively.

Table 2-15 Projection Water Revenues at Current Rates, Fees and Charges

Revenue Type	2022	2023	2024	2025	2026
Water User Rates	$47,786,417	$48,946,320	$50,194,523	$51,425,338	$52,586,285
Other Operating	3,267,176	3,324,336	3,382,638	3,442,107	3,502,765
Availability Charges	18,739,944	22,966,045	25,341,869	26,118,287	26,011,212
Investment Income	1,199,926	998,869	1,435,098	1,500,133	1,558,749
Total Water Revenues	**$70,993,462**	**$76,235,570**	**$80,354,129**	**$82,485,866**	**$83,659,011**

Table 2-16 Projection Sewer Revenues at Current Rates, Fees and Charges

Revenue Type	2022	2023	2024	2025	2026
Sewer User Rates	$56,263,795	$57,598,240	$59,034,921	$60,450,144	$61,782,589
Reclaimed Water Rates	1,551,500	1,660,105	1,776,312	1,900,654	2,033,700
Other Operating	4,158,224	4,079,866	4,151,420	4,224,404	4,298,848
Availability Charges	22,735,884	27,863,122	30,745,546	31,687,521	31,557,614
Investment Income	1,527,179	1,225,885	1,761,257	1,841,073	1,913,010
Total Sewer Revenues	**$86,236,582**	**$92,427,218**	**$97,469,456**	**$100,103,796**	**$101,585,761**

A comparison of the projected total revenue requirements (Tables 2-13 and 2-14) and revenues at current rates within the water and sewer systems reveal that the current rates, fees and charges are not sufficient to meet the future annual revenue requirements. Tables 2-17 and 2-18 present a comparison of the annual revenue requirements for each system and the forecasted revenues at current rates.

Table 2-17 Projection of Water Revenue Requirements and Current Revenues

	2022	2023	2024	2025	2026
Water Expenses	**$80,443,410**	**$82,401,223**	**$82,629,075**	**$90,071,625**	**$88,450,269**
Water Revenues	70,993,462	76,235,570	80,354,129	82,485,866	83,659,011
(Shortfall) / Surplus	**($9,449,948)**	**($6,165,653)**	**($2,274,946)**	**($7,585,759)**	**($4,791,258)**

Based on the forecast, the water system will experience a cumulative shortfall of approximately $30 million over the five-year forecast period should the water revenues at current rates, fees and charges remain in place.

Table 2-18 Projection of Sewer Revenue Requirements and Current Revenues

	2022	2023	2024	2025	2026
Sewer Expenses	**$102,019,867**	**$122,891,740**	**$98,143,566**	**$97,182,378**	**$97,712,841**
Sewer Revenues	86,236,582	92,427,218	97,469,456	100,103,796	101,585,761
(Shortfall) / Surplus	**($15,783,285)**	**($30,464,522)**	**($674,110)**	**$2,921,418**	**$3,872,920**

Based on the forecast, the sewer system will experience a cumulative shortfall of approximately $40 million over the five-year forecast period based on sewer revenues at current rates, fees and charges. While in any one year it is acceptable to have expenditures exceed revenues as available balances can be utilized, the consistent annual shortfalls in the water and sewer system would not allow Loudoun Water to maintain its minimum unrestricted net asset balance target given the current rates over the projection period.

2.4.3 Recommended Financial Plan

Based on the annual revenue requirements, the necessity to maintain the minimum unrestricted net asset balance and maintain the financial viability of the utility, a recommended plan of user rate increases was developed. The adjustments in user rates were developed in concert with the calculated availability charges and reclaimed water rates discussed later in this report and recognize the additional revenues that will be generated should Loudoun Water adjust these charges and rates. The recommended increases in water and sewer rates are proposed for 2022, 2023 and 2024. Based on our financial analysis we forecast that additional increases will be required in subsequent years. Table 2-19 presents the recommended rate adjustments and an estimate of future adjustments.

Table 2-19 Recommended Water and Sewer User Rate Adjustments

	2022	2023	2024	2025	2026
Water Rate Adjustment	**3.0%**	**3.0%**	**3.0%**	3.0%	3.0%
Sewer Rate Adjustment	**3.0%**	**3.0%**	**3.0%**	3.0%	3.0%

The recommended rate adjustments should be applied to all components of the water and sewer user rates and for both residential and commercial customers. The recommended water and sewer rates are presented in the following tables. It should be noted that the basic charges for commercial customer presented in the tables incorporate a modification to the scaling factors between meter sizes. Section 3

of the report describes the changes and the basis for the recommended changes in the basic charge scaling.

Table 2-20 Recommended Water Rates

	Current	Jan 1, 2022	Jan 1, 2023	Jan 1, 2024
Residential Rates				
Basic Charge	$36.74	$37.84	$38.98	$40.15
Tier 1: 0 - 25,000 Gallons	$2.69	$2.77	$2.85	$2.94
Tier 2: 25,001 - 50,000 Gallons	$7.47	$7.69	$7.92	$8.16
Tier 3: Over 50,000 Gallons	$10.00	$10.30	$10.61	$10.93
Commercial Rates				
Basic Charge				
5/8”	$36.74	$37.84	$38.98	$40.15
3/4"	$51.74	$56.76	$58.47	$60.23
1"	$108.79	$113.52	$116.94	$120.45
1 1/2"	$171.85	$245.96	$253.37	$260.98
2"	$276.93	$454.08	$467.76	$481.80
3"	$457.07	$1,002.76	$1,032.97	$1,063.98
4"	$757.30	$1,835.24	$1,890.53	$1,947.28
6"	$1,507.90	$2,573.12	$2,650.64	$2,730.20
Tier 1: Up to Purchased Capacity	$3.53	$3.64	$3.75	$3.86
Tier 2: Over Purchased Capacity	$6.07	$6.25	$6.44	$6.63
All Other Uses*	$7.47	$7.69	$7.92	$8.16

**Includes, but not limited to, fire hydrant special use, construction water for which an availability charge has not been paid and irrigation and irrigation submeters.*

Table 2-21 Recommended Sewer Rates

	Current	Jan 1, 2022	Jan 1, 2023	Jan 1, 2024
Residential Rates				
Basic Charge	$36.71	$37.81	$38.94	$40.11
Usage Rate per 1,000 gallons*	$5.27	$5.43	$5.59	$5.76
Commercial Rates				
Basic Charge				
5/8”	$36.71	$37.81	$38.94	$40.11
3/4"	$52.50	$56.72	$58.41	$60.17
1"	$112.67	$113.43	$116.82	$120.33
1 1/2"	$179.12	$245.77	$253.11	$260.72
2"	$289.89	$453.72	$467.28	$481.32
3"	$479.79	$1,001.97	$1,031.91	$1,062.92
4"	$796.28	$1,833.79	$1,888.59	$1,945.34
6"	$1,587.50	$2,571.08	$2,647.92	$2,727.48
Usage Rate per 1,000 gallons	$5.27	$5.43	$5.59	$5.76

**Usage capped at winter quarter average consumption plus 3,000 gallons, residential only*

Sample customer bill impacts resulting from the recommended water and sewer rates are presented in Section 7 of the report.

The adjustments to water and sewer rates along with proposed adjustments to reclaimed water rates and availability charges (both discussed later in this report) will allow Loudoun Water to maintain an unrestricted net asset balance that remains above the minimum balance, meet debt service coverage requirements and fund the operations and maintenance of the water and sewer systems. The detailed pro-forma cash flow results with the recommended changes are presented in Section 6 of the report.

3. EVALUATION OF WATER AND SEWER USER RATES

This section of the report examines the pricing of water and sewer service within Loudoun Water's system. While our scope of work for the study does not include the development of alternative water and sewer user rate structures, we were tasked with evaluating how well the current rate structures comport with intended cost of service recovery for each component of the rate structure and to develop recommendations within the current structure if the rates are not aligned with current policy. The design and structure of the current rates are discussed below.

3.1 EVALUATION OF WATER AND SEWER USER RATE STRUCTURE

As demonstrated in the prior section of the report, Loudoun Water's current water and sewer rates include fixed basic charges and volumetric or commodity rates that are charged based on the metered water used each quarter. All residential customers are charged the same fixed basic charge and commercial customers are based on the size of the meter serving each connection account. Volumetric rates are differentiated by the customer class between residential and commercial customers. Loudoun Water maintains specific cost of service recovery objectives for each component of the water and sewer user rates.

3.1.1 Basic Charges

Basic charges represent the fixed charges billed to customers regardless of actual water use. Fixed basic charges are important because they provide a minimum amount of fixed revenue regardless of changes in customers' water usage patterns. Additionally, the basic charges cover some of the fixed cost incurred by Loudoun Water in making service available to customers regardless of if they utilize the service or not. There has been an overall trend within the utility industry to increase the amount of fixed revenue generated from user rates due to the ongoing declines in customer usage patterns.

It is common industry practice to scale basic charges for commercial customer based on meter size, since the size of a customers' meter reflects the potential demand or use of the system service. For example, Loudoun Water is required to have more water available on demand for a customer with a 4" meter than a 5/8" meter simply based on the fact that the larger meter can draw significantly more water from the system. Loudoun Water uses this same principle when scaling availability charges for new customers joining the water and sewer system. A customer requiring a larger meter is charged a higher availability charge consistent with the demands they can place on the system.

As part of the rate study, the current factors that are used to scale fixed basic charges were reviewed. A review of the current scaling factors revealed that the factors are not consistent with the factors currently utilized to scale availability charges nor are the consistent with industry standard meter capacity ratios. The current basic charge scaling factors are shown in Table 3-1 along with the current scaling factors used for availability charges which are proposed for commercial basic charges going forward.

Table 3-1 Commercial Basic Charge Scaling Factors

Meter Size	Current	Proposed
5/8”	1.00	1.00
3/4"	1.41	1.50
1"	2.96	3.00
1 1/2"	4.68	6.50
2"	7.54	12.00
3"	12.44	26.50
4"	20.61	48.50
6"	41.04	68.00

It should be noted that given the lack of alignment between the scaling factors, the basic charge for commercial customers with large meters will increase at higher than 3-percent in FY22, as demonstrated in Tables 2-20 and 2-21.

The amount of revenue generated from the basic charge can be modified simply by increasing or decreasing the magnitude of the basic charge per account based on what percentage of revenues should be collected by the basic charge. It will also naturally increase based on the proposed equivalents for the utility. Loudoun Water maintains a rate goal that the basic charge should recover between 25% and 30% of total rate revenues. To evaluate whether the current rate structure is meeting, and will continue to meet this revenue target, the current revenues and future revenues from the basic charge under the financial plan were estimated over the projection period. Table 3-2 shows the percentage of basic charge revenue that will be generated in 2022 through 2026 under the financial plan.

Table 3-2 Basic Charge Analysis

	2022	2023	2024	2025	2026
Basic Charge Revenue	$31,143,859	$33,082,035	$35,182,206	$37,379,319	$39,637,665
Total Revenue	102,040,000	107,171,717	113,033,124	119,357,963	125,916,841
% of Total Revenue	**30.5%**	**30.9%**	**31.1%**	**31.3%**	**31.5%**

Table 3-2 demonstrates that under Loudoun Water’s current rate structure basic charges will generate in the range of 30% of revenues each year during the projection period, therefore meeting the revenue target.

3.1.2 Volumetric Charges

Variable charges represent the portion of the water and sewer bill that is based on metered water use. The key issues related to the variable charges are related to the intended cost of service recovery for

each component of the structure. Loudoun Water currently charges residential and commercial customers different rates for different levels of metered water consumption. These structures are intended to recover the costs incurred by Loudoun Water at the varying levels of customer usage. The specific components of the revenue requirements recovered in the current water rate structure tiers include the following:

- Residential Tiers 1 and 2 combined with Commercial Tier 1 plus a portion of basic charges and a portion of other miscellaneous revenues should fund all operating and maintenance expenses and the annual debt service payments allocated to user rates.
- Residential Tier 3 and Commercial Tier 2 revenue, irrigation revenues, a portion of basic charges and a portion of miscellaneous revenues should fund a majority of the capital replacement reserve contribution.

The design of the water variable charges reinforces the idea that overuse of the system will result in higher replacement costs for the system as a whole and therefore the users who overuse the system will be paying for this increased replacement cost. Essentially these customers are “renting” additional capacity above and beyond the capacity that was reserved when availability charges were paid. Table 3-3 presents the results of the current variable rate structure performance under the proposed financial plan. It should be noted that the revenues from Residential Tiers 1 and 2 and Commercial Tier 1 include the 75-percent of the basic charge revenue. The Residential Tier 3 and Commercial Tier 2 revenues include the remaining 25-percent of the basic charge revenue.

Table 3-3 Water Tiered Rate Structure Analysis

	2022	2023	2024	2025	2026
Water O&M and Debt	$33,390,336	$28,929,865	$33,320,602	$36,920,620	$38,457,162
Residential Tiers 1 & 2 and Commercial Tier 1	43,366,477	45,740,807	48,335,885	51,027,455	53,743,554
Target Met?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Annual R&R Reserve Contribution	-	-	19,897,160	14,009,349	17,739,902
Residential Tier 3 and Commercial Tier 2	$8,848,287	$7,074,212	$7,491,813	$7,927,170	$8,371,094
% of Funding from Residential Tier 3 and Commercial Tier 2	**N/A**	**N/A**	**37%**	**57%**	**47%**

Table 3-3 demonstrates that the current Residential Tier 1 and 2 and Commercial Tier 1 rates meet the target for each year over the projection period. Table 3-3 demonstrates that the revenues from Residential Tier 3 and Commercial Tier 2 will fund a portion of the contribution to the R&R account. It should be noted that in the past the level of revenue from Residential Tier 3 and Commercial Tier 2 has been able to fully fund the R&R reserve contributions. However as shown in Table 3-3, based on current

usage patterns, these tiers are not anticipated to fully fund the contributions. This is primarily due to reductions in water sold at the highest tiers.

Over the last several years, Loudoun Water has seen a reduction in the amount of water sold at Residential Tier 3 and Commercial Tier 2 rates likely as a result of conservation, water fixture change outs and recent weather patterns. This result demonstrates that these customers are currently not "overusing" as much water as they have in the past. However, it is important to note that the current usage patterns used in the study are from a period of time in which precipitation has been higher than recent history within the Loudoun Water service area. Table 3-4 shows the monthly rainfall amounts during the typical irrigation months over the past five years measured at the Dulles International Airport. The table demonstrates that 2018 and 2020 have been unusually wet summers.

Table 3-4 Monthly Rainfall Amounts - Dulles International Airport

Inches of Rainfall[(1)]	2018	2019	2020	2021
May	8.92	5.05	2.40	2.87
June	4.15	2.44	5.21	3.65
July	11.21	2.73	4.85	2.43
August	7.23	4.79	7.64	4.93
Total	**31.51**	**15.01**	**20.10**	**13.88**

(1) National Oceanic and Atmospheric Administration

We recommend that Loudoun Water continue to monitor customer usage patterns over the next three years to determine average demands in a year with normal precipitation levels. If precipitation patterns return to more recent historic levels but water sales at the higher tiers do not return to historic levels, the recent trends may represent a more fundamental shift in customer usage. If over the next few years, Loudoun Water learns that this is in fact the case, it would be worthwhile to investigate whether the current water tiers are set at the appropriate levels.

4. RECLAIMED WATER RATES

This section of the report outlines our evaluation of the current and projected cost of providing reclaimed water service within the Loudoun Water service area. The analysis includes an evaluation of whether adjustments to existing reclaimed water rates are warranted in light of the financial forecast and the anticipated demands for reclaimed water within the service area.

4.1 BACKGROUND

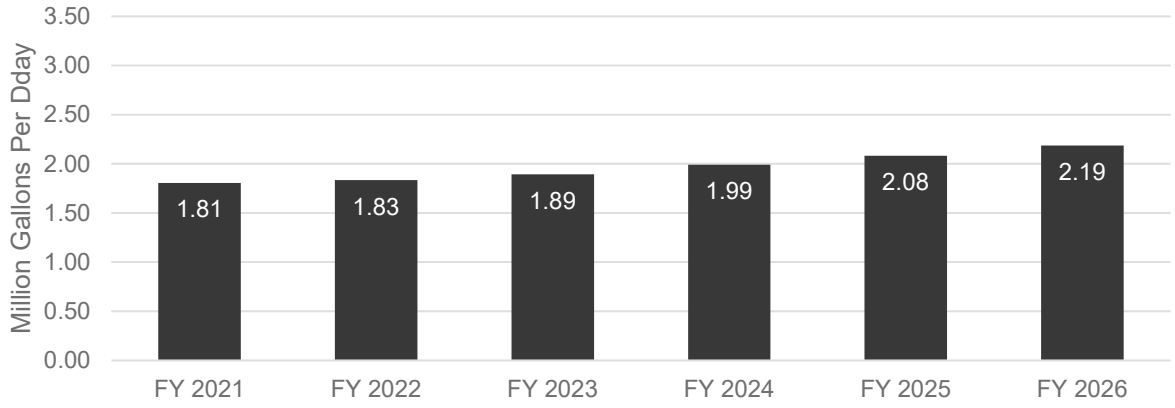
While the majority of the effluent from Loudoun Water's Broad Run Water Reclamation Facility (BRWRF) is discharged into Broad Run, a tributary of the Potomac River, a portion of effluent is delivered in the form of reclaimed water to commercial customers for various non-potable uses, such as irrigation and cooling water.

Over the last three years, Loudoun Water has gradually increased reclaimed water rates consistent with increases in potable water and sewer rates. The following sections of the report examine the growth in the system, the cost of providing service and specific recommendations for modifications to the existing reclaimed water rates.

4.2 RECLAIMED CUSTOMERS AND DEMAND FORECAST

Loudoun Water's reclaimed customer base includes 30 customers plus BRWRF onsite use, which is not billed. The customer base includes commercial customers that use reclaimed water for irrigation and as cooling water for data processing operations. In 2021, Loudoun Water has supplied approximately 1.81 MGD of reclaimed water on an average day basis. Based on discussions with Loudoun Water staff, the reclaimed water demands are expected to increase over the next five to ten years. The forecast of demand for the system is shown in Figure 4-1.

Figure 4-1 Reclaimed Water Demand Forecast (Average Day Demand)



4.3 REVENUE REQUIREMENTS

The cost of providing reclaimed water is closely related to the operational costs of Loudoun Water's BRWRF, given that the reclaimed water is generated at this facility. While it is challenging to quantify all costs associated with producing reclaimed water, there are expenditures that can be identified as specifically related to providing the service. These costs include:

- Customer service staff assigned to the reclaimed water system
- Chemicals required to produce the reclaimed water
- Pumping power costs associated with producing reclaimed water
- Funding of the repair and replacement of the reclaimed water system

As part of the study, the cost of each of these individual expense line items were quantified for 2018 and forecasted over the projection period. To develop the forecast of reclaimed water revenue requirements based on these cost components several escalation factors were utilized. The factors are included in Table 4-1.

Table 4-1 O&M Cost Escalation Assumptions

Expenditure Type	Annual Inflation
Salaries and Wages	3.0%
Fringe Benefits	3.0%
Electric	4.0%
Chemicals	3.0%

The annual contribution to the repair and replacement of the reclaimed water system was set at 50% of the annual depreciation on the existing reclaimed water system assets. Table 4-2 presents the specific costs associated with the reclaimed water system. It is important to note that the annual expenditures for chemicals and electricity increase based on the cost escalation factor and the increase in demands on the reclaimed water system.

Table 4-2 Reclaimed Water Revenue Requirements and Projected Revenues

Expenditure Type	2022	2023	2024	2025	2026
Personnel	$186,188	$191,774	$197,527	$203,453	$209,556
Chemicals	9,855	10,585	11,315	12,045	13,140
Electricity	41,543	44,601	48,800	53,035	57,914
R&R Contribution	948,109	948,109	948,109	948,109	948,109
Total Expenditures	**$1,185,695**	**$1,195,069**	**$1,205,751**	**$1,216,641**	**$1,228,719**
Revenues at Current Rates	**$1,104,798**	**$1,140,511**	**$1,199,893**	**$1,253,854**	**$1,316,547**

Table 4-2 shows that the current reclaimed water rates will not cover the anticipated expenditures on the reclaimed water system until 2025. Additionally, this catch up in revenues is highly dependent on growth in customer demands. If the demands do not materialize, the revenues will remain below the annual revenue requirements. Finally, it is important to note that the costs shown in Table 4-2 represent only those costs that can easily be identified directly to reclaimed water service. There are additional costs that Loudoun Water incurs that are associated with the BRWRF that are difficult to extract and quantify but are required to provide reclaimed water service.

4.4 FINANCIAL PLAN

Based on our review of the reclaimed water system revenue requirements and anticipated revenues from existing reclaimed water rates, we recommend that Loudoun Water adjust reclaimed water rates at the same rate as the sewer user rates. This approach will allow reclaimed water revenue to keep pace with the cost identified in Table 4-2 as well as the increasing costs incurred at the BRWRF. The recommended adjustments and resulting reclaimed water rates are presented in Table 4-3.

Table 4-3 Recommended Reclaimed Water Rates

	Current	Jan 1, 2022	Jan 1, 2023	Jan 1, 2024
Reclaimed Water Rate Adjustment		3.0%	3.0%	3.0%
Reclaimed Water Rate Per 1,000 gallons	$1.65	$1.70	$1.75	$1.80

The average customer bill impact resulting from the adjustments to the reclaimed water rates are presented in Section 7 of the report.

5. AVAILABILITY CHARGES

Loudoun Water collects availability charges from new customers joining the water and/or sewer system to recover the cost of providing water and sewer system infrastructure. The charges are also assessed to existing customers requiring increased system capacity. The availability charges are used to fund expansion projects or retire annual debt service related to system expansion. The proper establishment of availability charges is necessary to ensure that costs required to meet growth in the customer base are funded by these customers so that "growth pays for growth."

This section of the report outlines our evaluation of the current availability charges collected by Loudoun Water and our recommended modifications to the current charges.

5.1 EVALUATION OF CHARGES

There are a number of methods that are typically utilized to calculate water and sewer availability charges. The basic premise behind the determination of the charges is that they should represent the cost of providing water and sewer infrastructure and be applied based on the specific capacity required for each connection. In 2018, Loudoun Water completed an analysis that examined the methodology used to determine the availability charges. The evaluation resulted in the adoption of updated availability charges and the establishment of a three-year plan of adjustments for 2019, 2020 and 2021.

As part of the Study, the level of availability charges was evaluated and reviewed with Loudoun Water staff. Given the ongoing increases in the cost of providing system capacity it was determined that the current availability charges will not reflect the cost of providing capacity over the forecast period.

5.2 RECOMMENDED AVAILABILTY CHARGES

Based on the evaluation of the availability charges, we recommend that Loudoun Water increase the charges by 3-percent per year over the next three years. The recommended availability charges are presented in Tables 5-1 and 5-2.

Table 5-1 Recommended Water Availability Charges

Meter Size	Current	Jan 1, 2022	Jan 1, 2023	Jan 1, 2024
5/8"	$7,180	$7,395	$7,617	$7,846
3/4"	$10,770	$11,093	$11,426	$11,769
1"	$21,540	$22,185	$22,851	$23,538
1.5"	$46,671	$48,068	$49,511	$50,999
2"	$86,162	$88,740	$91,404	$94,152
% Change		*3%*	*3%*	*3%*

Table 5-2 Recommended Sewer Availability Charges

Meter Size	Current	Jan 1, 2022	Jan 1, 2023	Jan 1, 2024
5/8"	$8,711	$8,972	$9,241	$9,519
3/4"	$13,067	$13,458	$13,862	$14,279
1"	$26,134	$26,916	$27,723	$28,557
1.5"	$56,624	$58,318	$60,067	$61,874
2"	$104,537	$107,664	$110,892	$114,228
% Change		*3%*	*3%*	*3%*

6. CASH FLOW PROJECTIONS AND DEBT SERVICE COVERAGE

This section of the report presents the results of operation of the water and sewer systems under the recommended financial plan including the appropriate maintenance of cash balances and debt service coverage compliance.

6.1 FIVE YEAR PRO-FORMA CASH FLOW FORECAST

Based on the recommended financial plan including adjustments to water and sewer user rates, reclaimed water rates and availability charges, a five-year pro-forma cash flow forecast demonstrating the financial performance of the combined utility was developed and is presented in Table 6-1.

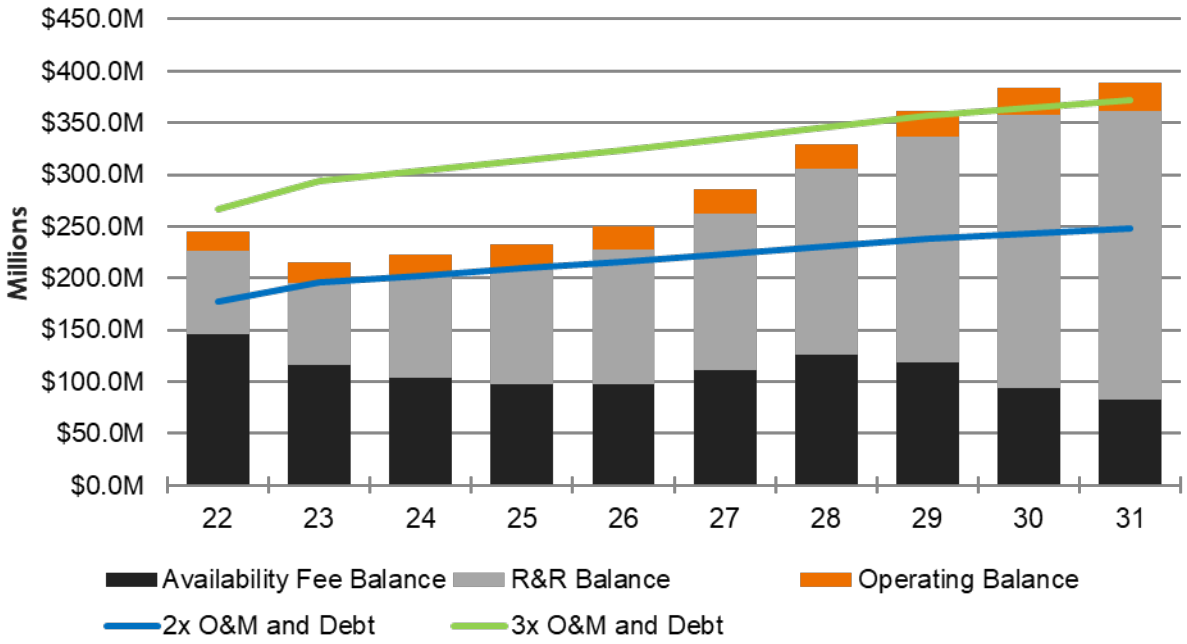
Table 6-1 Five-Year Pro-forma Cash Flow Forecast

	2022	2023	2024	2025	2026
Operating Revenues	**$116,148,617**	**$122,248,537**	**$128,822,089**	**$135,640,465**	**$142,579,401**
Operating Expenses	(76,138,742)	(79,164,777)	(82,329,122)	(85,624,991)	(89,051,346)
Net Operating Revenues	**40,009,876**	**43,083,760**	**46,492,967**	**50,015,474**	**53,528,055**
Non-Operating Revenues	44,218,619	53,129,755	59,369,579	61,215,631	61,182,656
Net Revenue	**84,228,495**	**96,213,515**	**105,862,547**	**111,231,105**	**114,710,711**
Total Debt Service	(19,669,535)	(19,673,186)	(20,378,142)	(20,694,012)	(20,696,763)
Amount Available for Capital Projects	**64,558,959**	**76,540,329**	**85,484,404**	**90,537,093**	**94,013,948**
Beginning Cash Balance	267,112,151	245,016,111	215,101,440	222,520,466	232,122,560
Surplus Available for Capital Projects	64,558,959	76,540,329	85,484,404	90,537,093	94,013,948
Bond Proceeds	36,430,000	-	17,329,623	-	-
Capital Expenditures	(123,085,000)	(106,455,000)	(95,395,000)	(80,935,000)	(76,415,000)
Ending Cash Balance	**$245,016,111**	**$215,101,440**	**$222,520,466**	**$232,122,560**	**$249,721,508**
Minimum Cash Balance	**$154,451,137**	**$177,721,306**	**$196,217,058**	**$202,663,757**	**$209,184,750**

Table 6-1 demonstrates that under the proposed financial plan, Loudoun Water will maintain a cash balance (unrestricted net asset balance) that is above the minimum target in each year of the projection

period. It should be noted that the forecast presented in Table 6-1 assumes 3-percent adjustments to water, sewer and reclaimed water rates in 2025 and 2026. The unrestricted net asset balance is made up of cash that has been designated for specific purposes into individual accounts including the operating reserve account, repair and replacement reserve account and the availability charge account. Figure 6-1 presents the forecast of cash balances within each account over the long-term projection period and demonstrates that the cash balance will remain within the target range over the entire projection period. It should be noted that the long-term forecast assumes annual 3-percent increases in water and sewer rates.

Figure 6-1 Ten-Year Forecast of Cash Balance by Account



6.2 DEBT SERVICE COVERAGE

Another measure of the financial health of Loudoun Water is the system's debt coverage. The main test of Loudoun Water's debt coverage is the level of revenues less operating expenses compared to the annual debt service of the system. To maintain a favorable financial position, Loudoun Water's debt covenants require the ratio of these totals to be 1.50. That is, net revenues less operating expenses should be at least 150% of annual debt service. Additional coverage tests are also included to demonstrate the impacts of not including a portion of availability charges and the inclusion of a portion of reserves, referred to as Test 2A and 2B respectively within Loudoun Water's bond covenants. Table 6-2 shows the results of the financial plan on Loudoun Water's debt coverage for each of the coverage tests.

Table 6-2 Debt Service Coverage Tests

	2022	2023	2024	2025	2026
Debt Coverage					
Net Revenues Available for Debt Service	$81,485,703	$93,912,927	$102,580,382	$107,821,283	$111,096,881
Annual Debt Service	$19,669,535	$19,673,186	$20,378,142	$20,694,012	$20,696,763
Coverage (Min 1.5)	**4.14**	**4.77**	**5.03**	**5.21**	**5.37**
Test 2A					
Net Revenues Available for Debt Service*	$60,747,789	$68,498,344	$74,536,675	$78,918,379	$82,312,468
Senior Lien Annual Debt Service	$19,142,481	$19,146,132	$19,851,088	$20,166,958	$20,169,708
Pass / Fail	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**
Test 2B					
Net Revenues Available for Debt Service **	$183,255,845	$176,049,064	$185,796,908	$194,979,658	$207,173,222
Senior Lien Annual Debt Service	$19,142,481	$19,146,132	$19,851,088	$20,166,958	$20,169,708
Coverage (Min 1.0)	**9.57**	**9.20**	**9.36**	**9.67**	**10.27**

**Net revenues available for debt service less 50% of availability charge revenues*
***Net revenues available for debt service less 50% of availability charge revenues plus 50% of cash balance*

Table 6-2 demonstrates that the financial plan will allow Loudoun Water to meet all of the debt service coverage test requirements during each year of the projection period.

7. CUSTOMER IMPACTS AND UTILITY COMPARISONS

The recommended changes to the water, sewer and reclaimed water rates will have an impact on customers of the Loudoun Water systems. This section of the report provides a summary of the impacts in the form of sample bills. This section also provides comparisons of the water and sewer bills for customers served by comparable and/or local utilities within the region along with a comparison of availability charges for new customers joining the water and sewer system.

7.1 WATER AND SEWER USER RATE BILL IMPACTS

The recommended increases in water and sewer user rates will result in modest increases in Loudoun Water customer bills over the planning period. To demonstrate the impacts of the changes, sample bills are provided for a cross section of customers in Tables 7-1, 7-2 and 7-3.

Table 7-1 Quarterly Residential Bill (21,000 gallons)

	Current	2022	2023	2024
Water Bill	$93.23	$96.01	$98.83	$101.89
Sewer Bill*	$126.30	$130.12	$133.97	$138.03
Total Bill	**$219.53**	**$226.13**	**$232.80**	**$239.92**
Quarterly $ Change		**$6.60**	**$6.67**	**$7.12**
Quarterly % Change		**3.0%**	**3.0%**	**3.0%**

**Sewer bill based on 14,000 gallons of average winter quarter consumption (capped at 17,000 gallons)*

Table 7-2 Monthly Commercial Bill (30,000 gallons - 1" Meter)

	Current	2022	2023	2024
Water Bill	$214.69	$222.72	$229.44	$236.25
Sewer Bill	$332.89	$344.22	$354.54	$365.25
Total Bill	**$547.58**	**$566.94**	**$583.98**	**$601.50**
Monthly $ Change		**$19.36**	**$17.04**	**$17.52**
Monthly % Change		**3.5%**	**3.0%**	**3.0%**

Table 7-3 Monthly Commercial Customer (150,000 gallons - 3" Meter)

	Current	2022	2023	2024
Water Bill	$986.57	$1,548.77	$1,595.48	$1,642.98
Sewer Bill	$1,577.57	$2,156.27	$2,220.98	$2,287.98
Total Bill	**$2,564.14**	**$3,705.04**	**$3,816.46**	**$3,930.96**
Monthly $ Change		**$1,140.90**	**$111.42**	**$114.50**
Monthly % Change		**44.5%**	**3.0%**	**3.0%**

7.2 RECLAIMED WATER BILL IMPACTS

The recommended increases in the reclaimed water rates will result in modest increases in Loudoun Water reclaimed customer bills over the planning period. Table 7-4 presents the bill impacts for the average reclaimed water customer. It should be noted that there is significant variation in the reclaimed water use by Loudoun Water's current reclaimed customers and that the average customer shown in the table represents the average use across the current 30 reclaimed customers.

Table 7-4 Monthly Reclaimed Water Customer (2,000,000 gallons)

	Current	2022	2023	2024
Reclaimed Water Bill	$3,300.00	$3,400.00	$3,500.00	$3,600.00
Monthly $ Change		$100.00	$100.00	$100.00
Monthly % Change		3.0%	3.0%	3.0%

7.3 WATER AND SEWER BILL COMPARISON SURVEY

To provide perspective on how the calculated water and sewer bills for Loudoun Water compare with neighboring communities, a bill comparison survey was developed of peer utilities. The figures below show a comparison of Loudoun Water's water, sewer and total residential monthly bill with those of neighboring utilities. The figures show the current water, sewer and combined bills for Loudoun Water and the bills under the recommended rate adjustments for 2022. As can be seen in the figures, the Loudoun Water bills are in the bottom range of benchmarked utilities. It should be noted that the bills for most of the comparison utilities represent current bills, and do not include likely future annual increases which are not yet publicly available.

Figure 7-1 Water Bill Comparison

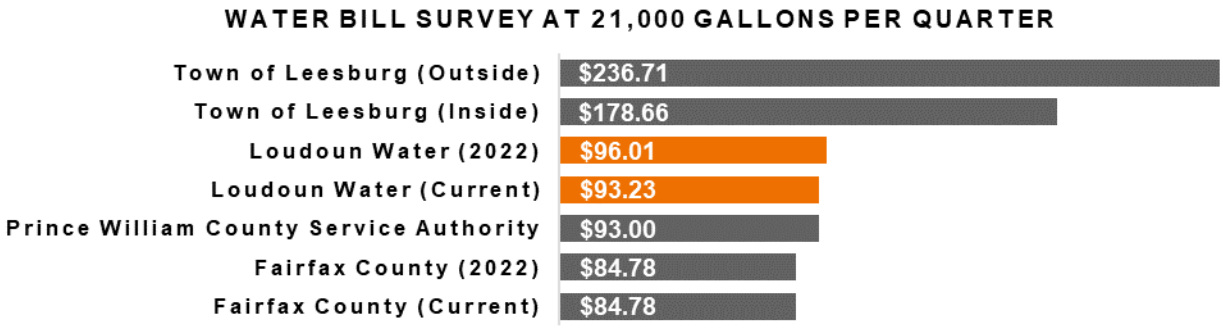


Figure 7-2 Sewer Bill Comparison

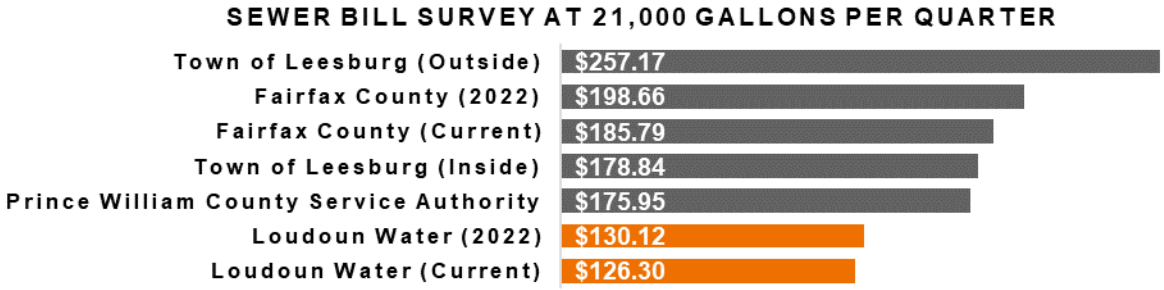
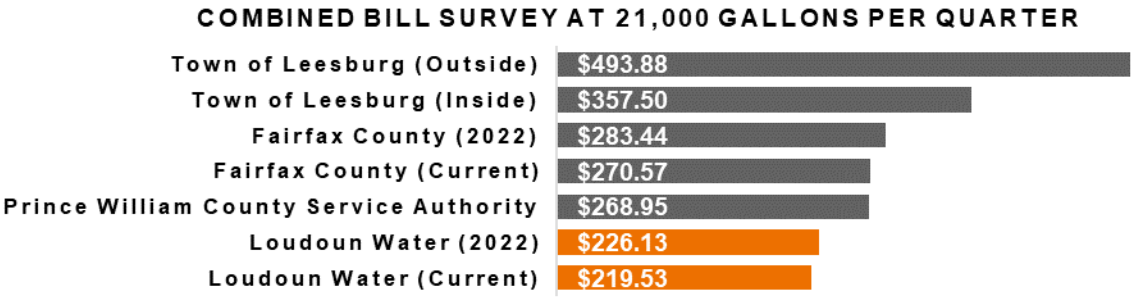


Figure 7-3 Combined Bill Comparison

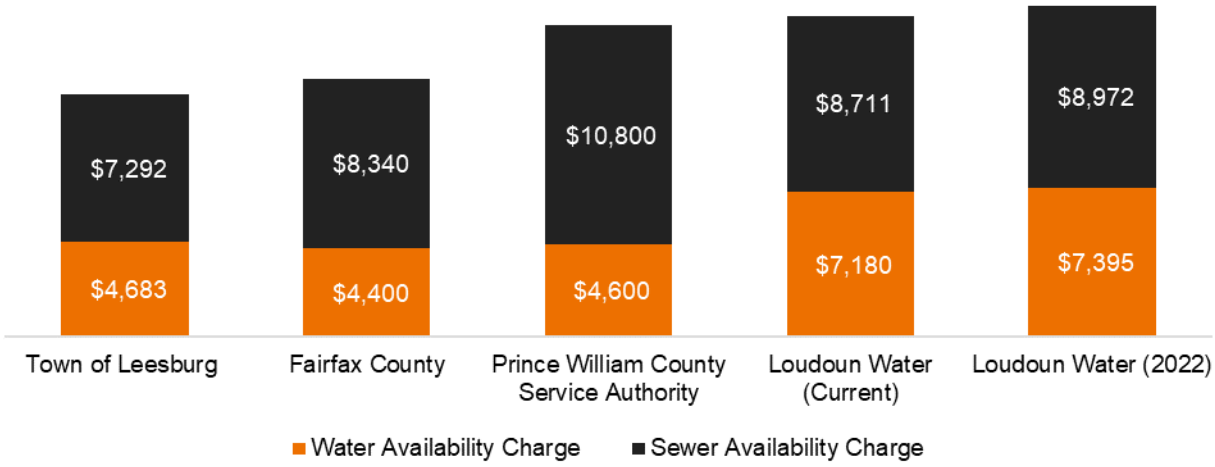


It is important to note that while bill comparisons can be informative, there are a number of factors that determine water and sewer rates within a community at a given time. Factors such as level of system reinvestment, support from the general fund or other sources and rate structure will all have a significant influence on the bills and must be taken into account. Therefore, bill comparisons should be taken as one data point for consideration, but the needs of each community are unique and the rates may be based on different variables.

7.4 AVAILABILITY CHARGE COMPARISONS

All of the utilities included in the bill survey also collect availability charges from new customers joining their respective utility. A comparison of the availability charge for each community is presented in Figure 7-4.

Figure 7-4 Availability Charge Comparisons



The comparison of availability charges demonstrates that Loudoun Water's charges are at the higher end of the range, but in line with comparable utilities such as the Prince William County Service Authority.

8. DEVELOPER FEES AND CHARGES

8.1 BACKGROUND

Loudon Water charges developer fees and charges to applicants for extension of the water, reclaimed water and sewer system. These fees include plan review and inspection fees, connection charges, record drawing fees and CCTV fees. In 2020, Loudoun Water conducted a detailed study to evaluate the structure and level of the developer fees and charges and the updated fees were adopted and effective January 1, 2021. Given the recent evaluation of the structure of the fees, the Study did not include an evaluation of the structure but rather examined the level of the fees to determine if the fees and charges still recover the cost of providing the services now and over the next several years.

8.2 EVALUATION AND RECOMMENDATIONS

To evaluate the level of the current developer fees, the costs associated with providing each of the fees were examined. These costs include primarily labor, materials and use of vehicles and equipment. While there have been variations in the inflation in the costs associated with each of these items on average they have increased at approximately 3-percent and at least this level of inflation is anticipated to continue over the next several years. Given the level of inflation the current developer fees do not recover the full cost of providing the services for new development. We recommend that Loudoun Water adjust the developer fees and charges at 3-percent per year over the next three years to ensure the fees and charges remain at the appropriate level and provide cost recovery. The current and recommended fees and charges are shown in the following tables.

Table 8-1 Plan Review Fees

Category	Current		Jan. 1, 2022		Jan. 1, 2023		Jan. 1, 2024	
	Base	Per LF*	Base	Per LF*	Base	Per LF*	Base	Per LF*
Water	$500	$0.40	$520	$0.42	$540	$0.43	$560	$0.44
Sewer	$500	$0.51	$520	$0.53	$540	$0.54	$560	$0.56
Reclaimed	$500	$0.40	$520	$0.42	$540	$0.43	$560	$0.44

**Linear Foot*

Table 8-2 Inspection Fees

Category	Current		Jan. 1, 2022		Jan. 1, 2023		Jan. 1, 2024	
	Min	Per LF*	Min	Per LF*	Min	Per LF*	Min	Per LF*
Water	$330	$3.26	$340	$3.36	$350	$3.46	$360	$3.57
Sewer	$360	$3.59	$370	$3.70	$380	$3.81	$390	$3.92
Reclaimed	$330	$3.26	$340	$3.36	$350	$3.46	$360	$3.57

**Linear Foot*

Table 8-3 Record Drawings

Category	Current		Jan. 1, 2022		Jan. 1, 2023		Jan. 1, 2024	
	Base	Per LF*	Base	Per LF*	Base	Per LF*	Base	Per LF*
Water	$500	$1.26	$520	$1.30	$540	$1.34	$560	$1.38
Sewer	$500	$1.51	$520	$1.56	$540	$1.60	$560	$1.65
Reclaimed	$500	$1.26	$520	$1.30	$540	$1.34	$560	$1.38

**Linear Foot*

Table 8-4 CCTV Fees

Category	Current		Jan. 1, 2022		Jan. 1, 2023		Jan. 1, 2024	
	Base	Per LF*	Base	Per LF*	Base	Per LF*	Base	Per LF*
All Services	$600	$1.38	$620	$1.43	$640	$1.47	$660	$1.51

**Linear Foot*

Table 8-5 Connection Charge

Category	Current	Jan. 1, 2022	Jan. 1, 2023	Jan. 1, 2024
Water - Residential	$80	$82	$84	$87
Water - Commercial	$120	$124	$128	$132
Sewer - Residential	$80	$82	$84	$87
Sewer - Commercial	$120	$124	$128	$132
Reclaimed Water - Commercial	$120	$124	$128	$132

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