Water and Sewer Rate Study

City of Harrisonville, Missouri

Water and Sewer Rate Study
Project No. 117917

Final Draft Report
08/12/2020

Water and Sewer Rate Study

prepared for

City of Harrisonville, Missouri
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Harrisonville, Missouri

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prepared by

Burns & McDonnell Engineering Company, Inc.

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LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
AWWA	American Water Works Association
BOD	Biochemical oxygen demand
CIP	Capital Improvement Program
COP	Certificates of Participation
CPI	Consumer Price Index
FY	Fiscal year
Kgal	Thousand gallons of water
O&M	Operation & Maintenance Expense
SS	Suspended solids
The City	The City of Harrisonville, Missouri
WEF	Water Environment Federation

1.0 EXECUTIVE SUMMARY

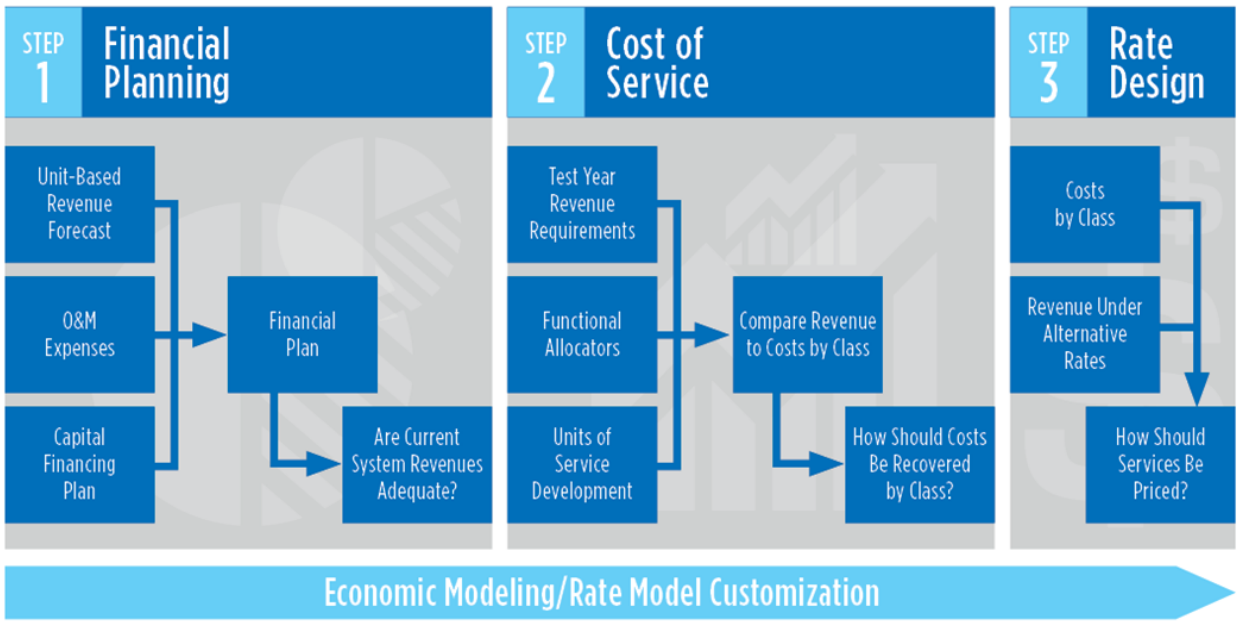
1.1 Project Background

Burns & McDonnell was engaged by the City of Harrisonville (the City) to develop a water and sewer rate study (Study) that (i) evaluates the financial planning implications of future operating costs and anticipated capital improvements, and (ii) proposes rates to adequately and equitably recover costs for the water and sewer utilities. During this process, connection fees were also evaluated. This Report presents the major findings of the Study.

1.2 Project Approach

Burns & McDonnell conducted the rate study in a three-step approach. This approach, depicted in Figure 1-1, is grounded in the principles established by the American Water Works Association (AWWA) *M1 Rate Manual* and the Water Environment Federation (WEF) *Financing and Charges for Wastewater Systems*.

Figure 1-1: Study Methodology



Step 1: Financial Planning provides an indication of the adequacy of the revenue generated by current rates. The results of the financial forecast analysis answer the questions "Are the existing rates adequate?" and "If not, what level of overall revenue increase is needed?" The Financial Planning Analysis is presented in Section 2.0 of our report.

Step 2: Cost of Service focuses on assigning cost responsibility to customer classes. Each customer class is allocated an appropriate share of the overall system costs based on the level of service provided. The net revenue requirements (costs to be recovered from rates) identified in Step 1 are allocated to customers in accordance with industry standards and principles and system specifics. The Cost of Service Analysis is detailed in Section 3.0 of this report.

Step 3: Rate Design provides for the required revenue recovery. Once the overall level of revenue required is identified and customer class responsibility for that level of revenue is determined, schedules of rates for each rate class are developed that will generate revenues accordingly. The Rate Design Analysis is detailed in Section 4.0 of this report.

1.3 Consideration of the Impact of COVID-19

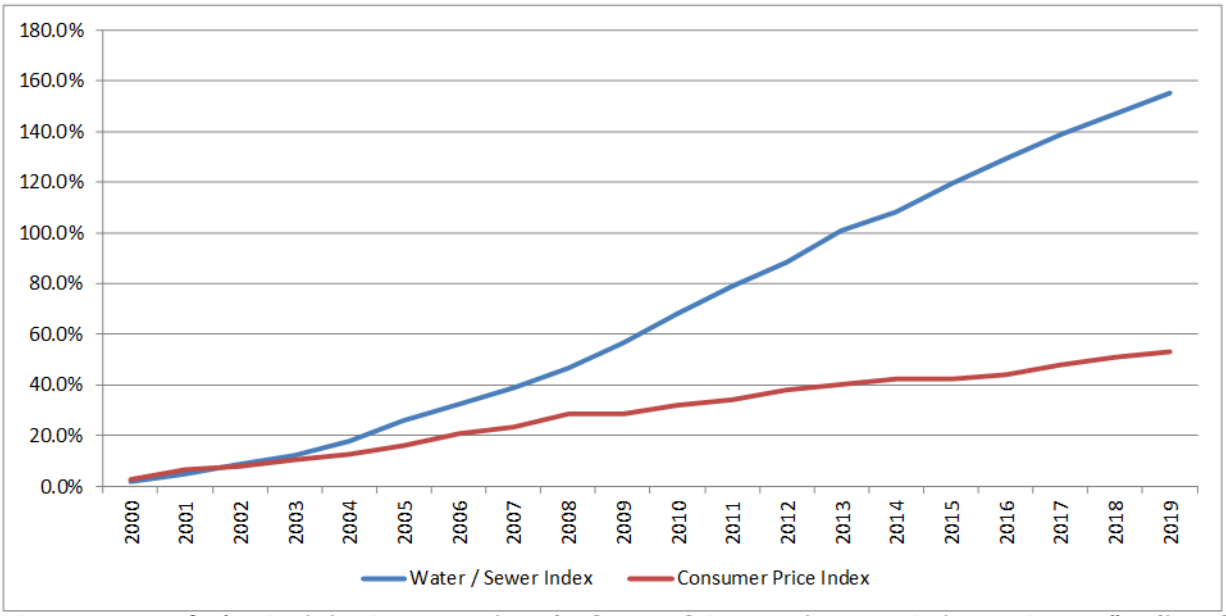
It should be noted that the forecasts prepared in this report do not reflect the potential disruption that COVID-19 may cause. The potential scale and duration of disruptions due to COVID-19 is currently unknown. At this time, it is impossible to foresee or to predict the full impact of COVID-19 and, therefore, forecasts do not include a contingency specifically for COVID-19.

1.4 Industry Trends in Water and Sewer Rates

Nationally, several factors are contributing to rising water and sewer rates. Replacement of aging infrastructure is one of several dynamics impacting water and sewer utility rates. Other dynamics typically include regulatory requirements, inflation on operating and capital costs, and a general trend in declining consumption most often associated with more efficient fixtures and appliances and greater awareness of water conservation.

Each utility is different, and the relative importance of these dynamics will vary by utility. However, there is no doubt that water and sewer rate increases have substantially outpaced general inflation in the United States. The United States Bureau of Labor Statistics (BLS) tracks many facets of inflation. The most commonly referenced measure is the Consumer Price Index for all Urban Consumers (CPI-U) which measures inflation at the consumer level. The BLS also tracks a combined inflation index for consumer water and sewer costs. Figure 1-1 compares changes in the consumer price index to changes in the water and sewer cost index.

Figure 1-2: Changes in General Inflation and Water and Sewer Rates



Source: Bureau of Labor Statistics, Consumer Price Index & Water & Sewer Maintenance Series, Not Seasonally Adjusted

Annually, since 2000 the water and sewer index has risen about 5 percent per year for the water and sewer index, while CPI's annual rate of change is about 2 percent per year.

Each utility may be influenced by specific circumstances that can lead to increases that are higher or lower than these industry trends. However, costs associated with renewal and replacement of existing infrastructure and the increasing cost of regulatory compliance are two of the primary dynamics contributing toward the increases in water and sewer rates. Understanding the reality of increasing costs within the water and sewer industry provides helpful context in evaluating proposed financial plans.

1.5 Financial Planning

Comprehensive financial planning conducted for the water and sewer utilities indicates that revenues under existing rates are not sufficient to meet the projected cash obligations of the utilities over the seven-year study period. The need for revenue adjustments is influenced by the following factors:

- Inflationary impacts on operation and maintenance expenses and future capital improvements.
- Implementation of the proposed capital plans, including renewal and replacement programs for the aging water distribution system and the sewer collection system.

Several financial planning scenarios were evaluated to fund the operating and capital needs of the utilities. Financial planning scenarios were evaluated based on the following guiding principles:

1. Minimize the need for sudden and substantial revenue adjustments.
2. Maintain projected operating reserves each year in an amount equal to a minimum of 180 days of O&M.
3. Mitigate new debt issuance where possible.
4. Reach targeted minimum debt service coverage of 1.50 each year
5. Funding the system renewal/replacement, infiltration/inflow reduction, and stormwater program targets by 2027.

In order to meet these objectives, a program of annual rate increase has been proposed and is summarized in Table 1-1 below.

Table 1-1: Existing and Proposed Water and Sewer Rates

	Water	Sewer	Combined
2021	2.50%	5.00%	3.70%
2022	2.50%	5.00%	3.70%
2023	2.50%	5.00%	3.70%
2024	2.50%	5.00%	3.70%
2025	2.50%	5.00%	3.70%
2026	2.50%	5.00%	3.70%
2027	2.50%	5.00%	3.70%

1.6 Proposed Rates

Section 3.0 of this report shows a detailed cost of service analysis was performed for each utility and provided necessary context for the development of proposed rates. Proposed rates are developed in Section 4.0 of this report. Additionally, utility rate levels were examined for 13 neighboring communities. Existing and proposed water and sewer rates are shown in Table 1-1.

Table 1-2: Existing and Proposed Water and Sewer Rates

Line		Existing	Proposed						
No.	Description	2020	2021	2022	2023	2024	2025	2026	2027
	Water Rates								
1	Base (First 1,000 Gal.)	$ 13.89	$ 14.24	$ 14.59	$ 14.96	$ 15.33	$ 15.72	$ 16.11	$ 16.51
2	Each Additional 1,000 Gal.	$ 8.71	$ 8.93	$ 9.15	$ 9.38	$ 9.61	$ 9.85	$ 10.10	$ 10.35
	Sewer Rates								
3	Base (First 1,000 Gal.)	$ 16.35	$ 17.17	$ 18.03	$ 18.93	$ 19.87	$ 20.87	$ 21.91	$ 23.01
4	Each Additional 1,000 Gal.	$ 9.16	$ 9.62	$ 10.10	$ 10.60	$ 11.13	$ 11.69	$ 12.28	$ 12.89

1.7 Typical Bills

Table 1-3 shows the typical water bill under proposed rates at three different usage levels. As shown on Table 1-3, the total water utility bill for a typical customer using 5,000 gallons would increase by approximately $1.22 per month in 2021.

Table 1-3: Typical Water Bills Under Existing and Proposed Rates

Line No.	Description	Billable Flow (1,000 Gal.)	Monthly Bill Under Existing 2020 Rates $	Proposed 2021 Rates $	Proposed 2022 Rates $	Proposed 2023 Rates $	Proposed 2024 Rates $	Proposed 2025 Rates $	Proposed 2026 Rates $	Proposed 2027 Rates $
1	Residential	2.0	$ 22.60	$ 23.17	$ 23.74	$ 24.34	$ 24.95	$ 25.57	$ 26.21	$ 26.86
2	Residential	5.0	$ 48.73	$ 49.95	$ 51.20	$ 52.48	$ 53.79	$ 55.13	$ 56.51	$ 57.92
3	Residential	8.0	$ 74.86	$ 76.73	$ 78.65	$ 80.62	$ 82.63	$ 84.70	$ 86.81	$ 88.99
	Change in $ over prior year									
4	Residential			$ 0.56	$ 0.58	$ 0.59	$ 0.61	$ 0.62	$ 0.64	$ 0.66
5	Residential			$ 1.22	$ 1.25	$ 1.28	$ 1.31	$ 1.34	$ 1.38	$ 1.41
6	Residential			$ 1.87	$ 1.92	$ 1.97	$ 2.02	$ 2.07	$ 2.12	$ 2.17
	Change in % over prior year									
7	Residential			2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
8	Residential			2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
9	Residential			2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%

Table 1-4 shows the typical sewer bill under proposed rates at three different usage levels. As shown on Table 1-3, the total sewer utility bill for a typical customer using 5,000 gallons would increase by approximately $2.65 per month in 2021.

Table 1-4: Typical Sewer Bills Under Existing and Proposed Rates

Line No.	Description	Billable Flow (1,000 Gal.)	Monthly Bill Under Existing 2020 Rates $	Proposed 2021 Rates $	Proposed 2022 Rates $	Proposed 2023 Rates $	Proposed 2024 Rates $	Proposed 2025 Rates $	Proposed 2026 Rates $	Proposed 2027 Rates $
1	Residential	2.0	$ 25.51	$ 26.79	$ 28.12	$ 29.53	$ 31.01	$ 32.56	$ 34.19	$ 35.90
2	Residential	5.0	$ 52.99	$ 55.64	$ 58.42	$ 61.34	$ 64.41	$ 67.63	$ 71.01	$ 74.56
3	Residential	8.0	$ 80.47	$ 84.49	$ 88.72	$ 93.15	$ 97.81	$ 102.70	$ 107.84	$ 113.23
	Change in $ over prior year									
4	Residential			$ 1.28	$ 1.34	$ 1.41	$ 1.48	$ 1.55	$ 1.63	$ 1.71
5	Residential			$ 2.65	$ 2.78	$ 2.92	$ 3.07	$ 3.22	$ 3.38	$ 3.55
6	Residential			$ 4.02	$ 4.22	$ 4.44	$ 4.66	$ 4.89	$ 5.14	$ 5.39
	Change in % over prior year									
7	Residential			5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
8	Residential			5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
9	Residential			5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%

1.8 Regional Comparison

Utility rate levels were examined and compared for 14 regional water utilities. Figure 1-3 shows a comparison of monthly residential water bills for neighboring regional water utilities. This survey

indicates the City is close to the average when compared to the surveyed utilities. It is worth noting that the other communities' rates are likely to rise over time.

Figure 1-3: Typical Residential Water Bill Comparison at 5 Kgal per Month

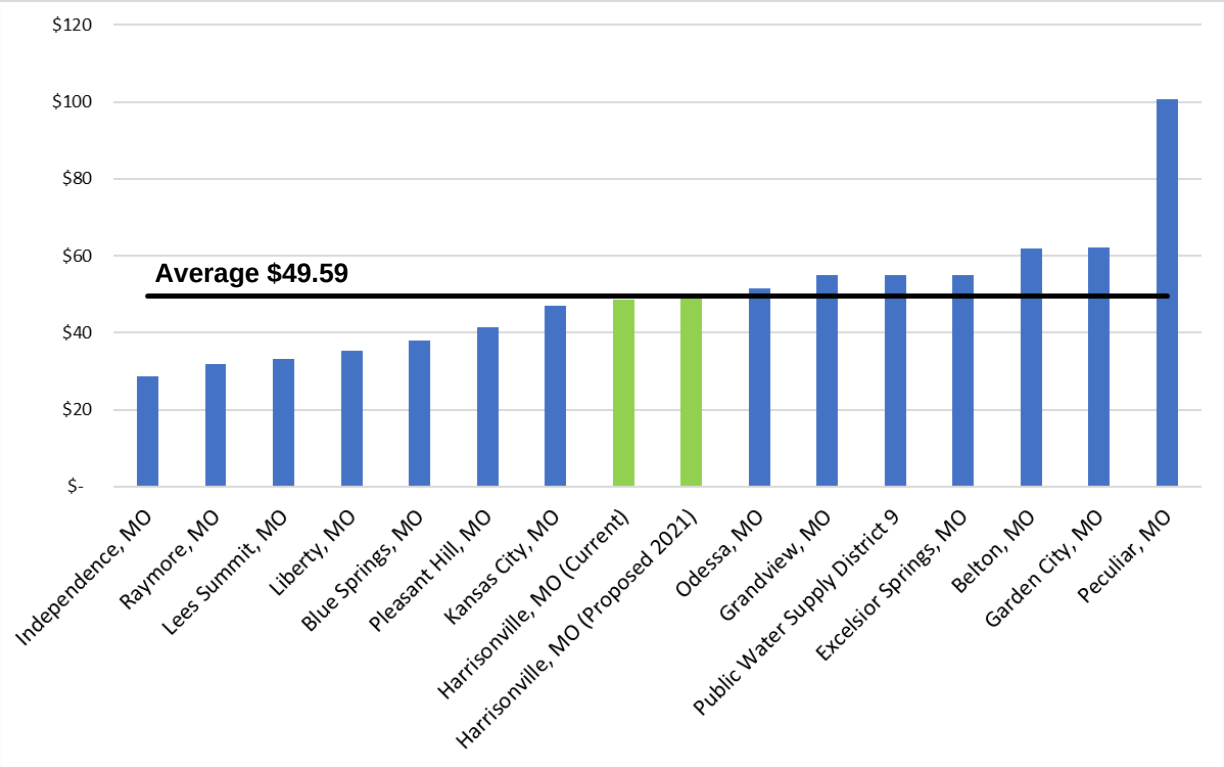
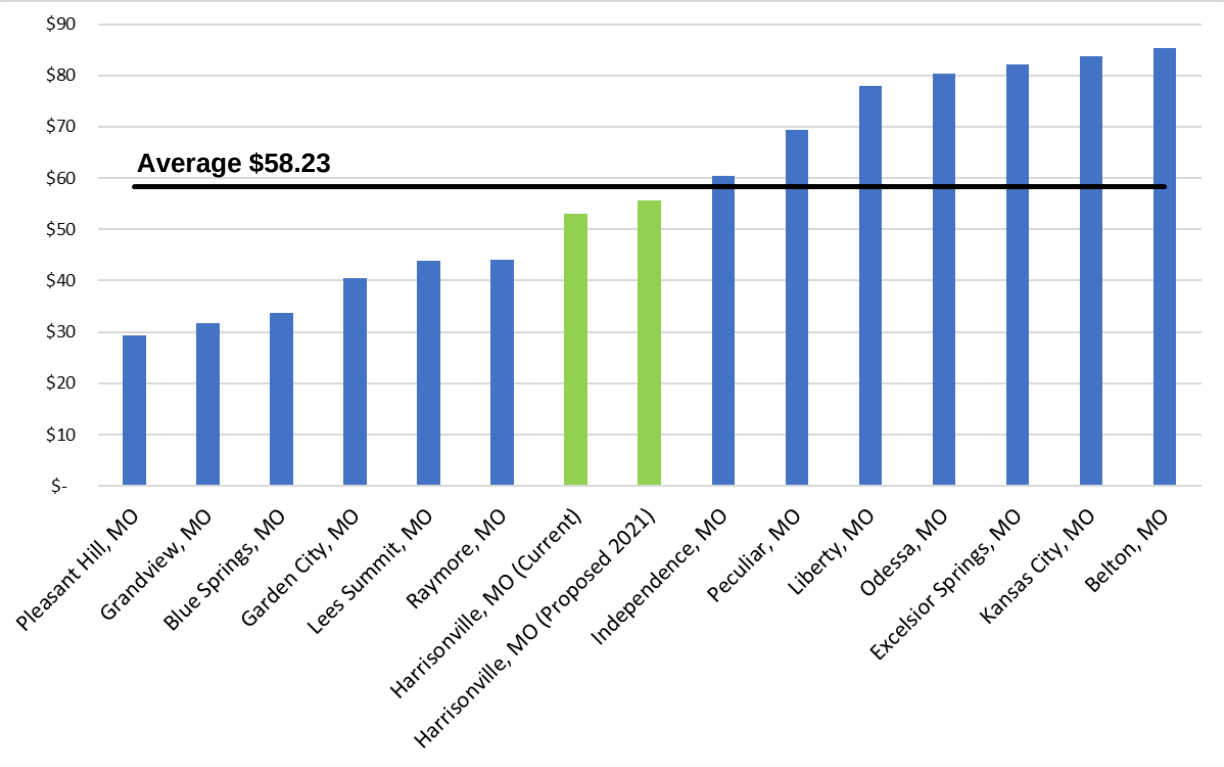


Figure 1-4 shows a comparison of monthly residential sewer bills for neighboring regional sewer utilities. This survey indicates the City is close to the average when compared to the surveyed utilities. It is worth noting that the other communities' rates are likely to rise over time.

Figure 1-4: Typical Residential Sewer Bill Comparison at 5 Kgal per Month



2.0 FINANCIAL PLANNING ANALYSIS

2.1 Introduction to Financial Planning

The primary issue addressed in the Financial Planning Analysis is revenue sufficiency. The results of the Financial Planning Analysis answer the questions:

- "Are the existing rates sufficient to fund anticipated operating and capital costs?"
- "If not, what level of overall revenue increase is needed?"

To determine if the existing schedule of rates can be expected to generate revenues sufficient to meet the City's future operating and capital costs, Burns & McDonnell prepared a seven-year financial projection of revenues and expenditures for the water and sewer utilities. A comparison of projected revenues and expenditures provides insight into the adequacy of overall revenue levels.

Our approach to Financial Planning involves the following basic steps:

1. Project revenues under existing rates.
2. Project water and sewer utility expenditures, including operating and capital costs.
3. Develop a seven-year financial plan, including the budget year and a nine-year forecast period.

The planning period includes the current fiscal year (FY) 2020 as a budget year and a seven-year forecast period, FY 2020 through FY 2027. The City's fiscal year ends on December 31, and the projected periods in the financial plan recognize the same fiscal year ending December 31.

2.2 Water and Sewer Utility Revenues under Existing Rates

The first step in financial planning was to project revenues under the existing schedule of rates. To complete this effort required an analysis of water and sewer customers, volumes, and revenues.

2.2.1 Historical and Projected Customers

Table 2-1 presents the historical water customers served by the City from 2017 to 2019 and the projection of customers for the 2020 to 2027 planning period. In recent years, The City has experienced minimal change in the number of accounts. Considering this trend in account growth, the projection of accounts assumes no growth in customer accounts across customer classes for 2020 through 2027.

Table 2-2 presents the historical sewer customers served by the City from 2017 to 2019 and the projection of customers for the 2020 to 2027 planning period. Similar to the water utility, the City has experienced

minimal change in the number of sewer accounts in recent years. The projection of sewer accounts assumes no growth in customer accounts across customer classes for 2020 through 2027, consistent with the approach to forecasting water accounts.

Table 2-1: Historical and Projected Water Accounts and Volume

Line No.		Historical			Projected							
		2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
	Accounts											
1	Commercial	267	274	279	279	279	279	279	279	279	279	279
2	Governmental	15	14	14	14	14	14	14	14	14	14	14
3	Power and Demand	200	205	205	205	205	205	205	205	205	205	205
4	Residential	3,128	3,131	3,145	3,145	3,145	3,145	3,145	3,145	3,145	3,145	3,145
5	School	16	14	14	14	14	14	14	14	14	14	14
6	Total Electric	350	351	355	355	355	355	355	355	355	355	355
7	Total Accounts	3,976	3,989	4,012	4,012	4,012	4,012	4,012	4,012	4,012	4,012	4,012
	Billed Volume *(1,000 Gallons)*											
8	Commercial	88,344	89,268	86,647	90,900	90,900	90,900	90,900	90,900	90,900	90,900	90,900
9	Governmental	8,206	4,583	2,871	4,580	4,580	4,580	4,580	4,580	4,580	4,580	4,580
10	Power and Demand	52,499	53,200	52,399	53,200	53,200	53,200	53,200	53,200	53,200	53,200	53,200
11	Residential	134,824	133,349	127,637	133,950	133,950	133,950	133,950	133,950	133,950	133,950	133,950
12	School	4,278	5,253	3,228	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250
13	Total Electric	11,782	11,864	11,874	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
14	Total Billed Volume	299,934	297,518	284,656	299,880	299,880	299,880	299,880	299,880	299,880	299,880	299,880

Table 2-2: Historical and Projected Sewer Accounts and Volume

Line No.		Historical			Projected							
		2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
	Accounts											
1	Commercial	250	258	266	266	266	266	266	266	266	266	266
2	Governmental	5	5	7	7	7	7	7	7	7	7	7
3	Power and Demand	188	191	193	193	193	193	193	193	193	193	193
4	Residential	3,179	3,181	3,201	3,201	3,201	3,201	3,201	3,201	3,201	3,201	3,201
5	School	11	11	11	11	11	11	11	11	11	11	11
6	Total Electric	457	457	463	463	463	463	463	463	463	463	463
7	WD9	5	5	5	5	5	5	5	5	5	5	5
8	Total Accounts	4,095	4,108	4,146	4,146	4,146	4,146	4,146	4,146	4,146	4,146	4,146
	Billed Volume *(1,000 Gallons)*											
9	Commercial	31,253	29,650	28,405	28,440	28,440	28,440	28,440	28,440	28,440	28,440	28,440
10	Governmental	1,658	1,360	1,416	1,420	1,420	1,420	1,420	1,420	1,420	1,420	1,420
11	Power and Demand	50,503	50,221	49,275	49,320	49,320	49,320	49,320	49,320	49,320	49,320	49,320
12	Residential	137,153	135,440	130,457	130,440	130,440	130,440	130,440	130,440	130,440	130,440	130,440
13	School	2,462	2,630	2,944	2,940	2,940	2,940	2,940	2,940	2,940	2,940	2,940
14	Total Electric	14,165	14,591	14,473	14,490	14,490	14,490	14,490	14,490	14,490	14,490	14,490
15	WD9	7,256	5,674	5,925	5,730	5,730	5,730	5,730	5,730	5,730	5,730	5,730
16	Total Billed Volume	244,451	239,567	232,896	232,780	232,780	232,780	232,780	232,780	232,780	232,780	232,780

2.2.2 Historical and Projected Volumes

Table 2-1 and Table 2-2 also present the historical and projected volumes. Table 2-1 presents historical water volumes based on customer class water sales for 2017 to 2019, and the projection of future water sales volumes for the 2020 to 2027 planning period.

Table 2-2 presents historical billed sewer flows based for 2017 to 2019, and the projection of billed sewer flows for the 2020 to 2027 planning period.

2.2.3 Existing Water and Sewer Rates

The water and sewer rate schedule is shown in Table 2-3. During the Study, a proposed sewer rate increase of roughly 3 percent was implemented effective at the beginning of 2021. Table 2-3 shows the rate history for both utilities for 2016 through 2021. The water and sewer rates consist of a base charge which includes the first thousand gallons of billed use and a volumetric charge per each additional thousand gallons.

Table 2-3: Existing Water and Sewer Rates

Line No		
	Water Rates	
1	Residential & Commercial	
2	Base (1st 1000 Gal)	13.89
3	Each Additional 1000 Gal.	8.71
	Sewer Rates	
4	Residential & Commercial	
5	Base (1st 1000 Gal)	16.35
6	Each Additional 1000 Gal.	9.16

2.2.4 User Revenues under Existing Rates

Table 2-4 and Table 2-5 present historical user charge revenues for 2017 to 2019 and a projection of user charge revenues under existing rates for the 2020 to 2027 planning period. The projection of user charge revenues was estimated based on the forecasted accounts and volumes factored by the schedule of existing water and sewer rates.

As can be seen on Table 2-4, since 2017 historical water user charge revenues ranged from $2.8 million to $2.9 million per year, with the decrease in 2019 related to wetter than normal climate. Forecasted user charge revenues reflect normal weather conditions, the anticipated stable levels of customers and volumes previously presented, and the existing water rates. Overall, water user charge revenues under existing rates are projected to remain stable at $2.9 million from 2020 to 2027.

Table 2-4: Historical and Projected Water User Revenues

Line No.		Historical			Projected							
		2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
	User Revenues under Existing Rates											
1	Commercial	$ 812,824	$ 822,714	$ 801,306	$ 839,800	$ 839,800	$ 839,800	$ 839,800	$ 839,800	$ 839,800	$ 839,800	$ 839,800
2	Governmental	$ 72,742	$ 41,164	$ 26,308	$ 41,400	$ 41,400	$ 41,400	$ 41,400	$ 41,400	$ 41,400	$ 41,400	$ 41,400
3	Power and Demand	$ 471,728	$ 478,509	$ 471,374	$ 478,400	$ 478,400	$ 478,400	$ 478,400	$ 478,400	$ 478,400	$ 478,400	$ 478,400
4	Residential	$1,393,280	$1,380,964	$1,331,630	$1,387,700	$1,387,700	$1,387,700	$1,387,700	$1,387,700	$1,387,700	$1,387,700	$1,387,700
5	School	$ 38,462	$ 46,906	$ 29,233	$ 47,000	$ 47,000	$ 47,000	$ 47,000	$ 47,000	$ 47,000	$ 47,000	$ 47,000
6	Total Electric	$ 127,015	$ 127,970	$ 128,572	$ 129,700	$ 129,700	$ 129,700	$ 129,700	$ 129,700	$ 129,700	$ 129,700	$ 129,700
7	Total Revenue Under Existing Rate:	$2,916,051	$2,898,226	$2,788,423	$2,924,000	$2,924,000	$2,924,000	$2,924,000	$2,924,000	$2,924,000	$2,924,000	$2,924,000

Table 2-5 presents the historical sewer user charge revenues, which amounted to about $1.8 million per year from 2017 through 2019. Forecasted user charge revenues reflect normal weather conditions, the anticipated stable levels of customers and volumes previously presented, and the existing sewer rates. In Table 2-5, projected revenues are shown under 2020 rates.. Overall, sewer user revenues under existing 2020 rates are projected to remain stable at $2.5 million from 2020 to 2027.

Table 2-5: Historical and Projected Sewer User Revenues

Line No.		Historical			Projected							
		2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
	User Revenues under Existing Rates											
1	Commercial	$ 243,312	$ 233,729	$ 226,472	$ 313,500	$ 313,500	$ 313,500	$ 313,500	$ 313,500	$ 313,500	$ 313,500	$ 313,500
2	Governmental	$ 11,500	$ 9,472	$ 9,988	$ 13,700	$ 13,700	$ 13,700	$ 13,700	$ 13,700	$ 13,700	$ 13,700	$ 13,700
3	Power and Demand	$ 354,520	$ 352,672	$ 346,227	$ 472,100	$ 472,100	$ 472,100	$ 472,100	$ 472,100	$ 472,100	$ 472,100	$ 472,100
4	Residential	$1,071,691	$1,058,855	$1,028,181	$1,472,200	$1,472,200	$1,472,200	$1,472,200	$1,472,200	$1,472,200	$1,472,200	$1,472,200
5	School	$ 17,383	$ 18,492	$ 20,586	$ 28,000	$ 28,000	$ 28,000	$ 28,000	$ 28,000	$ 28,000	$ 28,000	$ 28,000
6	Total Electric	$ 117,849	$ 119,328	$ 119,072	$ 173,300	$ 173,300	$ 173,300	$ 173,300	$ 173,300	$ 173,300	$ 173,300	$ 173,300
7	WD9	$ 49,540	$ 38,807	$ 40,546	$ 53,000	$ 53,000	$ 53,000	$ 53,000	$ 53,000	$ 53,000	$ 53,000	$ 53,000
8	Total Revenue Under Existing Rate:	$1,865,795	$1,831,355	$1,791,072	$2,525,800	$2,525,800	$2,525,800	$2,525,800	$2,525,800	$2,525,800	$2,525,800	$2,525,800

2.3 Water and Sewer Utility Expenditures

Typically, a municipal water or sewer utility's primary cash expenditures include the following direct operating and capital costs:

- Operation and Maintenance (O&M) Expenses
- Capital Improvement Program Expenditures
- Debt Service Principal and Interest Payments

2.3.1 O&M Expenses

Table 2-6 presents the recent water O&M expense history and the projection of water system O&M expenses through the 2027 planning period. Expenses summarized on Table 2-6 reflect operating costs only; costs related to capital projects are excluded from Table 2-6 and are addressed in Section 2.3.2 of this report. In recent history, water O&M expenses remained steady between $1.5 million and $1.6 million from 2017 to 2019. Anticipated 2020 O&M costs are based on the City's approved budget. In general, projected O&M expenses are anticipated to increase from budgeted 2020 amounts at approximately 3.0 percent annually. The inflationary increase assumptions were developed in collaboration with City staff.

Table 2-7 presents the recent sewer O&M expense history and the projection of sewer system O&M expenses through the 2027 planning period. Expenses summarized on Table 2-7 reflect operating costs only; costs related to capital projects are excluded from Table 2-7 and are addressed in Section 2.3.2 of this report. In recent history, sewer O&M expenses varied between $1.3 million and $1.4 million between

2017 and 2019. Anticipated 2020 O&M costs are based on the City's approved budget. Similar to water O&M, projected sewer O&M expenses are anticipated to increase from budgeted 2020 amounts at approximately 3.0 percent annually.

The City reports results for the water and sewer utility in a single, consolidated enterprise, which is common in the industry. Evaluate the water and sewer utilities as individual sub-enterprises provides insight into each utility's existing rates to meet future costs. In doing so, certain shared costs were allocated from the total enterprise to the water and sewer utility based on input from City staff shown below.

Category	Water	Sewer
Administrative Expense	50%	50%
Collection/ Distribution Expense	70%	30%
Sewer Plant Expense	0%	100%
Water Plant Expense	100%	0%

Table 2-6: Historical and Projected Water Operation and Maintenance Expenses

Line No.		Historical 2017	Historical 2018	Historical 2019	Budgeted 2020	Projected 2021	Projected 2022	Projected 2023	Projected 2024	Projected 2025	Projected 2026	Projected 2027
	Administration Expenses [1]											
1	Personnel Services	129,020	76,708	68,508	63,983	65,950	67,950	70,000	72,050	74,200	76,400	78,650
2	Contractual Services	2,248	4,982	9,273	13,855	14,300	14,700	15,150	15,600	16,050	16,500	17,000
3	Commodities	4,955	4,717	4,339	12,700	13,100	13,500	13,900	14,350	14,800	15,250	15,700
4	Other Charges	549,159	395,756	483,834	467,305	481,300	495,700	510,550	525,900	541,700	557,950	574,650
5	Capital Outlay	-	284	-	-	-	-	-	-	-	-	-
6	Total Adminstrative	685,382	482,447	565,953	557,843	574,650	591,850	609,600	627,900	646,750	666,100	686,000
		10.5%	*-29.6%*	*17.3%*	*-1.4%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*
	Distribution Expenses [2]											
7	Personnel Services	287,685	291,151	335,605	337,806	347,900	358,400	369,180	380,310	391,720	403,550	415,730
8	Contractual Services	31,767	45,033	49,324	45,315	46,690	48,160	49,630	51,100	52,640	54,180	55,720
9	Commodities	52,347	77,743	99,359	80,206	82,600	85,050	87,570	90,230	92,960	95,760	98,630
10	Capital Outlay	2,639	7,596	-	-	-	-	-	-	-	-	-
11	Total Distribution	374,437	421,523	484,289	463,327	477,190	491,610	506,380	521,640	537,320	553,490	570,080
		-19.8%	*12.6%*	*14.9%*	*-4.3%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*
	Water Plant Expenses											
12	Personnel Services	287,006	312,257	269,425	285,940	294,600	303,500	312,600	322,000	331,600	341,500	351,700
13	Contractual Services	132,946	156,750	168,164	192,100	197,900	203,800	209,900	216,200	222,700	229,400	236,300
14	Commodities	130,389	150,424	131,937	146,130	150,600	155,100	159,700	164,400	169,300	174,400	179,600
15	Other Charges	100	210	200	120	100	100	100	100	100	100	100
16	Capital Outlay	30,274	2,603	-	32,000	33,000	34,000	35,000	36,100	37,200	38,300	39,400
17	Total Water Plant	580,715	622,244	569,726	656,290	676,200	696,500	717,300	738,800	760,900	783,700	807,100
		-6.1%	*7.2%*	*-8.4%*	*15.2%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*
18	Total Water O&M	1,640,534	1,526,215	1,619,967	1,677,459	1,728,040	1,779,960	1,833,280	1,888,340	1,944,970	2,003,290	2,063,180

[1] Attributes 50% of total administrative costs to the water utility.
[2] Attributes 70% of the total distribution costs to the water utility

Table 2-7: Historical and Projected Sewer Operation and Maintenance Expenses

Line No.		Historical			Budgeted	Projected						
		2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
	Administration Expenses [1]											
1	Personnel Services	129,020	76,708	68,508	63,983	65,950	67,950	70,000	72,050	74,200	76,400	78,650
2	Contractual Services	2,248	4,982	9,273	13,855	14,300	14,700	15,150	15,600	16,050	16,500	17,000
3	Commodities	4,955	4,717	4,339	12,700	13,100	13,500	13,900	14,350	14,800	15,250	15,700
4	Other Charges	549,159	395,756	483,834	467,305	481,300	495,700	510,550	525,900	541,700	557,950	574,650
5	Capital Outlay	-	284	-	-	-	-	-	-	-	-	-
6	Total Adminstrative	685,382	482,447	565,953	557,843	574,650	591,850	609,600	627,900	646,750	666,100	686,000
		10.5%	*-29.6%*	*17.3%*	*-1.4%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*
	Distribution Expenses [2]											
7	Personnel Services	123,293	124,779	143,831	144,774	149,100	153,600	158,220	162,990	167,880	172,950	178,170
8	Contractual Services	13,614	19,300	21,139	19,421	20,010	20,640	21,270	21,900	22,560	23,220	23,880
9	Commodities	22,434	33,319	42,582	34,374	35,400	36,450	37,530	38,670	39,840	41,040	42,270
10	Capital Outlay	1,131	3,255	-	-	-	-	-	-	-	-	-
11	Total Distribution	160,473	180,653	207,552	198,569	204,510	210,690	217,020	223,560	230,280	237,210	244,320
		-19.8%	*12.6%*	*14.9%*	*-4.3%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*
	Wastewater Treatment Expenses											
12	Personnel Services	289,326	295,389	302,423	306,705	316,000	325,400	335,100	345,000	355,300	365,900	377,000
13	Contractual Services	277,200	337,693	222,333	405,650	417,900	430,500	443,500	456,800	470,500	484,600	499,200
14	Commodities	10,869	13,227	21,854	20,710	21,400	22,000	22,600	23,200	23,800	24,400	25,000
15	Other Charges	1,000	-	135	500	500	500	500	500	500	500	500
16	Capital Outlay	-	-	-	-	-	-	-	-	-	-	-
17	Total Wastewater Treatment	578,395	646,309	546,744	733,565	755,800	778,400	801,700	825,500	850,100	875,400	901,700
		-6.7%	*11.7%*	*-15.4%*	*34.2%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*	*3.0%*
18	Total Sewer O&M	1,424,250	1,309,409	1,320,249	1,489,976	1,534,960	1,580,940	1,628,320	1,676,960	1,727,130	1,778,710	1,832,020

[1] Attributes 50% of total administrative costs to the sewer utility.
[2] Attributes 30% of total distribution costs to the sewer utility.

2.3.2 Projected Capital Improvement Expenditures

Table 2-8 shows the projected water Capital Improvement Plan expenditures (CIP) for the 2020 to 2027 planning period. The water CIP includes $13.9 million in projects over the planning period. The CIP is inflated at 3 percent compounding annually starting in 2021 and totals $15.8 million in total inflated projects. The largest project is the New Raw Water Line which is anticipated to cost $10.6 million with the design work starting in 2023 and construction work slated to start in 2025.

Table 2-9 shows the projected sewer CIP for the 2020 to 2027 planning period. The sewer CIP includes $15.3 million in projects over the planning period. The CIP is inflated at 3 percent compounding annually starting in 2021 and totals $16.1 million in total inflated projects.

Table 2-8: Water Capital Improvement Program

Line No.		Projected 2020	2021	2022	2023	2024	2025	2026	2027	Total
	Budgeted Projects									
1	Waterline Replacement	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	800,000
2	Utility Meter Read Software 50%	-	-	750,000	-	-	-	-	-	750,000
3	Lake Harrisonville Spillway Rebuild	-	1,000,000	-	-	-	-	-	-	1,000,000
4	2012 Bobcat 65%	-	-	71,500	-	-	-	-	-	71,500
5	2002 Dump Truck 65%	-	-	65,000	-	-	-	-	-	65,000
6	2010 Extend-a-hoe 50%	55,000	-	-	-	-	-	-	-	55,000
7	2013 F150	-	-	-	-	-	40,000	-	-	40,000
8	2010 3/4 ton	-	-	-	-	-	40,000	-	-	40,000
9	2010 box v-plow	-	-	-	-	-	6,000	-	-	6,000
10	New Raw Water Line	-	-	-	1,375,000	-	9,279,000	-	-	10,654,000
11	Mower	7,000	-	-	-	-	-	-	-	7,000
12	2002 John Deere Tractor 70 hp 50%	-	-	-	-	-	-	-	25,000	25,000
13	Clarifier Covers	-	-	-	-	400,000	-	-	-	400,000
14	Total	162,000	1,100,000	986,500	1,475,000	500,000	9,465,000	100,000	125,000	13,913,500
15	Total Inflated CIP [1]	162,000	1,133,000	1,046,600	1,611,800	562,800	10,972,500	119,400	153,700	15,761,800

[1] 3% inflation compunding annually starting in 2021

Table 2-9: Sewer Capital Improvement Program

Line No.		Projected 2020	2021	2022	2023	2024	2025	2026	2027	Total
	Budgeted Projects									
1	Sewerline Replacement	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	800,000
2	UV Treatment at WWTP's	500,000	3,000,000	-	-	-	-	-	-	3,500,000
3	Utility Meter Read Software 50%	-	-	750,000	-	-	-	-	-	750,000
4	Lift Station Set Aside	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	200,000
5	Replace South & Main Plant Improvements	-	3,900,000	-	-	-	-	-	-	3,900,000
6	2001 Pump/Jet Truck	-	120,000	-	-	-	-	-	-	120,000
7	Camera Truck - used	-	90,000	-	-	-	-	-	-	90,000
8	2010 Extend-a-hoe 50%	55,000	-	-	-	-	-	-	-	55,000
9	2005 Gator	-	-	-	-	12,000	-	-	-	12,000
10	2012 Bobcat 35%	-	-	38,500	-	-	-	-	-	38,500
11	2002 Dump Truck 35%	-	-	35,000	-	-	-	-	-	35,000
12	2010 1/2 ton	-	-	-	-	-	40,000	-	-	40,000
13	2013 Z-Turn Mower	-	-	-	-	-	-	-	15,000	15,000
14	2002 John Deere Tractor 70 hp 50%	-	-	-	-	-	-	-	25,000	25,000
15	Infiltration/Inflow Reduction	-	-	300,000	300,000	300,000	300,000	300,000	300,000	1,800,000
16	Replace scum pump	-	16,000	-	-	-	-	-	-	16,000
17	City Lake and Dam Spillway Rehab	350,000	2,300,000	-	-	-	-	-	-	2,650,000
18	Replace 2 fairnks morris dry wthr pumps lift station 2	-	100,000	-	-	-	-	-	-	100,000
19	Mower	3,000	-	-	-	-	-	-	-	3,000
20	Sewer Plant Boom Truck	125,000	-	-	-	-	-	-	-	125,000
21	SCADA Replacement	50,000	-	-	-	-	-	-	-	50,000
22	Replace 2 blowers at digesters	65,000	-	-	-	-	-	-	-	65,000
23	Stormwater Improvements	-	-	150,000	150,000	150,000	150,000	150,000	150,000	900,000
24	Total	1,273,000	9,651,000	1,398,500	575,000	587,000	615,000	575,000	615,000	15,289,500
25	Total Inflated CIP [1]	1,273,000	9,940,500	1,483,700	628,300	660,700	713,000	686,600	756,400	16,142,200

[1] 3% inflation compunding annually starting in 2021

2.4 Water and Sewer Utility Financial Plan

During the Study, multiple financial planning scenarios were examined to understand the impact of the projected operating and capital costs, with specific emphasis on funding renewal and replacement of water and sewer mains. To consistently evaluate the financial performance of the scenarios, the following guiding principles were considered in the development of financial plans.

1. Minimize the need for sudden and substantial revenue adjustments.

2. Maintain projected operating reserves each year in an amount equal to a minimum of 180 days of O&M.
3. Mitigate new debt issuance where possible.
4. Reach targeted minimum debt service coverage of 1.50 each year
5. Funding the system renewal/replacement, infiltration/inflow reduction, and stormwater program targets by 2027.

Several scenarios were evaluated that examined alternatives including the speed with which renewal and replacement programs were implemented. After collaboration with City staff, a preferred financial plan was developed. The recommended plan is detailed herein, including recommendations regarding overall increase in revenues needed to meet the City's financial objectives.

2.4.1 Existing and Proposed Debt

Table 2-10 summarizes the water utility's existing debt and the proposed debt service payments associated with the proposed plan. For the water utility, a debt issue is anticipated in 2025 to help fund the raw water line construction, with net proceeds amounting to $8.5 million. The proposed debt service payments are assumed to start in the year of issuance with two years of interest only payments and full principal and interest payments starting in 2027. The proposed water debt is for a 20-year term at 2.50 percent interest and a 1.0 percent cost of issuance. These estimated payments are estimated solely for the purpose of depicting future revenue requirements and evaluating the sufficiency of revenues under approved and future rates. The actual structure of future debt may vary based on the recommendations of the City's Municipal Advisor and market conditions at the time of issuance.

Table 2-10: Existing and Proposed Water Debt

Line No.		Projected 2020	2021	2022	2023	2024	2025	2026	2027
	Existing Debt Issues								
1	2017	575,789	575,719	575,525	575,223	575,798	574,250	574,594	574,806
2	Gross Debt Service	575,789	575,719	575,525	575,223	575,798	574,250	574,594	574,806
	Proposed Debt*								
3	2025 Bond [1]	-	-	-	-	-	106,250	212,500	545,300
4	Total Proposed Debt	-	-	-	-	-	106,250	212,500	545,300
5	Total Gross Debt Service	575,789	575,719	575,525	575,223	575,798	680,500	787,094	1,120,106

[1] Assumed debt issuance with equal annual payments with Interest only in the first two years
Terms reflect 1% issuance expense, 20 year term and 2.50% interest on $8.5M loan
* Assumes proposed debt to be SRF

Table 2-11 summarizes the sewer utility's existing debt and the proposed debt service payments associated with the proposed plan. The net proceeds from the proposed debt amount for the sewer utility is $10.60 million which is anticipated to be issued in 2020. The proposed debt service payments are assumed to start the year following the issuance and is anticipated to be a Certificate of Participation (CO) debt instrument. The proposed sewer debt amortization was provided by the City's financial advisor, Baker Tilley. The proposed sewer debt is for a 20-year term.

Table 2-11: Existing and Proposed Water Debt

Line No.		Projected							
		2020	2021	2022	2023	2024	2025	2026	2027
	Existing Debt Issues								
1	2002	280,228	279,101	277,854	276,487	-	-	-	-
2	2003	230,496	235,083	239,445	243,997	248,492	-	-	-
3	2005	110,969	108,461	110,946	108,291	110,626	107,818	-	-
4	2010	251,503	251,516	251,446	251,593	251,454	251,530	251,517	251,612
5	Net Debt Service	873,196	874,161	879,690	880,368	610,571	359,348	251,517	251,612
	Proposed Debt*								
6	2020 Bond [1]	-	231,463	277,755	277,755	472,755	753,843	853,898	858,188
7	Total Proposed Debt	-	231,463	277,755	277,755	472,755	753,843	853,898	858,188
8	Total Debt Service	873,196	1,105,624	1,157,445	1,158,123	1,083,326	1,113,190	1,105,414	1,109,799

[1] Proposed debt is COP with a 20 year term - amortization provided by Baker Tilly

2.4.2 Water Utility Flow of Funds

Detailed cash flow tables were developed individually for the water and sewer utility, and then combined to show the consolidated utility cash flow under the proposed plan. Table 2-12 presents the water utility cash flow, Table 2-13 presents the sewer utility cash flow, and Table 2-14 shows the consolidated utility cash flow.

Beginning with the water utility, Line 1 of Table 2-12 shows user revenues under 2020 rates, identified previously in Table 2-4. Lines 2 through 9 present the revenue increases proposed which are assumed to be effective January 1 of each year indicated. Total user revenues are summarized on Line 11.

Line 12 presents other water fund revenue. All other water revenues shown on Line 12 are estimated to remain at 2020 budgeted levels. Line 13 shows the total operating revenue forecasted over the study period. Including the proposed revenue adjustments, total revenue is projected to range from $3.12 million in 2020 to $3.67 million in 2027.

Water utility revenue requirements are represented on Lines 14 through 20 and summarized on Line 21. Total revenue requirements are deducted from Line 13 total revenue to determine the annual operating

balance shown on Line 22. With the proposed revenue adjustments, the operating balance on Line 22 is positive throughout the forecast.

Lines 23 through 27 project future operating reserves for the water utility. For 2020, a beginning balance of approximately $3.37 million was available for the water utility for operating and capital purposes. For this study, $0.8 million was assumed to be available for operations as shown on Line 23, with the remainder assigned to fund capital projects as shown on Line 28. The annual operating balance is added to this amount to reflect cash produced by ongoing operations of the water utility. The utility intends to maintain a minimum operating balance of 180 days (or about 50 percent) of the next fiscal year's O&M, shown as the target on Line 27. Any balances exceeding this minimum are considered available for use on capital projects and are transferred for that purpose on Line 25. The water capital flow of funds is shown in Table 2-12 on Lines 28 through 36.

Sources of funds for the capital plan include beginning balances, the transfer of available cash from operations and the issuance of debt. In 2020, the transfer from operating funds is approximately $0.86 million as shown on Line 29. As noted previously, one debt issue is identified for the water utility, amounting to about $8.50 million in net proceeds in 2025 which can be seen on Line 31.

Water capital improvement projects shown on Line 33 are consistent with that shown previously in Table 2-8.

Line 36 of Table 2-12 shows the annual capital balance. The forecast shows there are enough funding sources to fund the capital plan in each year which leaves a positive capital balance each year.

Financial debt instruments usually include covenants regarding financial performance that generally require net revenues (defined as total utility revenue less O&M) to exceed annual debt service payments by a factor that may range from 1.10x to 1.35x. The City has a minimum debt service coverage requirement of 1.10x and an internal planning target of 1.50x. This coverage level provides assurances to bond holders that the utility has the financial wherewithal to meet its annual debt payment. Municipal bond rating agencies evaluate many criteria regarding the credit worthiness of utility debt. Debt service coverage is one of the primary indicators that is examined, and rating agencies generally reserve their stronger ratings for debt service coverage ratios that exceed 1.50x to 2.00x. As shown on Line 38, the water utility is anticipated to be well above the internal target of 1.50x in each year with the exception of 2027 where it dips slightly below the internal target but remains above the required 1.10x.

Table 2-12: Water Utility Financial Plan

Line No.				Projected 2020	2021	2022	2023	2024	2025	2026	2027
	Water Utility Operating Flow of Funds										
1	Revenue Under Existing Water Rates			2,924,000	2,924,000	2,924,000	2,924,000	2,924,000	2,924,000	2,924,000	2,924,000
	Proposed Revenue Adjustments										
	Year	Month	Increase								
2	2020	1	0.0%	-	-	-	-	-	-	-	-
3	2021	1	2.5%		73,100	73,100	73,100	73,100	73,100	73,100	73,100
4	2022	1	2.5%			74,900	74,900	74,900	74,900	74,900	74,900
5	2023	1	2.5%				76,800	76,800	76,800	76,800	76,800
6	2024	1	2.5%					78,700	78,700	78,700	78,700
7	2025	1	2.5%						80,700	80,700	80,700
8	2026	1	2.5%							82,700	82,700
9	Total Proposed Additional Revenue			-	73,100	148,000	224,800	303,500	384,200	466,900	551,700
10	Total Water User Charge Revenue			2,924,000	2,997,100	3,072,000	3,148,800	3,227,500	3,308,200	3,390,900	3,475,700
11	Other Water Fund Revenue			193,930	193,930	193,930	193,930	193,930	193,930	193,930	193,930
12	**Grand Total Water Revenue**			**3,117,930**	**3,191,030**	**3,265,930**	**3,342,730**	**3,421,430**	**3,502,130**	**3,584,830**	**3,669,630**
	Revenue Requirements										
13	Water Administrative			557,843	574,650	591,850	609,600	627,900	646,750	666,100	686,000
14	Water Plant			656,290	676,200	696,500	717,300	738,800	760,900	783,700	807,100
15	Water Distribution/ Collection			463,327	477,190	491,610	506,380	521,640	537,320	553,490	570,080
16	Total Operation and Maintenance Expense			1,677,459	1,728,040	1,779,960	1,833,280	1,888,340	1,944,970	2,003,290	2,063,180
	Debt Service										
17	Existing Debt			575,789	575,719	575,525	575,223	575,798	574,250	574,594	574,806
18	Proposed Debt			-	-	-	-	-	106,250	212,500	545,300
19	Total Debt Service			575,789	575,719	575,525	575,223	575,798	680,500	787,094	1,120,106
20	**Total Revenue Requirements**			**2,253,248**	**2,303,759**	**2,355,485**	**2,408,503**	**2,464,138**	**2,625,470**	**2,790,384**	**3,183,286**
21	**Annual Operating Balance**			**864,682**	**887,272**	**910,446**	**934,227**	**957,292**	**876,661**	**794,447**	**486,345**
22	Beginning Balance [1]			827,288	827,271	852,142	877,788	904,114	931,206	959,167	987,913
23	Annual Operating Balance			864,682	887,272	910,446	934,227	957,292	876,661	794,447	486,345
24	Transfers to Capital			(864,771)	(862,342)	(884,788)	(907,914)	(930,206)	(848,667)	(765,713)	(456,758)
25	Ending Balance			827,200	852,200	877,800	904,100	931,200	959,200	987,900	1,017,500
26	Op. Reserve Target [2]			827,200	852,200	877,800	904,100	931,200	959,200	987,900	1,017,500
	Water Utility Capital Flow of Funds										
	Sources										
27	Beginning Capital Balance			2,539,318	3,242,018	2,971,418	2,809,618	2,105,718	2,473,118	764,318	1,410,618
28	Transfer from Operations			864,771	862,342	884,788	907,914	930,206	848,667	765,713	456,758
29	Anticipated Grants			-	-	-	-	-	-	-	-
30	Debt Issuance [3]			-	-	-	-	-	8,500,000	-	-
31	**Total Capital Sources**			**3,404,089**	**4,104,360**	**3,856,206**	**3,717,532**	**3,035,924**	**11,821,785**	**1,530,031**	**1,867,376**
	Uses										
32	Total Inflated CIP			162,000	1,133,000	1,046,600	1,611,800	562,800	10,972,500	119,400	153,700
33	Debt Issuance Expense			-	-	-	-	-	85,000	-	-
34	**Total Capital Uses**			**162,000**	**1,133,000**	**1,046,600**	**1,611,800**	**562,800**	**11,057,500**	**119,400**	**153,700**
35	**Annual Capital Balance**			**3,242,089**	**2,971,360**	**2,809,606**	**2,105,732**	**2,473,124**	**764,285**	**1,410,631**	**1,713,676**
36	Total End of Year Cash			4,069,289	3,823,560	3,687,406	3,009,832	3,404,324	1,723,485	2,398,531	2,731,176
37	Debt Service Coverage [4]			2.50	2.54	2.58	2.62	2.66	2.29	2.01	1.43

[1] Beginning Balance is split evenly across water and wastewater utilities
[2] Based on 180 days operation and maintenance expense
[3] Debt is net of DSRF and issuance cost
[4] Minimum debt service coverage is 1.10: Targeting 1.50

2.4.3 Sewer Utility Flow of Funds

Line 1 of Table 2-13 shows user revenues under 2020 rates, identified previously in Table 2-5. Lines 2 through 9 present the revenue increases proposed which are assumed to be effective January 1 of each year indicated. Total user revenues are summarized on Line 11.

Line 12 presents other sewer fund revenue. All other sewer revenues shown on Line 12 are estimated to remain at 2020 budgeted levels. Line 13 shows the total operating revenue forecasted over the study period. Including the proposed revenue adjustments, total revenue is projected to range from $2.67 million in 2020 to $3.70 million in 2027.

Sewer utility revenue requirements are represented on Lines 14 through 20 and summarized on Line 21. Total revenue requirements are deducted from Line 13 total revenue to determine the annual operating balance shown on Line 22. With the proposed revenue adjustments, the operating balance on Line 22 is positive throughout the forecast.

Lines 23 through 27 project future operating reserves for the sewer utility. For 2020, a beginning balance of approximately $3.37 million was available for the sewer utility for operating and capital purposes. For this study, $0.7 million was assumed to be available for operations as shown on Line 23, with the remainder assigned to fund capital projects as shown on Line 28. The annual operating balance is added to this amount to reflect cash produced by ongoing operations of the sewer utility. The utility intends to maintain a minimum operating balance of 180 days (or about 50 percent) of the next fiscal year's O&M, shown as the target on Line 27. Any balances exceeding this minimum are considered available for use on capital projects and are transferred for that purpose on Line 29. The sewer capital flow of funds is shown in Table 2-13 on Lines 28 through 36.

Sources of funds for the capital plan include beginning balances, the transfer of available cash from operations and the issuance of debt. In 2020, the transfer from operating funds is approximately $0.3 million as shown on Line 29. As noted previously, one debt issue is identified for the sewer utility, amounting to about $10.60 million in net proceeds in 2020 which can be seen on Line 31.

Sewer capital improvement projects shown on Line 33 are consistent with that shown previously in Table 2-9.

Line 36 of Table 2-13 shows the annual capital balance. The forecast shows there are enough funding sources to fund the capital plan in each year which leaves a positive capital balance each year.

Financial debt instruments usually include covenants regarding financial performance that generally require net revenues (defined as total utility revenue less O&M) to exceed annual debt service payments by a factor that may range from 1.10x to 1.35x. The City has a minimum debt service coverage requirement of 1.10x and an internal planning target of 1.50x. This coverage level provides assurances to bond holders that the utility has the financial wherewithal to meet its annual debt payment. Municipal bond rating agencies evaluate many criteria regarding the credit worthiness of utility debt. Debt service coverage is one of the primary indicators that is examined, and rating agencies generally reserve their stronger ratings for debt service coverage ratios that exceed 1.50x to 2.00x. As shown on Line 38, the sewer utility is anticipated to be well above the minimum of 1.10x in each year and exceeds the 1.50x target in the last two years of the plan.

2.4.4 Consolidated Utility Flow of Funds

A combined water and sewer utility detailed cash flow table is presented in Table 2-14. On a consolidated basis, proposed revenue adjustments remain constant at 3.70 percent from 2020 through 2027, as shown on Lines 4 through 11. Ending operating balances meet the 180-day operating reserve in each year. The CIP is fully funded by the available cash and proposed debt issuance, and debt service coverage is above the internal target of 1.50x through 2027.

Table 2-13: Sewer Utility Financial Plan

Line No.				Projected 2020	2021	2022	2023	2024	2025	2026	2027
	Sewer Utility Operating Flow of Funds										
1	Revenue Under Existing Sewer Rates			2,525,800	2,525,800	2,525,800	2,525,800	2,525,800	2,525,800	2,525,800	2,525,800
	Proposed Revenue Adjustments										
	Year	Month	Increase								
2	2020	1	0.00%	-	-	-	-	-	-	-	-
3	2021	1	5.00%		126,300	126,300	126,300	126,300	126,300	126,300	126,300
4	2022	1	5.00%			132,600	132,600	132,600	132,600	132,600	132,600
5	2023	1	5.00%				139,200	139,200	139,200	139,200	139,200
6	2024	1	5.00%					146,200	146,200	146,200	146,200
7	2025	1	5.00%						153,500	153,500	153,500
8	2026	1	5.00%							161,200	161,200
9	2027	1	5.00%								169,200
10	Total Proposed Additional Revenue			-	126,300	258,900	398,100	544,300	697,800	859,000	1,028,200
11	Total Sewer User Charge Revenue			2,525,800	2,652,100	2,784,700	2,923,900	3,070,100	3,223,600	3,384,800	3,554,000
12	Other Sewer Fund Revenue			138,765	138,765	138,765	138,765	138,765	138,765	138,765	138,765
13	**Grand Total Water Revenue**			**2,664,565**	**2,790,865**	**2,923,465**	**3,062,665**	**3,208,865**	**3,362,365**	**3,523,565**	**3,692,765**
	Revenue Requirements										
14	Sewer Administrative			557,843	574,650	591,850	609,600	627,900	646,750	666,100	686,000
15	Sewer Plant			733,565	755,800	778,400	801,700	825,500	850,100	875,400	901,700
16	Sewer Distribution/ Collection			198,569	204,510	210,690	217,020	223,560	230,280	237,210	244,320
17	Total Operation and Maintenance Expense			1,489,976	1,534,960	1,580,940	1,628,320	1,676,960	1,727,130	1,778,710	1,832,020
	Debt Service										
18	Existing Debt			873,196	874,161	879,690	880,368	610,571	359,348	251,517	251,612
19	Proposed Debt			-	231,463	277,755	277,755	472,755	753,843	853,898	858,188
20	Total Debt Service			873,196	1,105,624	1,157,445	1,158,123	1,083,326	1,113,190	1,105,414	1,109,799
21	**Total Revenue Requirements**			**2,363,172**	**2,640,584**	**2,738,385**	**2,786,443**	**2,760,286**	**2,840,320**	**2,884,124**	**2,941,819**
22	**Annual Operating Balance**			**301,393**	**150,281**	**185,080**	**276,222**	**448,579**	**522,045**	**639,441**	**750,946**
23	Beginning Balance [1]			734,799	734,800	757,000	779,600	803,000	827,000	851,700	877,200
24	Annual Operating Balance			301,393	150,281	185,080	276,222	448,579	522,045	639,441	750,946
25	Transfers to Capital			(301,392)	(128,081)	(162,480)	(252,822)	(424,579)	(497,345)	(613,941)	(724,646)
26	Ending Balance			734,800	757,000	779,600	803,000	827,000	851,700	877,200	903,500
27	Op. Reserve Target [2]			734,800	757,000	779,600	803,000	827,000	851,700	877,200	903,500
	Sewer Utility Capital Flow of Funds										
	Sources										
28	Beginning Capital Balance			2,631,807	12,260,207	2,447,807	1,126,507	751,107	515,007	299,307	226,707
29	Transfer from Operations			301,392	128,081	162,480	252,822	424,579	497,345	613,941	724,646
30	Anticipated Grants			-	-	-	-	-	-	-	-
31	Debt Issuance [3]			10,600,000	-	-	-	-	-	-	-
32	**Total Capital Sources**			**13,533,199**	**12,388,288**	**2,610,287**	**1,379,329**	**1,175,686**	**1,012,352**	**913,248**	**951,353**
	Uses										
33	Total Inflated CIP			1,273,000	9,940,500	1,483,700	628,300	660,700	713,000	686,600	756,400
34	Debt Issuance Expense			-	-	-	-	-	-	-	-
35	**Total Capital Uses**			**1,273,000**	**9,940,500**	**1,483,700**	**628,300**	**660,700**	**713,000**	**686,600**	**756,400**
36	**Annual Capital Balance**			**12,260,199**	**2,447,788**	**1,126,587**	**751,029**	**514,986**	**299,352**	**226,648**	**194,953**
37	Total End of Year Cash			12,994,999	3,204,780	1,906,160	1,554,082	1,341,961	1,151,005	1,103,846	1,098,392
38	Debt Service Coverage [4]			1.35	1.14	1.16	1.24	1.41	1.47	1.58	1.68

[1] Beginning Balance is split evenly across water and wastewater utilities
[2] Based on 180 days operation and maintenance expense
[3] Debt is net of DSRF and issuance cost
[4] Minimum debt service coverage is 1.10: Targeting 1.50

Table 2-14: Combined Water and Sewer Utility Financial Plan

Line No.				Projected 2020	2021	2022	2023	2024	2025	2026	2027
	Combined Utility Operating Flow of Funds										
1	Revenue Under Existing Water Rates			2,924,000	2,924,000	2,924,000	2,924,000	2,924,000	2,924,000	2,924,000	2,924,000
2	Revenue Under Existing Sewer Rates			2,525,800	2,525,800	2,525,800	2,525,800	2,525,800	2,525,800	2,525,800	2,525,800
3	Total User Charge Revenue			5,449,800	5,449,800	5,449,800	5,449,800	5,449,800	5,449,800	5,449,800	5,449,800
	Proposed Revenue Adjustments										
	Year	Month	Increase								
4	2020	1	0.00%	-	-	-	-	-	-	-	-
5	2021	1	3.70%		199,400	199,400	199,400	199,400	199,400	199,400	199,400
6	2022	1	3.70%			207,500	207,500	207,500	207,500	207,500	207,500
7	2023	1	3.70%				216,000	216,000	216,000	216,000	216,000
8	2024	1	3.70%					224,900	224,900	224,900	224,900
9	2025	1	3.70%						234,200	234,200	234,200
10	2026	1	3.70%							243,900	243,900
11	2027	1	3.70%								254,000
12	Total Proposed Additional Revenue			-	199,400	406,900	622,900	847,800	1,082,000	1,325,900	1,579,900
13	Total User Charge Revenue			5,449,800	5,649,200	5,856,700	6,072,700	6,297,600	6,531,800	6,775,700	7,029,700
14	Other Fund Revenue			332,695	332,695	332,695	332,695	332,695	332,695	332,695	332,695
15	**Grand Total Revenue**			**5,782,495**	**5,981,895**	**6,189,395**	**6,405,395**	**6,630,295**	**6,864,495**	**7,108,395**	**7,362,395**
	Revenue Requirements										
16	Water O&M			1,677,459	1,728,040	1,779,960	1,833,280	1,888,340	1,944,970	2,003,290	2,063,180
17	Sewer O&M			1,489,976	1,534,960	1,580,940	1,628,320	1,676,960	1,727,130	1,778,710	1,832,020
18	Total Operation and Maintenance Expense			3,167,435	3,263,000	3,360,900	3,461,600	3,565,300	3,672,100	3,782,000	3,895,200
	Debt Service										
19	Existing Debt			1,448,985	1,449,880	1,455,215	1,455,591	1,186,370	933,597	826,110	826,417
20	Proposed Debt			-	231,463	277,755	277,755	472,755	860,093	1,066,398	1,403,488
21	Total Debt Service			1,448,985	1,681,342	1,732,970	1,733,346	1,659,125	1,793,690	1,892,508	2,229,905
22	**Total Revenue Requirements**			**4,616,420**	**4,944,342**	**5,093,870**	**5,194,946**	**5,224,425**	**5,465,790**	**5,674,508**	**6,125,105**
23	**Annual Operating Balance**			**1,166,075**	**1,037,553**	**1,095,525**	**1,210,449**	**1,405,870**	**1,398,705**	**1,433,887**	**1,237,290**
24	Beginning Balance			1,562,088	1,562,100	1,609,200	1,657,500	1,707,100	1,758,200	1,810,900	1,865,100
25	Annual Operating Balance			1,166,075	1,037,553	1,095,525	1,210,449	1,405,870	1,398,705	1,433,887	1,237,290
26	Transfers to Capital			(1,166,100)	(990,500)	(1,047,200)	(1,160,800)	(1,354,800)	(1,346,000)	(1,379,700)	(1,181,400)
27	Ending Balance			1,562,100	1,609,200	1,657,500	1,707,100	1,758,200	1,810,900	1,865,100	1,921,000
28	Op. Reserve Target [1]			1,562,000	1,609,200	1,657,400	1,707,100	1,758,200	1,810,900	1,865,100	1,920,900
	Combined Utility Capital Flow of Funds										
	Sources										
29	Beginning Capital Balance			5,171,125	15,502,225	5,419,225	3,936,125	2,856,825	2,988,125	1,063,625	1,637,325
30	Transfer from Operations			1,166,100	990,500	1,047,200	1,160,800	1,354,800	1,346,000	1,379,700	1,181,400
31	Anticipated Grants			-	-	-	-	-	-	-	-
32	Debt Issuance			10,600,000	-	-	-	-	8,500,000	-	-
33	**Total Capital Sources**			**16,937,225**	**16,492,725**	**6,466,425**	**5,096,925**	**4,211,625**	**12,834,125**	**2,443,325**	**2,818,725**
	Uses										
34	Total Inflated CIP			1,435,000	11,073,500	2,530,300	2,240,100	1,223,500	11,685,500	806,000	910,100
35	Debt Issuance Expense			-	-	-	-	-	85,000	-	-
36	**Total Capital Uses**			**1,435,000**	**11,073,500**	**2,530,300**	**2,240,100**	**1,223,500**	**11,770,500**	**806,000**	**910,100**
37	**Annual Capital Balance**			**15,502,225**	**5,419,225**	**3,936,125**	**2,856,825**	**2,988,125**	**1,063,625**	**1,637,325**	**1,908,625**
38	Total End of Year Cash			17,064,288	7,028,340	5,593,565	4,563,914	4,746,285	2,874,490	3,502,377	3,829,568
39	Debt Service Coverage			1.80	1.62	1.63	1.70	1.85	1.78	1.76	1.55

[1] Based on 180 days operation and maintenance expense
[2] Minimum debt service coverage is 1.10: Targeting 1.50

3.0 COST OF SERVICE ANALYSIS

3.1 Introduction

The cost of service analysis is focused on determining revenue responsibility. Once the overall need for revenue increases is identified through financial planning, the results of the cost of service analysis help answer the following question:

- "Which customer class or classes are responsible for the costs incurred to provide service?"

To determine each customer class' equitable share of the cost of providing utility service, the cost of service analysis compares the revenues received from each customer class under the existing schedule of rates with the allocated cost responsibility for that class.

The cost of service analysis was developed in the following steps:

1. Determine the net revenue requirements to be recovered from user charges.
2. Allocate test period operating and capital costs.
3. Estimate the system test period units of service.
4. Develop test period unit costs of service by class.
5. Assign the costs of service to customer classes.

To equitably develop rates for water and sewer service, the water and sewer utility's customer classes are allocated their respective share of the total cost of service according to their use of the system. Cost are assigned through consideration of volume, peak water demand characteristics, wastewater strength, customer costs, and other relevant factors. Ultimately, proposed rates must be sufficient to meet the net revenue requirements forecasted for the water and sewer utility.

3.2 Water Cost of Service

3.2.1 Net Revenue Requirements

As described in Section 2.0 of this report, the cash needs of the water utility were projected over a seven-year study period. The test period for the cost of service analysis is 2021, which corresponds to the first year for which revenue adjustments are proposed. For the water utility, the revenue adjustment amounts to a 2.5 percent increase.

Table 3-1 summarizes the development of the net revenue requirements to be recovered from water rates in the 2021 test year. The net revenue requirements represent the level of costs that must be recovered

from water sales under the established water rate schedule and are equal to total operating and capital cost expenditures less all sources of other revenue. As presented in Table 3-1, the net operating costs are equal to $1,558,982 and the net capital costs are equal to $1,438,119 for a total net revenue requirement of $2,997,100. This is 2.5 percent higher than revenues under existing water rates which is consistent with the 2021 revenue increase identified in the recommended water utility financial plan.

Table 3-1: Test Year 2021 Water Net Revenue Requirements

Line No.	Description	Operating Expense $	Capital Cost $	Total $
	Revenue Requirements			
1	Operating Expense	1,728,040	-	1,728,040
2	Debt Service	-	575,719	575,719
3	Revenue Capital Financing	-	862,400	862,400
4	Total	1,728,040	1,438,119	3,166,159
	Revenue Requirements Met from Other Sources			
5	Other Miscellaneous Revenue	193,930	-	193,930
6	Use of / (Deposit to) Reserves	(24,872)	-	(24,872)
7	Total	169,059	-	169,059
8	Cost of Service to be met by User Charges	1,558,982	1,438,119	2,997,100
9	Revenue under Existing Rates			2,924,000
10	Indicated System Revenue Adjustment			2.5%

3.2.2 Cost of Service Methodology

Two alternative water cost allocation methodologies are generally accepted by the American Water Works Association as described in AWWA *Manual M1, Principles of Water Rates, Fees, and Charges*: (1) the Base-Extra Capacity Method, and (2) the Commodity-Demand Method. Both methods are similar in that each customer class' average water usage requirements and peak demand water usage requirements are reflected in the allocation process. Although the allocation approach varies slightly in the assignment of costs, both approaches are centered on the recovery of costs related to both average and peak conditions.

For this Study, the Base-Extra Capacity method was followed. Under the Base-Extra Capacity method, costs are assigned to functional components including base, extra capacity, customer costs and fire protection. Base costs vary directly with the volume of water used and reflect the costs associated with

serving customers under average load conditions. Base costs tend to include items such as power and chemicals costs.

Extra capacity costs reflect costs incurred to meet the peak demand at both a maximum day and a maximum hour. These costs include operating and capital costs necessary to provide additional capacity beyond average load conditions.

Customer costs are those that generally vary in accordance with the quantity of customers served. Such costs typically include meter reading, billing, customer care, and related support costs.

3.2.3 Functional Cost Assignment

The water utility system includes a variety of facilities that work in concert with one another to meet the average and peak demands of the system. Water systems are designed to meet peak coincidental demands of the system as a whole. For every volume-related element within the water system, an average demand is served and therefore a portion of such costs is attributable to the base cost component. Water system elements designed to primarily meet average day demand are assigned 100 percent to the base component. Extra capacity requirements exceeding the base are further distinguished between maximum day and maximum hour demands.

3.2.3.1 Operating Expenses

Operating expenses for the water system are budgeted and actual expenses are recorded to reflect costs associated with administrative costs, water treatment and the distribution system. These costs were forecasted previously in Table 2-6 of this report. Test year 2021 operating costs are assigned to functional components in Table 3-2.

Table 3-2: Allocation of Test Year 2021 Water Operation and Maintenance Expenses

Line No.	Description	Test Year 2021 Total	Base	Maximum Day	Maximum Hour	Meters	Billing
		$	$	$	$	$	$
	Administration						
1	Personnel Services	65,950	38,332	16,015	8,895	-	2,708
2	Contractual Services	14,300	8,314	3,470	1,928	-	588
3	Commodities	13,100	7,615	3,181	1,767	-	537
4	Office Facilities and Service - Billing	49,400	-	-	-	-	49,400
5	Other Charges	431,900	251,026	104,875	58,259	-	17,740
6	Capital Outlay	-	-	-	-	-	-
7	Total Administrative	574,650	305,287	127,541	70,849	-	70,973
	Water Plant						
8	Personnel Services	294,600	194,824	99,776	-	-	-
9	Contractual Services	197,900	130,874	67,026	-	-	-
10	Chemicals	128,800	128,800	-	-	-	-
11	Other Commodities	150,600	143,216	7,384	-	-	-
12	Other Charges	100	66	34	-	-	-
13	Capital Outlay	33,000	21,823	11,177	-	-	-
14	Total Water Plant	676,200	490,803	185,397	-	-	-
	Distribution						
15	Personnel Services	347,900	151,845	77,768	118,287	-	-
16	Contractual Services	46,690	20,379	10,437	15,874	-	-
17	Commodities	82,600	36,052	18,464	28,084	-	-
18	Other Charges	-	-	-	-	-	-
19	Capital Outlay	-	-	-	-	-	-
20	Total Distribution	477,190	208,276	106,669	162,245	-	-
21	Total Water O&M	1,728,040	1,004,366	419,607	233,094	-	70,973
		100%	58%	24%	13%	0%	4%
	Less Other Operating Revenue						
22	Miscellaneous Revenue	193,930	112,715	47,091	26,159	-	7,965
23	Use of / (Deposit to) Reserves	(24,872)	(14,456)	(6,039)	(3,355)	-	(1,022)
24	Total	169,059	98,260	41,051	22,804	-	6,943
25	Net Water O&M Expense	1,558,982	906,106	378,556	210,290	-	64,030

Water utility operating costs were allocated based on several considerations, including:

- Water utility input regarding the functional purpose of certain costs.
- The design basis of the supply infrastructure, which is influenced primarily by average and maximum day service requirements.
- The design basis of the transmission and distribution system, which is influenced primarily by the maximum day and maximum hour service requirements.
- Directly assignable costs such as customer billing.

3.2.3.2 Capital Costs

Cash capital costs for the water utility include pay-as-you-go (or revenue-financed) capital projects and payments on existing and proposed debt. As shown on Table 3-3, the costs of the existing debt in 2021 are allocated using Base-Maximum Day basis, reflecting the use of 2017 debt to fund for the water treatment plant improvements. Revenue financed capital is allocated using a five-year outlook of the CIP as the next five years of water CIP are anticipated to be funded by available cash. Capital costs are allocated on a project by project basis, taking into consideration the cost-causative design associated with these projects.

Table 3-3: Allocation of Test Year 2021 Water Capital Costs

Line No.	Description	Test Year 2021 $	Common to All Customers: Base $	Maximum Day $	Maximum Hour $	Customer Meters $	Billing $
1	Existing Debt [1]	575,719	380,719	195,000	-	-	-
2	Proposed Debt	-	-	-	-	-	-
3	Revenue Financed Capital [2]	862,400	461,200	236,100	11,700	-	153,400
4	Net Water Capital Expense	1,438,119	841,919	431,100	11,700	-	153,400

[1] Existing debt was allocated using a Base-Max Day methodology reflecting the expansion and improvement of the water treatment plant

[2] Allocated using the capital improvement plan

3.2.4 Units of Service

Functional costs responsibility of each customer class may be established based on the respective service requirements of each class. These service requirements are referred to as units of service and are summarized in Table 3-4.

Base cost responsibility is determined by the water volume used under average day conditions. Average day quantities reflect historical and forecasted demand. Extra capacity costs are assigned to classes based on the estimate of individual class peak demand characteristics and the relationship of these peaks to average use. The estimated capacity factors were developed based on an examination of peak to average demand available from the water utility's billing data, experience with the City's system, and judgment.

Table 3-4: Water Units of Service

Line No.	Description	Total Annual Usage Kgal	Average Day Kgal/ day	Maximum Day Capacity Factor %	Maximum Day Total Capacity Kgal/ day	Maximum Day Extra Capacity (a) Kgal/ day	Maximum Hour Capacity Factor %	Maximum Hour Total Capacity Kgal/ day	Maximum Hour Extra Capacity (b) Kgal/ day	Customers Equivalent Meters	Customers Billed Units
1	Commercial	90,900	249	200%	498	249	425%	1,058	809	312	3,348
2	Governmental	4,580	13	200%	25	13	425%	53	41	15	168
3	Power and Demand	53,200	146	200%	292	146	425%	620	474	225	2,460
4	Residential	133,950	367	225%	826	459	450%	1,651	1,284	3,145	37,740
5	School	5,250	14	200%	29	14	425%	61	47	15	168
6	Total Electric	12,000	33	225%	74	41	450%	148	115	392	4,260
7	Total	299,880	822		1,743	922		3,592	2,770	4,103	48,144

Projected customers for Test Year 2021 are the basis for the customer-related units of service. Equivalent meter ratios documented in the AWWA M1 manual reflect the relationship of the costs to install and maintain various sized meters to a standard 5/8-inch. These ratios are used to estimate 5/8-inch equivalents for each customer class. Billing costs are allocated to classes based on the projected number of billed units.

3.2.5 Unit Cost Development

Based on the functionalized operation and maintenance expenses and capital costs shown in Tables 3-2 and 3-3, respectively, and the units of service developed in Table 3-4, unit costs of service for each functional cost component may be determined. Table 3-5 indicates, for each functional component, the unit of measure and applicable unit cost.

Table 3-5: Water Unit Cost Development

Line No.	Description	Test Year 2021 Total	Base Kgal	Maximum Day Kgal/day	Maximum Hour Kgal/day	Customer Meters Equivalent Meters	Billing Bills
1	Total Units of Service		299,880	922	2,770	4,103	48,144
2	Net Operating Expense - $	1,558,982	906,106	378,556	210,290	-	64,030
3	Unit Cost - $/Unit		3.0216	410.7544	75.9166	-	1.3300
4	Net Capital Costs - $	1,438,119	841,919	431,100	11,700	-	153,400
5	Unit Cost - $/Unit		2.8075	467.7679	4.2238	-	3.1863
6	Total Cost of Service	2,997,100	1,748,025	809,656	221,990	-	217,430
7	Unit Cost - $/Unit		5.8291	878.5223	80.1404	-	4.5162

3.2.6 Allocation of Costs to Customer Classes

Applying the unit costs by function to each customer class' units of service allows for the distribution of costs to customer classes, as shown in Table 3-6. Units of service for each class are as developed

previously in Table 3-5. By applying the unit cost for each function against the level of service provided to each customer class, the total cost of service by customer class may be determined.

Table 3-6: Water Cost Allocation to Customer Classes

Line No.	Description	Test Year 2021 Total	Base	Maximum Day	Maximum Hour	Meters	Billing
1	Unit Cost of Service - $/Unit		$ 5.829	$ 878.522	$ 80.140	$ -	$ 4.516
	Commercial						
2	Units of Service		90,900	249	809	312	3,348
3	Allocated Cost - $	828,700	529,900	218,800	64,900	-	15,100
	Governmental						
4	Units of Service		4,580	13	41	15	168
5	Allocated Cost - $	41,800	26,700	11,000	3,300	-	800
	Power and Demand						
6	Units of Service		53,200	146	474	225	2,460
7	Allocated Cost - $	487,200	310,100	128,000	38,000	-	11,100
	Residential						
8	Units of Service		133,950	459	1,284	3,145	37,740
9	Allocated Cost - $	1,457,100	780,800	403,000	102,900	-	170,400
	School						
10	Units of Service		5,250	14	47	15	168
11	Allocated Cost - $	47,800	30,600	12,700	3,700	-	800
	Total Electric						
12	Units of Service		12,000	41	115	392	4,260
13	Allocated Cost - $	134,400	69,900	36,100	9,200	-	19,200
14	Total Units of Service		299,880	922	2,770	4,103	48,144
15	Total Cost of Service	2,997,000	1,748,000	809,600	222,000	-	217,400

After Test Year 2021 costs are assigned to customer classes, they may be compared against revenue under existing rates. This comparison provides an indication of equity in the recovery of costs through revenues under existing 2020 rates. As shown in Table 3-7, the total system adjustment is indicated to be 2.5 percent, with impacts varying at the customer class level.

Table 3-7: Comparison of Revenue Under Existing Rates to Allocated Cost of Service

Line No.	Description	Revenue Under Existing Rates $	Total Allocated Cost of Service $	Indicated Increase / (Decrease) $	Indicated Increase / (Decrease) %
1	Commercial	839,800	828,700	(11,100)	-1.3%
2	Governmental	41,400	41,800	400	1.0%
3	Power and Demand	478,400	487,200	8,800	1.8%
4	Residential	1,387,700	1,457,100	69,400	5.0%
5	School	47,000	47,800	800	1.7%
6	Total Electric	129,700	134,400	4,700	3.6%
7	Total	2,924,000	2,997,000	73,000	2.5%

It is important to note that cost of service results are instructive but for many reasons should not be interpreted as prescriptive in the development of proposed rates. Section 4.0 will discuss proposed rates for the water utility.

3.3 Sewer Cost of Service

3.3.1 Net Revenue Requirements

As described in Section 2.0 of this report, the cash needs of the sewer utility were projected over a seven-year study period. The test period for the cost of service analysis is 2021, which corresponds to the first year for which revenue adjustments are proposed. For the sewer utility, the revenue adjustment amounts to a 5 percent increase.

Table 3-8 summarizes the development of the net revenue requirements to be recovered from sewer rates in the 2021 test year. The net revenue requirements represent the level of costs that must be recovered from sewer rates and are equal to total operating and capital cost expenditures less all sources of other revenue. As presented in Table 3-8, the net operating costs are equal to $1,418,376 and the net capital costs are equal to $1,233,724 for a total net revenue requirement of $2,652,100. This is 5.0 percent higher than revenues under existing sewer volume rates, consistent with the 2021 revenue increase identified in the recommended sewer utility financial plan.

Table 3-8: Test Year 2021 Sewer Net Revenue Requirements

Line No.	Description	Operating Expense $	Capital Cost $	Total $
	Revenue Requirements			
1	Operating Expense	1,534,960	-	1,534,960
2	Debt Service	-	1,105,624	1,105,624
3	Revenue Capital Financing	-	128,100	128,100
4	Total	1,534,960	1,233,724	2,768,684
	Revenue Requirements Met from Other Sources			
5	Other Miscellaneous Revenue	138,765	-	138,765
6	Use of / (Deposit to) Reserves	(22,181)	-	(22,181)
7	Total	116,584	-	116,584
8	Cost of Service to be met by User Charges	1,418,376	1,233,724	2,652,100
9	Revenue under Existing Rates			2,525,800
10	Indicated System Revenue Adjustment			5.0%

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3.3.2 Cost of Service Methodology

According to the Water Environment Federation (WEF) publication *Financing and Charges for Wastewater Systems*, three cost allocation methodologies are generally used in the identification and allocation of wastewater utility costs. They are:

- Design-Basis Cost Allocation Methodology, whereby costs are allocated to functions based on engineering design considerations that influence the size and purpose of facilities.
- Functional Cost Allocation Methodology, whereby costs are allocated to functions based on the operational purpose of facilities rather than engineering design.
- Hybrid Approach, where in general capital costs are allocated on the design basis while operating costs are allocated on the functional basis.

For this analysis, the functional cost allocation basis was followed, which aligns well with the current sewer cost structure and services related to its collection and treatment systems.

3.3.3 Functional Cost Assignment

The sewer utility system includes a variety of facilities that work in concert with one another to meet necessary service requirements. For the City, sewer system expenses include administrative, wastewater treatment, and collection costs which can be spread on the functional cost recovery basis of volume, treatment plant, customer, and general system.

Volume costs are those which vary directly with the quantity of wastewater contributed. Treatment plant includes the strength of wastewater as measured in biochemical oxygen demand (BOD) and suspended solids (SS). Customer costs are those that generally vary in accordance with the quantity of customers served. Such costs may include a portion of billing, customer care, and related support costs. General system are all other costs incurred by the utility which are spread on the basis of all other direct costs.

3.3.3.1 Operating Expenses

Operating expenses for the sewer system were forecasted previously in Table 2-7 of this report. Test year 2021 operating costs are assigned to functional components in Table 3-9.

In general operation and maintenance costs were allocated based on several considerations, including:

- The cost causative or functional nature of the underlying expense.
- Directly assignable costs such as customer costs.
- City input regarding the functional purpose of certain costs.

Table 3-9: Allocation of Test Year 2021 Sewer Operation and Maintenance Expenses

Line No.	Description	Test Year 2021 Total	Volume	BOD	Suspended Solids	Customer
		$	$	$	$	$
	Administration					
1	Personnel Services	65,950	44,950	8,900	8,900	3,200
2	Contractual Services	14,300	9,800	1,900	1,900	700
3	Commodities	13,100	8,800	1,800	1,800	700
4	Office Facilities and Service - Billing	49,400	-	-	-	49,400
5	Other Charges	431,900	292,800	59,000	59,000	21,100
6	Capital Outlay	-	-	-	-	-
7	Total Administrative	574,650	356,350	71,600	71,600	75,100
	Wastewater Plant					
8	Personnel Services	316,000	157,600	79,200	79,200	-
9	Utilities	205,000	205,000	-	-	-
10	Other Contractual Services	212,900	106,300	53,300	53,300	-
11	Commodities	21,400	10,600	5,400	5,400	-
12	Total Other Charges	500	300	100	100	-
13	Capital Outlay	-	-	-	-	-
14	Total Wastewater Plant	755,800	479,800	138,000	138,000	-
	Distribution					
15	Personnel Services	149,100	149,100	-	-	-
16	Contractual Services	20,010	20,010	-	-	-
17	Commodities	35,400	35,400	-	-	-
18	Other Charges	-	-	-	-	-
19	Capital Outlay	-	-	-	-	-
20	Total Distribution	204,510	204,510	-	-	-
21	Total Wastewater O&M	1,534,960	1,040,660	209,600	209,600	75,100
		100%	68%	14%	14%	5%
	Less Other Operating Revenue					
22	Miscellaneous Revenue	138,765	94,100	18,900	18,900	6,800
23	Use of / (Deposit to) Reserves	(22,181)	(15,000)	(3,000)	(3,000)	(1,100)
24	Total	116,584	79,100	15,900	15,900	5,700
25	Net Wastewater O&M Expense	1,418,376	961,560	193,700	193,700	69,400

3.3.3.2 Capital Costs

Cash capital costs for the sewer utility include pay-as-you-go (or revenue-financed) capital projects and payment on existing and proposed debt. As shown in Table 3-10, Test Year 2021 capital costs include both revenue-financed capital and a payment on existing and proposed revenue bonds. These costs are assigned to functional components in Table 3-10 on the basis of existing debt using fixed asset data and

the planned investment from the CIP and the cost-causative design associated with these projects over the first five years of the study period.

Table 3-10: Allocation of Test Year 2021 Sewer Capital Costs

Line No.	Description	Test Year 2021 Total	Volume	BOD	Suspended Solids	Customer
		$	$	$	$	$
1	Existing Debt [1]	874,161	653,561	110,200	110,200	200
2	Proposed Debt [2]	231,463	207,163	5,600	4,300	14,400
3	Revenue Financed Capital [2]	128,100	114,700	3,100	2,400	7,900
4	Net Sewer Capital Expense	1,233,724	975,424	118,900	116,900	22,500

[1] Existing debt was allocated using fixed asset data
[2] Allocated using the capital improvement plan

3.3.4 Units of Service

Functional costs responsibility of each customer class may be established based on the respective service requirements of each class. These service requirements are referred to as units of service and are summarized in Table 3-11.

Billable flow or volume is that portion of each customer's annual water use discharged directly into the sewer system. Billable flow is based upon utility billing records. An additional consideration for system wide treatment costs is Infiltration/ Inflow (I/I) which is the amount of volume treated at the plant beyond billable flow. This wastewater is related to wet weather events, where additional volume enters the system via leaks, cracks, direct downspout connections and other means, and is ultimately treated at the wastewater treatment plant. Billing costs are allocated to classes based on the projected number of billed units.

Table 3-11: Sewer Units of Service

Line No.	Description	Billable Flow	Infiltration/Inflow Volume	Infiltration/Inflow Customer	Treated Flow	Strength BOD	Strength SS	Meters	Billed Units
		Kgal	50%	50%	Kgal	lbs	lbs.		
1	Commercial	28,440	16,037	8,421	52,898	111,835	123,694	266	3,192
2	Governmental	1,420	801	222	2,443	5,543	6,135	7	84
3	Power and Demand	49,320	27,811	6,110	83,241	192,170	212,737	193	2,316
4	Residential	130,440	73,553	101,342	305,335	362,826	362,826	3,201	38,412
5	School	2,940	1,658	348	4,946	11,452	12,678	11	132
6	Total Electric	14,490	8,171	14,658	37,319	41,014	41,014	463	5,556
7	WD9	5,730	3,231	158	9,119	22,211	24,601	5	60
8	Units of Service	232,780	131,262	131,259	495,301	747,052	783,685	4,146	49,752

3.3.5 Unit Cost Development

Based on the functionalized operation and maintenance expenses and capital costs shown in Tables 3-9 and 3-10, respectively, and the units of service developed in Table 3-11, unit costs of service for each functional cost component may be determined. Table 3-12 indicates, for each functional component, the unit of measure and applicable unit cost.

Table 3-12: Sewer Unit Cost Development

Line No.	Description	Test Year 2021 Total	Volume	BOD	Suspended Solids	Customer
1	Total Units of Service		495,301	747,052	783,685	49,752
2	Unit of Measure		Treated Kgal	Lbs	Lbs	Bills
3	Net Operating Expense - $	1,418,360	961,560	193,700	193,700	69,400
4	Unit Cost - $/Unit		1.9414	0.2593	0.2472	1.3949
5	Net Capital Costs - $	1,233,724	975,424	118,900	116,900	22,500
6	Unit Cost - $/Unit		1.9694	0.1592	0.1492	0.4522
7	Total Cost of Service	2,652,084	1,936,984	312,600	310,600	91,900
8	Unit Cost - $/Unit		3.9108	0.4185	0.3964	1.8471

3.3.6 Allocation of Costs to Customer Classes

Applying the unit costs by function to each customer class' units of service allows for the distribution of costs to customer classes, as shown in Table 3-13. Units of service for each class are as developed previously in Table 3-11. By applying the unit cost for each function against the level of service provided to each customer class, the total cost of service by customer class may be determined.

After Test Year 2021 costs are assigned to customer classes, they may be compared against revenue under existing rates. This comparison provides an indication of equity in the recovery of costs through revenues under existing 2020 rates. As shown in Table 3-14, the total system adjustment is indicated to be 5.0 percent overall, with impacts varying at the customer class level.

Table 3-13: Sewer Cost Allocation to Customer Classes

Line No.	Description	Test Year 2021 Total	Common to All Customers			
			Volume	BOD	Suspended Solids	Meter Reading
1	Unit Cost of Service - $/Unit		$ 3.911	$ 0.419	$ 0.396	$ 1.847
	Commercial					
2	Units of Service		52,898	111,835	123,694	3,192
3	Allocated Cost - $	308,600	206,900	46,800	49,000	5,900
	Governmental					
4	Units of Service		2,443	5,543	6,135	84
5	Allocated Cost - $	14,500	9,600	2,300	2,400	200
	Power and Demand					
6	Units of Service		83,241	192,170	212,737	2,316
7	Allocated Cost - $	494,500	325,500	80,400	84,300	4,300
	Residential					
8	Units of Service		305,335	362,826	362,826	38,412
9	Allocated Cost - $	1,560,700	1,194,100	151,800	143,800	71,000
	School					
10	Units of Service		4,946	11,452	12,678	132
11	Allocated Cost - $	29,300	19,300	4,800	5,000	200
	Total Electric					
12	Units of Service		37,319	41,014	41,014	5,556
13	Allocated Cost - $	189,700	145,900	17,200	16,300	10,300
	WD9					
14	Units of Service		9,119	22,211	24,601	60
15	Allocated Cost - $	54,900	35,700	9,300	9,800	100
16	Total Units of Service		495,301	747,052	783,685	49,752
17	Total Cost of Service	2,652,200	1,937,000	312,600	310,600	92,000

Table 3-14: Comparison of Revenue Under Existing Rates to Allocated Cost of Service

Line No.	Description	Revenue Under Existing Rates $	Total Allocated Cost of Service $	Indicated Increase / (Decrease) $	Indicated Increase / (Decrease) %
1	Commercial	313,500	308,600	(4,900)	-1.6%
2	Governmental	13,700	14,500	800	5.8%
3	Power and Demand	472,100	494,500	22,400	4.7%
4	Residential	1,472,200	1,560,700	88,500	6.0%
5	School	28,000	29,300	1,300	4.6%
6	Total Electric	173,300	189,700	16,400	9.5%
7	WD9	53,000	54,900	1,900	3.6%
8	Total	2,525,800	2,652,200	126,400	5.0%

Similar to the water utility, it is important to note that cost of service results are instructive but for many reasons should not be interpreted as prescriptive in the development of proposed rates. Section 4.0 will discuss proposed rates for the sewer utility.

4.0 PROPOSED RATE DESIGN

4.1 Introduction

The primary focus of Step 3, Rate Design is the examination of revenue recovery. Generally speaking, the objective is to design rates for each utility to progress toward the following goals:

- Generate adequate revenues to meet the projected operating and capital costs, while maintaining sound financial performance.
- Provide revenue stability.
- Provide cost recovery that is reasonably commensurate with the cost of providing service.

4.2 Existing Rates

The current 2020 rate schedule is shown in Table 4-1. The water and sewer rate consists of a volumetric charge per thousand gallons and a fixed fee which includes the first 1,000 gallons.

Table 4-1: Current Water and Sewer Rates

Line No		
	Water Rates	
1	Residential & Commercial	
2	Base (1st 1000 Gal)	13.89
3	Each Additional 1000 Gal.	8.71
	Sewer Rates	
4	Residential & Commercial	
5	Base (1st 1000 Gal)	16.35
6	Each Additional 1000 Gal.	9.16

Three advantages of the current rate structure are that it is understood by water and sewer customers, it is easy to explain, and it provides for fixed cost recovery. The fixed cost recovery built into the existing rates is beneficial because it provides a degree of alignment with the predominately fixed nature of the utility's costs.

4.3 Proposed Rates

Table 4-2 represents the existing and proposed water and sewer rates over the forecast period, maintaining the existing rate structure.

Table 4-2: Proposed Water and Sewer Rates

Line No.	Description	Existing 2020	Proposed 2021	2022	2023	2024	2025	2026	2027
	Water Rates								
1	Base (First 1,000 Gal.)	$ 13.89	$ 14.24	$ 14.59	$ 14.96	$ 15.33	$ 15.72	$ 16.11	$ 16.51
2	Each Additional 1,000 Gal.	$ 8.71	$ 8.93	$ 9.15	$ 9.38	$ 9.61	$ 9.85	$ 10.10	$ 10.35
	Sewer Rates								
3	Base (First 1,000 Gal.)	$ 16.35	$ 17.17	$ 18.03	$ 18.93	$ 19.87	$ 20.87	$ 21.91	$ 23.01
4	Each Additional 1,000 Gal.	$ 9.16	$ 9.62	$ 10.10	$ 10.60	$ 11.13	$ 11.69	$ 12.28	$ 12.89

4.4 Typical Bills

Table 4-3 shows the typical water bill under proposed rates at three different usage levels. As shown on Table 4-3, the total water utility bill for a typical customer using 5,000 gallons would increase by approximately $1.22 per month in 2021.

Table 4-3: Typical Water Bills Under Existing and Proposed Rates

Line No.	Description	Billable Flow (1,000 Gal.)	Monthly Bill Under Existing 2020 Rates $	Proposed 2021 Rates $	Proposed 2022 Rates $	Proposed 2023 Rates $	Proposed 2024 Rates $	Proposed 2025 Rates $	Proposed 2026 Rates $	Proposed 2027 Rates $
1	Residential	2.0	$ 22.60	$ 23.17	$ 23.74	$ 24.34	$ 24.95	$ 25.57	$ 26.21	$ 26.86
2	Residential	5.0	$ 48.73	$ 49.95	$ 51.20	$ 52.48	$ 53.79	$ 55.13	$ 56.51	$ 57.92
3	Residential	8.0	$ 74.86	$ 76.73	$ 78.65	$ 80.62	$ 82.63	$ 84.70	$ 86.81	$ 88.99
	Change in $ over prior year									
4	Residential			$ 0.56	$ 0.58	$ 0.59	$ 0.61	$ 0.62	$ 0.64	$ 0.66
5	Residential			$ 1.22	$ 1.25	$ 1.28	$ 1.31	$ 1.34	$ 1.38	$ 1.41
6	Residential			$ 1.87	$ 1.92	$ 1.97	$ 2.02	$ 2.07	$ 2.12	$ 2.17
	Change in % over prior year									
7	Residential			2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
8	Residential			2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
9	Residential			2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%

Table 4-4 shows the typical sewer bill under proposed rates at three different usage levels. As shown on Table 4-3, the total sewer utility bill for a typical customer using 5,000 gallons would increase by approximately $2.65 per month in 2021.

Table 4-4: Typical Sewer Bills Under Existing and Proposed Rates

Line No.	Description	Billable Flow (1,000 Gal.)	Monthly Bill Under Existing 2020 Rates $	Proposed 2021 Rates $	Proposed 2022 Rates $	Proposed 2023 Rates $	Proposed 2024 Rates $	Proposed 2025 Rates $	Proposed 2026 Rates $	Proposed 2027 Rates $
1	Residential	2.0	$ 25.51	$ 26.79	$ 28.12	$ 29.53	$ 31.01	$ 32.56	$ 34.19	$ 35.90
2	Residential	5.0	$ 52.99	$ 55.64	$ 58.42	$ 61.34	$ 64.41	$ 67.63	$ 71.01	$ 74.56
3	Residential	8.0	$ 80.47	$ 84.49	$ 88.72	$ 93.15	$ 97.81	$ 102.70	$ 107.84	$ 113.23
	Change in $ over prior year									
4	Residential			$ 1.28	$ 1.34	$ 1.41	$ 1.48	$ 1.55	$ 1.63	$ 1.71
5	Residential			$ 2.65	$ 2.78	$ 2.92	$ 3.07	$ 3.22	$ 3.38	$ 3.55
6	Residential			$ 4.02	$ 4.22	$ 4.44	$ 4.66	$ 4.89	$ 5.14	$ 5.39
	Change in % over prior year									
7	Residential			5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
8	Residential			5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
9	Residential			5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%

4.5 Regional Comparison

Utility rate levels were examined and compared for 13 neighboring communities. Figure 4-1 shows a comparison of monthly residential water bills for neighboring regional water utilities. This survey indicates the City is close to the average when compared to the surveyed utilities. Proposed rates for 2021 do not change the competitive position of the City. It is worth noting that the water rates for these surveyed communities are likely to rise over time.

Figure 4-1: Typical Residential Water Bill Comparison at 5 Kgal per Month

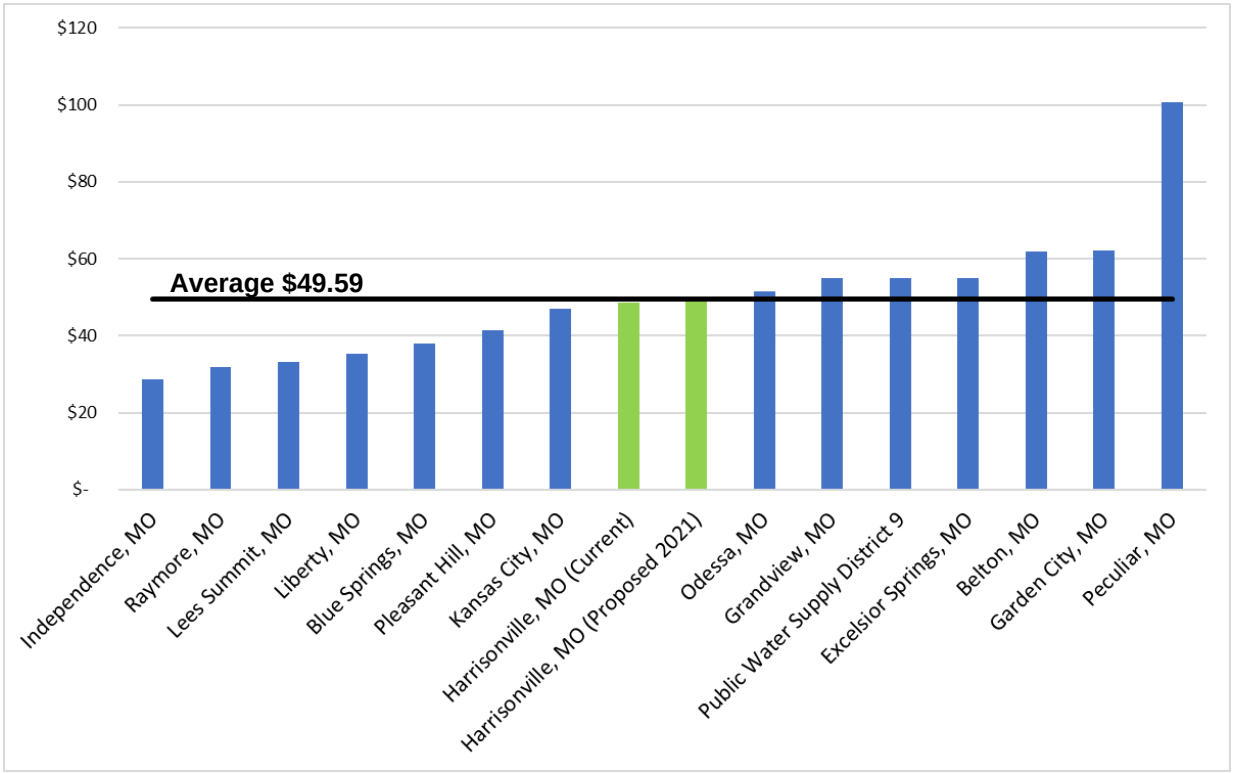
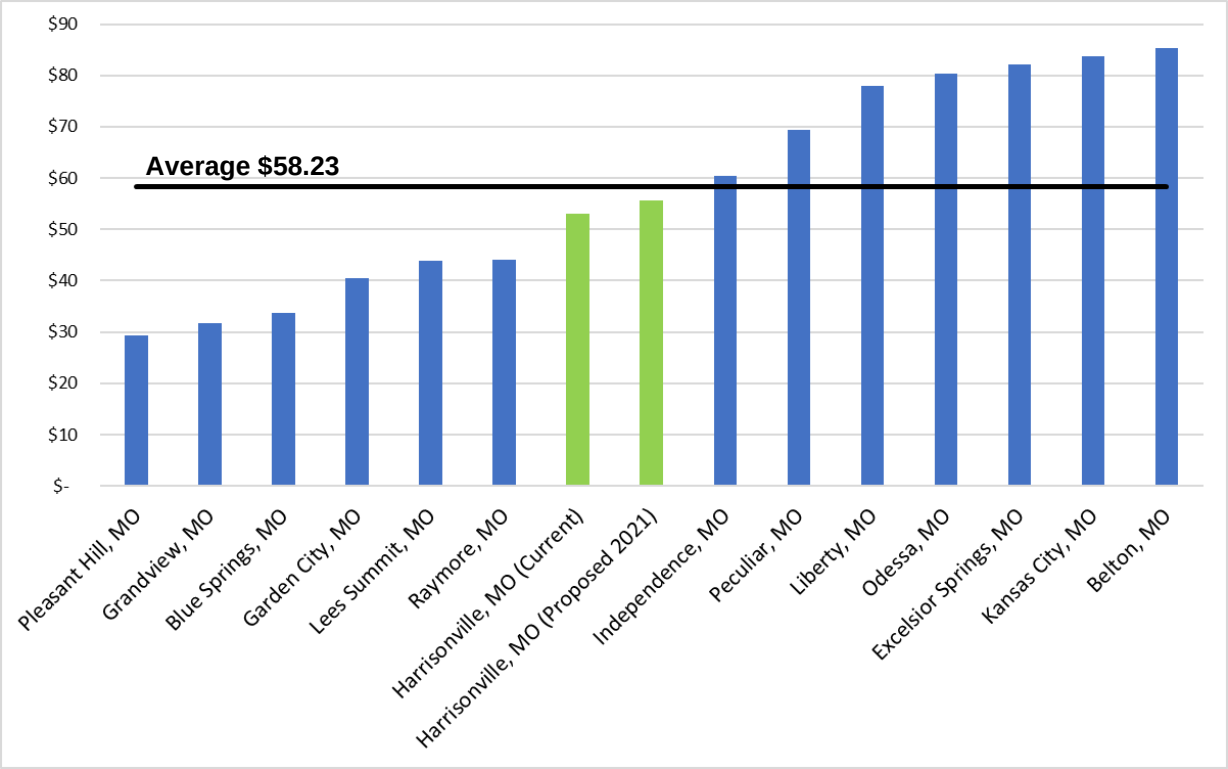


Figure 4-2 shows a comparison of monthly residential sewer bills for neighboring regional sewer utilities. Comparable to water, this survey indicates the City is close to the average when compared to the surveyed utilities. Proposed rates for 2021 do not change the competitive position of the City. It is worth noting that the other communities' rates are likely to rise over time.

Figure 4-2: Typical Residential Sewer Bill Comparison at 5 Kgal per Month



4.6 Statement of Limitations

In preparation of the City of Harrisonville Rate Study (Study), Burns & McDonnell relied upon information provided by the City. The information included various analyses, computer-generated information and reports, audited financial reports, and other financial and statistical information, as well as other documents such as operating budgets and current retail water rate schedules. In addition, input to key assumptions regarding expected future levels of revenue, sales, and expenditures was provided by City staff to Burns & McDonnell. While Burns & McDonnell has no reason to believe that the information provided, and upon which Burns & McDonnell has relied, is inaccurate or incomplete in any material respect, Burns & McDonnell has not independently verified such information and cannot guarantee its accuracy or completeness.

Estimates and projections prepared by Burns & McDonnell relating to financial forecasting and costs are based on Burns & McDonnell's experience, qualifications, and judgment as a professional consultant. Since Burns & McDonnell has no control over weather, cost and availability of labor, material and equipment, labor productivity, contractors' procedures and methods, unavoidable delays, economic conditions, government regulations and laws (including interpretation thereof), competitive bidding, and market conditions or other factors affecting such estimates or projections, Burns & McDonnell does not guarantee the accuracy of its estimates or predictions.

It should be noted that the forecasts prepared in this report do not reflect the potential disruption that COVID-19 may cause. The potential scale and duration of disruptions due to COVID-19 is currently unknown. At this time, it is impossible to foresee or to predict the full impact of COVID-19 and, therefore, forecasts do not include a contingency specifically for COVID-19.

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