CITY OF

SEAL BEACH

Water and Wastewater Rate Study

Final Report / December 18, 2020

RAFTELIS

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Dec3ember 18, 2020

Mr. Steve Myrter, PE
Director of Public Works
City of Seal Beach
211 Eighth Street
Seal Beach, CA 90740

Subject: Water and Wastewater Rate Study

Dear Mr. Myrter,

Raftelis Financial Consultants, Inc. (Raftelis) is pleased to provide this Water and Wastewater Rate Study Report (Report) for the City of Seal Beach (City) to establish a financial plan and water and wastewater rates that are equitable and in compliance with Proposition 218.

The major study objectives include:

- Developing financial plans for the water and wastewater enterprises to ensure financial sufficiency, and meet operation and maintenance (O&M) costs,
- Developing sufficient reserve fund targets, and
- Developing equitable water and wastewater rates.

The Executive Summary summarizes the key findings and recommendations and the main body of the report fully derives the water and wastewater rates.

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

Sincerely,

Steve Gagnon, PE
Senior Manager

Arisha Ashraf, PhD
Lead Consultant

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1. Executive Summary

1.0. Study Background

In 2019, the City of Seal Beach engaged Raftelis to conduct a Water and Wastewater Rate Study (Study) which includes a financial plan and rates for the water and wastewater enterprises. Raftelis developed equitable rates to meet guidelines in Proposition 218. The last comprehensive water and wastewater rate studies were conducted in 2010 and 2005, respectively.

1.0.1. STUDY OBJECTIVES

The major study objectives include the following:

- Develop financial plans for the water and wastewater enterprises to ensure financial sufficiency, meet operation and maintenance (O&M) costs,
- Develop sufficient reserves,
- Review and revise the rate structures,
- Assess customer bill impacts.

1.1. Water - Results and Recommendations

1.1.1. WATER REVENUE NEEDS

The following items affect the City's revenue needs (also known as revenue requirements) and thus its rates. The City's expenses include O&M expenses and capital expenses, including debt service.

» **Capital Funding:** The City plans to spend approximately $16.4 million in capital expenditures over the next five fiscal years. The capital replacement projects will be funded through a combination of cash from rates and debt. The City may elect to accelerate or postpone its Capital Improvement Plan (CIP) timeline based on available funds and other considerations. A more detailed discussion of the projected capital improvement projects to be funded through the five-year CIP is provided in Table 2-16.

» **Reserve Funding:** The City does not currently have a reserve policy specific to the water enterprise. Raftelis recommends that the City establish reserve policies to meet its cashflow needs, ensure adequate funding of repairs and replacements in the event of asset failure or other unforeseen circumstances or events, and protect ratepayers from rate spikes. Reserve balances for the Proposed Financial Plan are shown in Table 2-22. Raftelis recommends establishing an operating reserve policy of a minimum of 90 days of operating expenses to meet working capital needs. Raftelis also recommends establishing a Water Capital Reserve with a minimum target balance of one year of average replacement capital costs.

1.1.2. PROPOSED WATER RATES

In this report, the terms rate and charge are often used interchangeably. Significant changes to the City's rate structure proposed in this Study include:

1) Grouping customers into traditional classes such as Single Family Residential (SFR), Multi-Family Residential (MFR), Commercial, Irrigation, Schools, Construction, and City Use,
2) Volumetric rates that are by class instead of by meter size,
3) Creating MFR and Irrigation customer classes since these classes use water differently that the other classes,
4) Lowering the Tier 1 breakpoint from 26 to 17 hundred cubic feet (hcf) to reflect average indoor water use.

Additional discussion on proposed rate changes can be found in Section 4.

1.1.2.1. Current and Proposed Fixed Charges

The current fixed charges for all customer classes and private fire service are shown in Table 1-1 and Table 1-2, respectively.

Table 1-1: Water Current Bi-Monthly Fixed Charge

Meter Size	Fixed Charge ($)
5/8" - 3/4"	$37.86
1"	$47.89
1 1/2"	$72.97
2"	$103.06
3"	$183.32
4"	$273.60
6"	$524.39
8"	$825.34
10"	$1,176.45
12"	$1,577.72
Leisure World*	
Capital Fund Fixed Charge	
12"	$788.86

**Although Leisure World is billed monthly, bi-monthly rates are shown to be consistent with other classes.*

Table 1-2: Current Bi-Monthly Private Fire Rates

Meter Size	Fixed Charge ($)
4"	$50.40
6"	$113.42
8"	$201.62
10"	$315.04

The proposed water fixed charges for all customer classes and private fire are shown in Table 1-3 and Table 1-4, respectively.

Table 1-3: Proposed Five-Year Bi-Monthly Water Fixed Charges

Meter Size	May 2021	January 2022	January 2023	January 2024	January 2025
5/8"	$36.79	$41.20	$44.91	$48.50	$52.38
3/4"	$36.79	$41.20	$44.91	$48.50	$52.38
1"	$54.72	$61.28	$66.80	$72.14	$77.92
1.5"	$106.00	$118.72	$129.40	$139.75	$150.93
2"	$160.35	$179.59	$195.75	$211.41	$228.33
3"	$285.30	$319.53	$348.29	$376.16	$406.25
4"	$474.70	$531.66	$579.51	$625.87	$675.94
6"	$934.74	$1,046.91	$1,141.13	$1,232.42	$1,331.01
8"	$1,495.09	$1,674.50	$1,825.20	$1,971.22	$2,128.92
10"	$2,140.04	$2,396.84	$2,612.56	$2,821.56	$3,047.29
6" Leisure World*	$467.37	$523.45	$570.56	$616.21	$665.51
2" Aquatic Park	$241.99	$271.03	$295.42	$319.05	$344.58

**Leisure World billed monthly but shown bi-monthly.*

Table 1-4: Proposed Five-Year Bi-Monthly Private Fire Rates

Meter Size	May 2021	January 2022	January 2023	January 2024	January 2025
4"	$38.22	$42.80	$46.65	$50.39	$54.42
6"	$111.01	$124.33	$135.52	$146.36	$158.07
8"	$236.57	$264.95	$288.80	$311.90	$336.86
10"	$425.43	$476.48	$519.36	$560.91	$605.79

1.1.2.2. Current and Proposed Volumetric Rates

The current volumetric rates are shown in Table 1-5, and the proposed volumetric five-year rates are shown in Table 1-6.

Table 1-5: Current Volumetric Water Rates

Residential Bi-monthly		Leisure World Monthly	
All Meter Sizes	**$ / hcf**	**12"**	**$ / hcf**
Tier 1 0 - 26 hcf	$2.23	Tier 1 0 - 45,490 hcf	$2.23
Tier 2 26+	$2.88	Tier 2 45,490+	$2.88
Commercial Bi-monthly			
5/8 - 3/4"	**$ / hcf**	**4"**	**$ / hcf**
Tier 1 0 - 26 hcf	$2.25	Tier 1 0 - 686 hcf	$2.25
Tier 2 27+	$2.81	Tier 2 687+	$2.81
1"		**6"**	
Tier 1 0 - 43 hcf	$2.25	Tier 1 0 - 1,941 hcf	$2.25
Tier 2 44+	$2.81	Tier 2 1,942+	$2.81
1 1/2"		**8"**	
Tier 1 0 - 88 hcf	$2.25	Tier 1 0 - 4,951 hcf	$2.25
Tier 2 89+	$2.81	Tier 2 4,952+	$2.81
2"		**10"**	
Tier 1 0 -205 hcf	$2.25	Tier 1 0 - 7,117 hcf	$2.25
Tier 2 206+	$2.81	Tier 2 7,118+	$2.81
3"		**12"**	
Tier 1 0 -420 hcf	$2.25	Tier 1 0 - 45,490 hcf	$2.23
Tier 2 421+	$2.81	Tier 2 45,491+	$2.88
City Bi-monthly			
All Meter Sizes $/hcf	$2.42		

**Residential includes both SFR and MFR accounts.*

Table 1-6: Proposed Five-Year Bi-Monthly Volumetric Water Rates

Customer Class	Tier Breakpoint	May 2021	January 2022	January 2023	January 2024	January 2025
Single Family Residential						
Tier 1	0 to 17 hcf	$2.65	$2.97	$3.24	$3.49	$3.77
Tier 2	>17 hcf	$2.80	$3.14	$3.42	$3.69	$3.99
Multi-Family Residential *						
Tier 1	0 to 17 hcf	$2.65	$2.97	$3.24	$3.49	$3.77
Tier 2	>17 hcf	$2.77	$3.10	$3.38	$3.65	$3.94
Leisure World*						
Tier 1	0 to 17 hcf	$2.65	$2.97	$3.24	$3.49	$3.77
Tier 2	>17 hcf	$2.77	$3.10	$3.38	$3.65	$3.94
Commercial		$2.65	$2.97	$3.24	$3.49	$3.77
Irrigation		$2.71	$3.04	$3.31	$3.57	$3.86
City		$2.68	$3.00	$3.27	$3.53	$3.82
Aquatic Park		$3.00	$3.36	$3.66	$3.95	$4.27

* * *Tier 1 width increases in proportion to number of dwelling units served*

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1.2. Wastewater - Results and Recommendations

1.2.1. WASTEWATER REVENUE NEEDS

The wastewater enterprise has healthy reserves and as such the City has decided to use those reserves and reduce yearly revenue (known as the yearly revenue requirement). Reserves will fund O&M, capital projects, and debt service. The City is proposing a 25% decrease in revenue for FY 2021 (see Table 7-12).

- **Capital Funding:** The City has approximately $6.98 million in capital expenditures over the next five fiscal years, which will be entirely funded through cash reserves. The City may elect to accelerate or postpone its Capital Improvement Plan (CIP) timeline based on system demand, available funds, and other conditions. Projects to be funded through the five-year CIP are provided in Table 7-8.

- **Reserve Funding:** Reserve balances are shown in the proposed financial plan in Table 7-13. As with the Water Enterprise, an operating reserve policy of a minimum of 90 days of operating expenses is recommended. Raftelis also recommends establishing a Wastewater Capital Reserve with a reserve policy for the utility of a minimum target balance of one year of average replacement capital costs. The City does not currently have a reserve policy specific to the Wastewater Enterprise.

1.2.2. CURRENT AND PROPOSED WASTEWATER RATES

The City's current sewer charge is the sum of a sewer capital charge and service charge. The current sewer capital charge, shown in Table 1-7, is based on water meter size.

Table 1-7: Current Bi-Monthly Sewer Capital Charge

Residential Capital Charge	
5/8"	$43.32
3/4"	$43.32
1"	$59.88
1 1/2"	$110.26
2"	$173.46
3"	$1,228.60
4"	$2,055.54
Commerical and City Capital Charge	
5/8"	$47.26
3/4"	$47.26
1"	$102.38
1 1/2"	$133.88
2"	$535.54
3"	$1,480.62
4"	$2,669.84
6"	$3,772.42
8"	$7,875.62
10"	$7,875.62
Aquatic Park Equity Charges*	
Service Equity Charge	$1,322
Capital Equity Charge	$998

**Aquatic Park Equity Charges are presented per account.*

The capital charge (shown above) is added to the sewer service charge; the sewer service charge is calculated as shown:

$$Sewer\ Service\ Charge = 22\% \times (Water\ Fixed\ Charge + Water\ Volumetric\ Charge)$$

Raftelis recommends revising the sewer rate structure. Both SFR and Leisure World will be assessed flat charges regardless of their water use. SFR will continue to be charged bi-monthly and Leisure World charged monthly. The proposed five-year flat charges are presented in Table 1-8.

Table 1-8: Proposed Five-Year Sewer Flat Charges ($/account)

Customer Class	Billing Frequency	May 2021	January 2022	January 2023	January 2024	January 2025
Single Family	Bi-monthly	$48.04	$48.04	$48.04	$48.04	$48.04
Leisure World	Monthly	$1,099.03	$1,099.03	$1,099.03	$1,099.03	$1,099.03

All other customer classes will have a two-part rate structure. The first part is a bi-monthly fixed charge to replace the meter-based sewer capital charge, as shown in Table 1-9.

Table 1-9: Proposed Bi-Monthly Sewer Fixed Charges ($/account)

Customer Class	May 2021	January	January	January	January
Multi-family	$1.22	$1.22	$1.22	$1.22	$1.22
Commercial	$1.22	$1.22	$1.22	$1.22	$1.22
City	$1.22	$1.22	$1.22	$1.22	$1.22
Leisure World*	$0.61	$0.61	$0.61	$0.61	$0.61
Navy*	$0.61	$0.61	$0.61	$0.61	$0.61

**Billed monthly. Leisure World fixed charge included in Table 1-8.*

The second part is a uniform volumetric rate for all customer classes except SFR and Leisure World. The proposed five-year flow-based (i.e., volumetric) charges are in Table 1-10.

Table 1-10: Proposed Five-Year Sewer Volumetric Rate ($/hcf)

Customer Class	May 2021	January 2022	January 2023	January 2024	January 2025
Multi-family	$4.00	$4.00	$4.00	$4.00	$4.00
Commercial	$4.00	$4.00	$4.00	$4.00	$4.00
City	$4.00	$4.00	$4.00	$4.00	$4.00
Navy*	$0.24	$0.24	$0.24	$0.24	$0.24

**Billed monthly*

2. Water Financial Plan

This section describes the Water Financial Plan assumptions to project operating and capital expenses as well as reserve policies and debt coverage requirements that determine the overall revenue adjustments for a sustainable water enterprise. Revenue adjustments are the change in revenue for the water enterprise but often do not directly translate to customer bill increases due to rate restructuring as part of the cost of service analysis, which is also part of the Rate Study.

2.0. Water System Background

The City of Seal Beach has access to both surface water and groundwater. The City is a member of the Municipal Water District of Orange County (MWDOC), which imports surface water from the Southern California Metropolitan Water District (MWD). The City also has three active wells that draw water from the 350 square mile Orange County Basin, which is managed by Orange County Water District (OCWD). The City has a limit, or basin pumping percentage (BPP), above which the City is assessed an additional charge (i.e., Basin Equity Assessment). Groundwater production at or below the BPP is only charged a Replenishment Assessment.

2.1. Key Assumptions

The Study Period is FY 2021 to 2025, with proposed revenue adjustments and rates presented for the same period. Various types of assumptions and inputs are incorporated into the Study based on discussions with and/or direction from City staff. These include the projected number of accounts, water demand over time, and inflationary factors among others.

2.1.1. INFLATIONARY COST ASSUMPTIONS

The inflation factors are used to project costs across the Study period. The factors are applied to all years beginning in FY 2021. Raftelis worked with City staff to escalate individual budget line items according to appropriate escalation factors. Inflationary factors are presented in Table 2-1.

Table 2-1: Water Inflation Assumptions

Escalation Factors	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
General	2.2%	2.2%	2.2%	2.2%	2.2%
Personnel	3.0%	3.0%	3.0%	3.0%	3.0%
Capital	3.2%	3.2%	3.2%	3.2%	3.2%
Non-Rate Revenues	0.0%	0.0%	0.0%	0.0%	0.0%
Reserve Interest Rate	0.8%	0.8%	0.8%	0.8%	0.8%

2.1.2. WATER SUPPLY COSTS ESCALATION

The City receives imported water from MWDOC, and groundwater from OCWD. The inflationary assumptions for the various MWDOC charges are presented in Table 2-2. More detail on these assumptions is

in Appendix A. OCWD cost escalation is a 10-year average increase of the annual replenishment charge. Other fixed supply costs are those costs unrelated to MWDOC and OCWD purchases[1].

Table 2-2: Water Supply Escalation

Escalation Factors	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
MWDOC Volumetric Supply Charge	2.8%	3.0%	4.0%	4.0%	4.0%
MWDOC Annual Retail Service Connection	3.3%	3.5%	4.0%	4.0%	4.0%
MWDOC Readiness to Serve	0.8%	3.0%	8.0%	8.0%	8.0%
MWDOC Capacity Charge	12.4%	18.0%	14.0%	14.0%	14.0%
MWDOC Choice Program	3.3%	3.5%	4.0%	4.0%	4.0%
OCWD Water Supply Costs	6.5%	6.5%	6.5%	6.5%	6.5%
Other Fixed Water Supply Costs	3.5%	3.5%	3.5%	3.5%	3.5%

2.1.3. ACCOUNT GROWTH AND WATER DEMAND ASSUMPTIONS

To estimate future water rate revenue, two factors are used – account growth from new connections and changes in annual water demand listed in Table 2-3. Raftelis assumed no account growth and constant water demand during the study period, represented by 100% in each fiscal year.

Table 2-3: Water Account and Demand Growth

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Account Growth	0.0%	0.0%	0.0%	0.0%	0.0%
Demand Factor	100.0%	100.0%	100.0%	100.0%	100.0%

2.2. Revenues from Current Rates

Raftelis developed a five-year Water Financial Plan, which models anticipated revenues and expenses. To calculate the projected revenue (without rate adjustments), the number of accounts is multiplied by the bi-monthly fixed charge (Table 2-4) and the total water use is multiplied by the volumetric rate (Table 2-6). The revenues generated from existing rates and charges are compared to expenses. This serves as the basis for any required revenue adjustments. In other words, if revenues are not sufficient to cover expenses, revenues are adjusted.

[1] In FY 19, these included payments to the South Coast Air Quality Management District, State Water Resources Control Board, and State Controller's Office.

Table 2-4: Current Water Bi-Monthly Fixed Charges

Meter Size	Fixed Charge ($)
5/8" - 3/4"	$37.86
1"	$47.89
1 1/2"	$72.97
2"	$103.06
3"	$183.32
4"	$273.60
6"	$524.39
8"	$825.34
10"	$1,176.45
12"	$1,577.72
Leisure World*	
Capital Fund Fixed Charge	
12"	$788.86

**Although Leisure World is billed monthly, bi-monthly rates are shown to be consistent with other classes.*

Table 2-5: Current Bi-Monthly Fire Service Charges

Meter Size	Fixed Charge ($)
4"	$50.40
6"	$113.42
8"	$201.62
10"	$315.04

Table 2-6: Current Bi-Monthly Volumetric Charges

Residential Bi-monthly		Leisure World Monthly	
All Meter Sizes	**$ / hcf**	**12"**	**$ / hcf**
Tier 1 0 - 26 hcf	$2.23	Tier 1 0 - 45,490 hcf	$2.23
Tier 2 26+	$2.88	Tier 2 45,490+	$2.88
Commercial Bi-monthly			
5/8 - 3/4"	**$ / hcf**	**4"**	**$ / hcf**
Tier 1 0 - 26 hcf	$2.25	Tier 1 0 - 686 hcf	$2.25
Tier 2 27+	$2.81	Tier 2 687+	$2.81
1"		**6"**	
Tier 1 0 - 43 hcf	$2.25	Tier 1 0 - 1,941 hcf	$2.25
Tier 2 44+	$2.81	Tier 2 1,942+	$2.81
1 1/2"		**8"**	
Tier 1 0 - 88 hcf	$2.25	Tier 1 0 - 4,951 hcf	$2.25
Tier 2 89+	$2.81	Tier 2 4,952+	$2.81
2"		**10"**	
Tier 1 0 -205 hcf	$2.25	Tier 1 0 - 7,117 hcf	$2.25
Tier 2 206+	$2.81	Tier 2 7,118+	$2.81
3"		**12"**	
Tier 1 0 -420 hcf	$2.25	Tier 1 0 - 45,490 hcf	$2.23
Tier 2 421+	$2.81	Tier 2 45,491+	$2.88
City Bi-monthly			
All Meter Sizes $/hcf	$2.42		

**Residential includes both SFR and MFR accounts.*

Table 2-7 and Table 2-8 present the number of accounts across the 5-year study period. Note that these remain constant due to the assumption of zero account growth (Table 2-3).

Table 2-7: Projected Water Account Growth

Meter Size (in)	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
5/8"	513	513	513	513	513
3/4"	3,733	3,733	3,733	3,733	3,733
1"	756	756	756	756	756
1 1/2"	116	116	116	116	116
2"	187	187	187	187	187
3"	15	15	15	15	15
4"	19	19	19	19	19
6"	6	6	6	6	6
8"	2	2	2	2	2
10"	2	2	2	2	2
Leisure World 6"	1	1	1	1	1
Total	**5,350**	**5,350**	**5,350**	**5,350**	**5,350**

Table 2-8: Projected Private Fire Accounts

Meter Size (in)	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
4"	20	20	20	20	20
6"	14	14	14	14	14
8"	18	18	18	18	18
10"	14	14	14	14	14
Total	**66**	**66**	**66**	**66**	**66**

Table 2-9 presents the water use across the five-year study period. Water demand remains constant per the assumption in Table 2-3.

Table 2-9: Projected Water Use

Meter Size	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
SFR					
5/8", 3/4", 1", 1 1/2"					
0-26 hcf	404,122	404,122	404,122	404,122	404,122
27+ hcf	78,027	78,027	78,027	78,027	78,027
2"					
0-205 hcf	3,342	3,342	3,342	3,342	3,342
206+ hcf	625	625	625	625	625
3"					
0-420 hcf	4,231	4,231	4,231	4,231	4,231
421+ hcf	1,219	1,219	1,219	1,219	1,219
4"					
0-686 hcf	13,773	13,773	13,773	13,773	13,773
687+ hcf	12,574	12,574	12,574	12,574	12,574
MFR					
5/8", 3/4", 1", 1 1/2"					
0-26 hcf	26,168	26,168	26,168	26,168	26,168
27+ hcf	11,564	11,564	11,564	11,564	11,564
2"					
0-205 hcf	9,183	9,183	9,183	9,183	9,183
206+ hcf	1,250	1,250	1,250	1,250	1,250
3"					
0-420 hcf	9,688	9,688	9,688	9,688	9,688
421+ hcf	745	745	745	745	745
4"					
0-686 hcf	9,954	9,954	9,954	9,954	9,954
687+ hcf	479	479	479	479	479
Commercial					
5/8" - 3/4"					
0-26 hcf	4,845	4,845	4,845	4,845	4,845
27+ hcf	5,118	5,118	5,118	5,118	5,118
1"					
0-43 hcf	8,670	8,670	8,670	8,670	8,670
44+ hcf	8,959	8,959	8,959	8,959	8,959
1 1/2"					
0-88 hcf	8,574	8,574	8,574	8,574	8,574
89+ hcf	5,083	5,083	5,083	5,083	5,083
2"					
0-205 hcf	51,888	51,888	51,888	51,888	51,888
206+ hcf	27,726	27,726	27,726	27,726	27,726
3"					
0-420 hcf	13,190	13,190	13,190	13,190	13,190
421+ hcf	37,029	37,029	37,029	37,029	37,029
4"					
0-686 hcf	16,584	16,584	16,584	16,584	16,584
687+ hcf	1,819	1,819	1,819	1,819	1,819
6"					
0-1,941 hcf	31,553	31,553	31,553	31,553	31,553
1,942+ hcf	50,105	50,105	50,105	50,105	50,105
8"					
0-4,951 hcf	9,794	9,794	9,794	9,794	9,794
4,952+ hcf	0	0	0	0	0
10"					
0-7,117 hcf	8,845	8,845	8,845	8,845	8,845
7,118+ hcf	0	0	0	0	0
Leisure World*					
12"					
0-45,490 hcf	443,156	443,156	443,156	443,156	443,156
45,491+ hcf	27,215	27,215	27,215	27,215	27,215
Aquatic Park					
2"					
0-205 hcf	4,392	4,392	4,392	4,392	4,392
206+ hcf	837	837	837	837	837
Navy					
4"					
0-686 hcf	9	9	9	9	9
687+ hcf	0	0	0	0	0
10"					
0-7,117 hcf	2,749	2,749	2,749	2,749	2,749
7,118+ hcf	0	0	0	0	0
City**					
3/4"	225	225	225	225	225
1"	948	948	948	948	948
1 1/2"	4,166	4,166	4,166	4,166	4,166
2"	37,779	37,779	37,779	37,779	37,779
4"	10,804	10,804	10,804	10,804	10,804

Notes:
*Leisure World billed monthly
**City has different rate structure from other customer classes

Table 2-10 summarizes the projected revenues from current rates. Fixed charges (Table 2-4) are multiplied by number of accounts (Table 2-7) and six billing periods to obtain total fixed charge revenues. For total private fire service revenues, the values in Table 2-5 are multiplied by the number of accounts in Table 2-8 and six billing periods.

Revenues from commodity charges are calculated by multiplying the current commodity rate (Table 2-6) by the projected water use in hcf (Table 2-9). This calculation is repeated for all meter sizes and tiers or customer classes and then summed to arrive at the total commodity charge revenue shown in Table 2-10. Due to the assumptions of zero account and demand growth, the projected water revenues remain constant across the study period. The overall adequacy of water revenues is measured by comparing the total projected annual revenue required from rates with projected revenues from the existing rates.

Table 2-10: Projected Water Rate Revenue with Current Rates

Revenue Source	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Fixed Charges	$1,396,867	$1,396,867	$1,396,867	$1,396,867	$1,396,867
Private Fire Charges	$63,814	$63,814	$63,814	$63,814	$63,814
Commodity Charges	$3,321,547	$3,321,547	$3,321,547	$3,321,547	$3,321,547
Total	**$4,782,228**	**$4,782,228**	**$4,782,228**	**$4,782,228**	**$4,782,228**

The utility also derives revenues from other non-rate sources. These revenues consist of miscellaneous revenues, fees, and interest income as summarized in Table 2-11.

Table 2-11: Projected Water Non-Rate Revenues

Revenue Source	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Miscellaneous Revenues	$1,000	$1,000	$1,000	$1,000	$1,000
Fees	$47,200	$47,200	$47,200	$47,200	$47,200
Interest	$50,486	$24,503	$0	$0	$0
Total	**$98,686**	**$72,703**	**$48,200**	**$48,200**	**$48,200**

2.3. Operating and Maintenance Expenses

2.3.1. WATER SUPPLY COSTS

Line 1 of Table 2-12 shows the total water demand (sales) for each year of the Study period. In addition to the water sold to its customers, the City also loses water during the transmission and distribution to a variety of factors, such as real losses from leaks in distribution pipelines and paper losses from meter reading and billing errors. The City must account for this loss in estimating the supply needed to meet its demand. The City has an approximate 8 percent water loss on average. To project the required water supply (Line 5), the following equation is used to calculate water production:

Total Water Demand (Line 1) / [1 - Water Loss (Line 2)] = Total Water Production (Line 5)

The total production (Line 5) is disaggregated into well water (Line 3) and imported water (Line 4) by assuming a 75:25 ratio, respectively. For example, Line 5 is multiplied by 75 percent to obtain Line 3.

Table 2-12: Projected Water Supply and Demand

Line No.		FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
1	**Total Water Demand (AF)**	3,235	3,235	3,235	3,235	3,235
2	**Water Loss (%)**	8.0%	8.0%	8.0%	8.0%	8.0%
3	Well Water (AF)	2,637	2,637	2,637	2,637	2,637
4	Imported Water (AF)	879	879	879	879	879
5	**Total Water Production (AF)**	**3,516**	**3,516**	**3,516**	**3,516**	**3,516**

Water supply unit costs are projected in Table 2-13 based on the escalation assumptions in Table 2-2.

Table 2-13: Water Supply Unit Costs

Line No.		Unit	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
1	**Volumetric Costs**						
2	OCWD (FY Costs)	$/AF	$519	$552	$588	$626	$667
3	MWDOC (Jul-Dec)	$/AF	$1,078	$1,104	$1,148	$1,194	$1,242
4	MWDOC (Jan-Jun)	$/AF	$1,104	$1,143	$1,189	$1,236	$1,286
5	**MWDOC Fixed Costs**						
6	MWDOC Annual Retail Service Connection	per meter	$13	$13	$14	$14	$15
7	MWDOC Readiness to Serve (Jul-Dec)	monthly	$3,677	$3,787	$4,090	$4,417	$4,770
8	MWDOC Readiness to Serve (Jan-Jun)	monthly	$4,231	$4,357	$4,706	$5,083	$5,489
9	MWDOC Capacity Charge (Jul-Dec)	monthly	$3,726	$4,397	$5,013	$5,715	$6,515
10	MWDOC Capacity Charge (Jan-Jun)	monthly	$3,865	$4,561	$5,199	$5,927	$6,757
11	MWDOC Choice Program	annual	$20,660	$21,383	$22,238	$23,128	$24,053
12	**Other Fixed Costs**						
13	South Coast Air Quality Mgmt District	flat charge	$15,525	$16,068	$16,631	$17,213	$17,815
14	State Water Resources Control Board	flat charge	$33,102	$34,261	$35,460	$36,701	$37,986
15	State Controllers Office	flat charge	$103	$106	$110	$114	$118

The water supply unit costs are then multiplied by the respective units (e.g., $/AF, per month, per meter) to obtain the total water supply costs (Table 2-14).

Table 2-14: Water Supply Costs

Line No.		FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
1	**Volumetric Costs**					
2	Orange County Water District	$1,367,438	$1,456,086	$1,550,480	$1,650,993	$1,758,023
3	MWDOC Treated Domestic	$970,392	$1,004,672	$1,044,859	$1,086,654	$1,130,120
4	**Total Volumetric Costs**	**$2,337,830**	**$2,460,758**	**$2,595,339**	**$2,737,647**	**$2,888,143**
5	**MWDOC Fixed Costs**					
6	MWDOC Annual Retail Service Connection	$68,529	$70,928	$73,765	$76,715	$79,784
7	MWDOC Water Loss Control Technician Assistance	$41,320	$42,766	$44,477	$46,256	$48,106
8	MWDOC Readiness to Serve	$47,442	$48,865	$52,775	$56,997	$61,556
9	MWDOC Capacity Charge	$45,548	$53,746	$61,271	$69,849	$79,628
10	MWDOC Choice Programs Billing	$20,660	$21,383	$22,238	$23,128	$24,053
11	**Total MWDOC Fixed Costs**	**$223,499**	**$237,689**	**$254,526**	**$272,945**	**$293,127**
12	**Other Fixed Costs**					
13	South Coast Air Quality Management District	$15,525	$16,068	$16,631	$17,213	$17,815
14	State Water Resources Control Board	$33,102	$34,261	$35,460	$36,701	$37,986
15	State Controllers Office	$103	$106	$110	$114	$118
16	**Total Other Fixed Costs**	**$48,730**	**$50,436**	**$52,201**	**$54,028**	**$55,919**
17	**TOTAL WATER SUPPLY COSTS**	**$2,610,060**	**$2,748,882**	**$2,902,066**	**$3,064,620**	**$3,237,189**

2.3.2. O&M EXPENSES

Total projected O&M expenses are shown in Table 2-15 based on the assumptions in Table 2-1.

Table 2-15: Total Water O&M Costs

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Water Supply Costs	$2,610,060	$2,748,882	$2,902,066	$3,064,620	$3,237,189
General	$1,070,748	$1,093,991	$1,117,737	$1,142,000	$1,166,788
Personnel	$1,622,765	$1,671,448	$1,721,591	$1,773,239	$1,826,436
Total O&M	**$5,303,573**	**$5,514,321**	**$5,741,394**	**$5,979,858**	**$6,230,413**

2.4. Capital Improvement Plan (CIP)

The projected five-year inflated CIP is provided in Table 2-16. The CIP was inflated by City staff prior to sending to Raftelis. The CIP is reduced by 15% from the original CIP provided by the City (Line 13). The Aquatic Park Capital Line improvements (Line 14) are only paid by Aquatic Park Customers.

Table 2-16: Five-Year Water CIP

Line No.	Project	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
1	6th Street Water Main Replacement	$0	$986,000	$0	$0	$0
2	Hellman Ranch Transmission Main Lining	$238,000	$85,000	$1,700,000	$0	$0
3	Bolsa Chica Wellhead Rehabilitation	$595,000	$1,360,000	$0	$0	$0
4	Beverly Manor Pump Station Rehab	$42,500	$42,500	$85,000	$2,465,000	$2,295,000
5	Navy Reservoir CL System Upgrade	$272,000	$0	$0	$0	$0
6	SCADA – System Upgrades	$85,000	$85,000	$0	$0	$0
7	Lampson Well Head Treatment	$136,000	$850,000	$850,000	$0	$0
8	Advance Water Meter Implementation	$59,500	$552,500	$765,000	$765,000	$765,000
9	Annual Valve Replacement Program	$42,500	$42,500	$42,500	$42,500	$42,500
10	Annual Water Meter Replacement Program	$42,500	$42,500	$21,250	$21,250	$21,250
11	Lampson Transmission Main Replacement Project	$0	$0	$0	$0	$255,000
12	Annual Distribution Pipe Replacement	$0	$0	$0	$0	$0
13	**Total without Aquatic Park Capital Line**	**$1,555,500**	**$4,088,500**	**$3,676,250**	**$3,506,250**	**$3,591,250**
14	Aquatic Park Capital Line	$8,500	$8,500	$8,500	$8,500	$8,500

2.5. Existing and Proposed Debt Service

The City's Water Enterprise has only one outstanding debt obligation with the West Orange County Water Board as shown in Table 2-17. Note that this loan does not have a debt covenant.

Table 2-17: Water Debt Service

Line No.	Debt Service	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
1	**West Orange County Water Board Loan (WOCWB)**					
2	Principal	$89,493	$89,493	$89,493	$89,493	$83,900
3	Interest	$16,234	$16,311	$15,673	$14,357	$7,352
4	**Total**	**$105,727**	**$105,804**	**$105,166**	**$103,850**	**$91,252**

The City is considering issuing new debt to fund its CIP to mitigate rate increases to customers. The proposed new debt would be issued in FYE 2023, as shown in Line 6 of Table 2-18. Issuance expenses (Line 7) are determined by multiplying the total proposed debt (Line 6) by the issuance percentage cost (Line 4). The annual debt service cost (Line 8) is calculated based on the interest rate (Line 2) and term of the loan (Line 3). The debt reserve amount (Line 9) is calculated by multiplying proposed debt issue (Line 6) by the debt reserve requirement (Line 5). The final amount of debt that can be used by the City is referred to as debt proceeds (Line 10). This is calculated by subtracting Lines 7 – 9 from the total debt issue (Line 6).

Table 2-18: Water Proposed Debt

Line No.		FY 2023
1	**Debt Assumptions**	
2	Interest	4.5%
3	Term (# of Years)	30
4	Issuance Cost	2.0%
5	Debt Reserve Requirement	6.6%
6	Proposed Debt Issue	$11,000,000
7	Issuance Expenses	$220,000
8	Annual Debt Service	$675,307
9	Debt Reserve Amount	$720,500
10	Debt Proceeds	$9,384,193

2.6. Financial Reserve Policy

Currently, the City does not have formal reserve targets. Raftelis recommends that the City establishes reserve policies to meet its cash flow needs, ensure adequate funding of repairs and replacements in the event of asset failure or other unforeseen circumstances or events, and protect ratepayers from rate spikes.

Raftelis recommends establishing an operating reserve equal to 90 days of operating expenses in cash to meet cash flow needs. Raftelis also recommends establishing a capital reserve with a minimum target balance of one year of average capital costs.

Table 2-19: Water Reserve Policies

Reserve	Policy	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Operating	90 days of operating expenses	$1,325,893	$1,378,580	$1,435,349	$1,494,965	$1,557,603
Capital	1 year of average CIP*	$3,333,700	$3,094,850	$2,916,350	$2,448,850	$1,998,350
Total		**$4,659,593**	**$4,473,430**	**$4,351,699**	**$3,943,815**	**$3,555,953**

**Average CIP = 5-year moving average*

2.7. Status Quo Financial Plan (No Revenue Increase)

Table 2-20 displays the operating cash flows assuming no revenue increases. The cash flow incorporates the revenues from current rates (Table 2-10), non-rate revenues (Table 2-11), water supply costs (Table 2-14), O&M expenses (Table 2-15), capital improvement projects (Table 2-16), and annual debt service payments (Table 2-17) to project the debt coverage ratio (Line 27) and projected ending balances (Line 24). All projections shown in the table are based upon the City's current rate structure and do not include rate adjustments. Under the "status-quo" financial plan scenario, in which the City spends the proposed budget and CIP projects, the City will face negative net cashflow[2] starting in FY 21 (Line 20). Revenues generated from rates and other miscellaneous revenues will be inadequate to sufficiently recover operating expenses, capital expenditures, debt obligations, and to maintain adequate reserves throughout the study period.

[2] Net Cashflow = Total Revenues – Total Expenses

Reserves will fall well below the reserve targets shown in Line 25. The capital costs associated with infrastructure improvements on the Aquatic Park water line are included in Line 16.

Table 2-20: Water Status Quo Financial Plan

Line No.		FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
1	**Revenue**					
2	Existing Rate Revenue	$4,782,228	$4,782,228	$4,782,228	$4,782,228	$4,782,228
3	Miscellaneous Revenues	$1,000	$1,000	$1,000	$1,000	$1,000
4	Fees	$47,200	$47,200	$47,200	$47,200	$47,200
5	Interest	$50,486	$24,503	$0	$0	$0
6	**Total Revenues**	**$4,880,914**	**$4,854,931**	**$4,830,428**	**$4,830,428**	**$4,830,428**
7						
8	**O&M Expenses**					
9	Water Supply Costs	$2,610,060	$2,748,882	$2,902,066	$3,064,620	$3,237,189
10	General	$1,070,748	$1,093,991	$1,117,737	$1,142,000	$1,166,788
11	Personnel	$1,622,765	$1,671,448	$1,721,591	$1,773,239	$1,826,436
12	**Total O&M**	**$5,303,573**	**$5,514,321**	**$5,741,394**	**$5,979,858**	**$6,230,413**
13						
14	Existing Debt Service	$105,727	$105,804	$105,166	$103,850	$91,252
15	Rate-Funded CIP	$1,555,500	$4,088,500	$3,676,250	$3,506,250	$3,591,250
16	Aquatic Park Capital Line	$8,500	$8,500	$8,500	$8,500	$8,500
17						
18	**Total Expenses**	**$6,973,300**	**$9,717,125**	**$9,531,310**	**$9,598,458**	**$9,921,415**
19						
20	**Net Cashflow**	**($2,092,386)**	**($4,862,194)**	**($4,700,882)**	**($4,768,030)**	**($5,090,987)**
21						
22	**Beginning Balance**	$7,802,841	$5,710,455	$848,261	($3,852,621)	($8,620,651)
23	Net Cashflow	($2,092,386)	($4,862,194)	($4,700,882)	($4,768,030)	($5,090,987)
24	**Ending Balance**	**$5,710,455**	**$848,261**	**($3,852,621)**	**($8,620,651)**	**($13,711,638)**
25	*Target Balance*	*$4,659,593*	*$4,473,430*	*$4,351,699*	*$3,943,815*	*$3,555,953*
26						
27	Calculated Debt Coverage Ratio	-400%	-623%	-866%	-1107%	-1534%
28	Required Debt Coverage Ratio	125%	125%	125%	125%	125%

2.8. Proposed Financial Plan

Table 2-21 shows the proposed revenue adjustment plan for the Water Enterprise. The proposed revenue adjustments attain adequate revenue to fund operating expenses, achieve reserve policy targets, fund the long-term capital program, and pay debt service. Revenue adjustments are not necessarily equal to customer bill impacts. Actual percentage increases (or decreases) in rates are dependent upon the cost-of-service analysis and are unique to each customer class and meter size. The revenue adjustment for FY 21 is proposed to take effect on May 1, 2021, while all subsequent adjustments are assumed to take effect on January 1st of each fiscal year.

Table 2-21: Water Revenue Adjustments

FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
May 2021	Jan 2022	Jan 2023	Jan 2024	Jan 2025
14.0%	**12.0%**	**9.0%**	**8.0%**	**8.0%**

The Proposed Financial Plan (Table 2-22) incorporates the revenues from current rates (Table 2-10), the revenue from increases in rates consistent with the proposed adjustments (Table 2-21), non-rate revenues (Table 2-11), O&M expenses (Table 2-15), capital improvement projects (Table 2-16), existing annual debt service payments (Table 2-17), and proposed debt service (Table 2-18). The capital costs associated with infrastructure improvements on the Aquatic Park water line that are included in Line 17.

Net cashflow (Line 21) is positive throughout the study period. In addition, the ending balance (Line 25) is meeting the reserve target (Line 26) throughout the study period. The debt service coverage ratio (Line 26) is low in FY 21 but sufficient in all subsequent years[3]. In summary, the proposed financial plan ensures financial sufficiency and solvency for the City to meet projected expenditures and financial obligations including debt service, debt coverage, and reserve targets while funding CIP projects.

Table 2-22: Water Proposed Financial Plan

Line No.		FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
1	**Revenue**					
2	Proposed Rate Revenue	$4,893,813	$5,778,844	$6,380,717	$6,921,704	$7,475,440
3	Miscellaneous Revenues	$1,000	$1,000	$1,000	$1,000	$1,000
4	Fees	$47,200	$47,200	$47,200	$47,200	$47,200
5	Interest	$50,904	$29,081	$15,597	$17,358	$14,980
6	**Total Revenues**	**$4,992,917**	**$5,856,125**	**$6,444,513**	**$6,987,262**	**$7,538,620**
7						
8	**O&M Expenses**					
9	Water Supply Costs	$2,610,060	$2,748,882	$2,902,066	$3,064,620	$3,237,189
10	General	$1,070,748	$1,093,991	$1,117,737	$1,142,000	$1,166,788
11	Personnel	$1,622,765	$1,671,448	$1,721,591	$1,773,239	$1,826,436
12	**Total O&M**	**$5,303,573**	**$5,514,321**	**$5,741,394**	**$5,979,858**	**$6,230,413**
13						
14	Existing Debt Service	$105,727	$105,804	$105,166	$103,850	$91,252
15	Proposed Debt Service	$0	$0	$337,653	$675,307	$675,307
16	Rate-Funded CIP	$1,555,500	$4,088,500	$0	$0	$1,389,557
17	Aquatic Park Capital Line	$8,500	$8,500	$8,500	$8,500	$8,500
18						
19	**Total Expenses**	**$6,973,300**	**$9,717,125**	**$6,192,714**	**$6,767,515**	**$8,395,029**
20						
21	**Net Cashflow**	**($1,980,383)**	**($3,861,000)**	**$251,799**	**$219,747**	**($856,409)**
22						
23	**Beginning Balance**	$7,802,841	$5,822,458	$1,961,458	$11,597,451	$11,817,198
24	Net Cashflow	-$1,980,383	-$3,861,000	$251,799	$219,747	-$856,409
25	**Ending Balance**	**$5,822,458**	**$1,961,458**	**$2,213,258**	**$11,817,198**	**$10,960,788**
26	*Target Balance*	*$4,659,593*	*$4,473,430*	*$4,689,352*	*$4,619,122*	*$4,231,260*
27						
28	Calculated Debt Coverage Ratio	-294%	323%	159%	129%	171%
29	Required Debt Coverage Ratio	125%	125%	125%	125%	125%

[3] Note that the existing loan with the West Orange County Water Board does not have a debt covenant.

Figure 2-1 through Figure 2-3 display the proposed financial plan information shown in Table 2-22 in graphical format. Figure 2-1 shows the City's expenses in stacked bars and the current and proposed revenue in solid and dashed black lines, respectively. The stacked bars show the expenses broken down into the categories displayed in the legend. The gray portion of the stacked bar below the x-axis shows the operating yearly deficit. In these years, the City will minimize customer bill impacts by drawing down reserves.

Figure 2-1: Water Operating Financial Plan

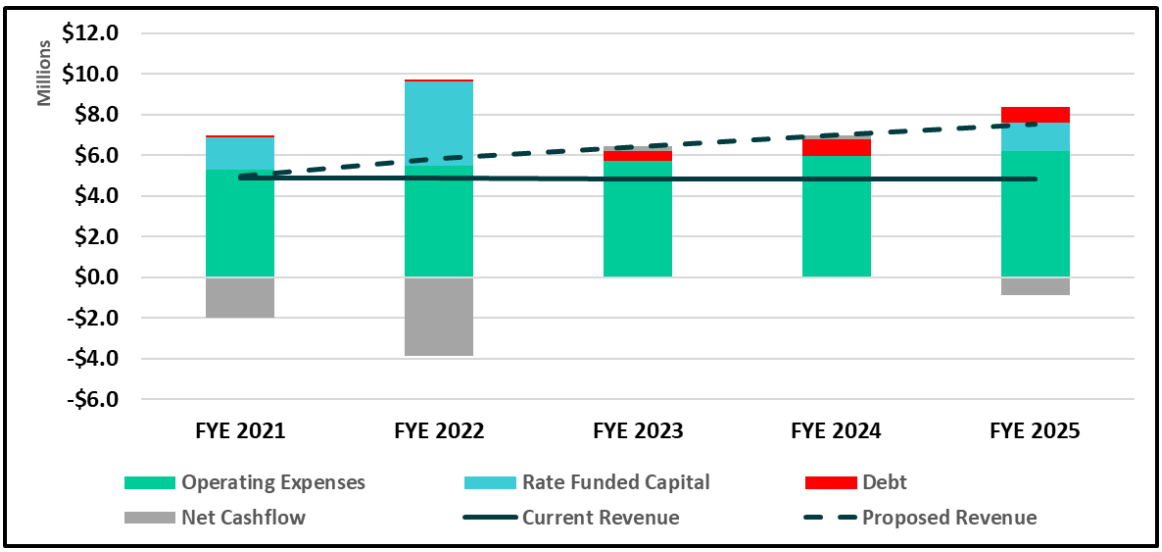


Figure 2-2 shows the total annual CIP over the study period and designates the portion to be funded by PAY-GO (which is a term used to designate rate funded CIP) in blue and debt in red. The City anticipates funding the capital projects through a combination of rate revenue (PAY-GO) and debt issuance as shown in Figure 2-2.

Figure 2-2: Capital Funding Sources

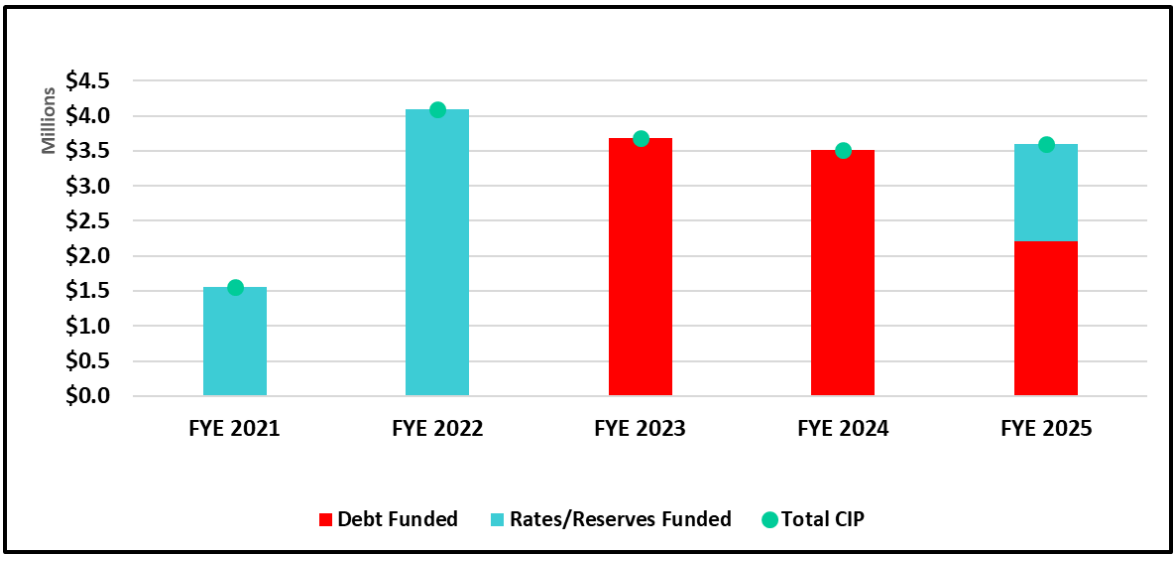
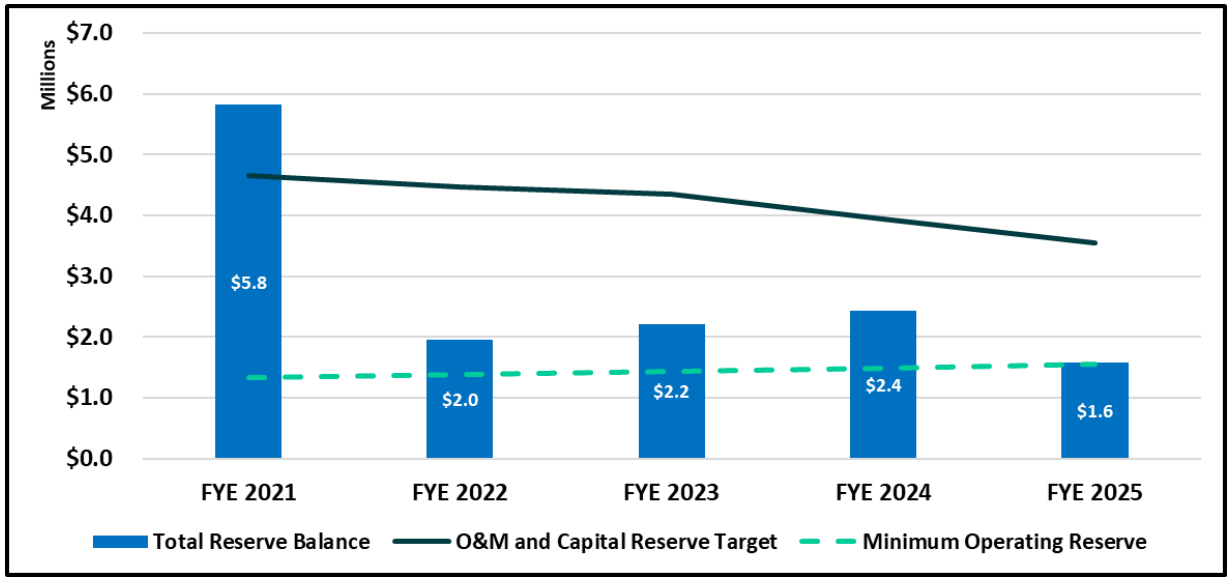


Figure 2-3 shows the ending total reserve balances. The minimum reserve target shown in Table 2-19 is represented by the dashed blue line and is equal to 90 days of operating expenses. The total minimum reserve target for both the operating and capital reserves is represented by the solid black line in Figure 2-3 and is equal to the sum of operating and capital reserve targets shown in Table 2-19. The City does not quite reach its reserve goals by the end of the Study period however this is intentional to reduce customer bill impacts.

Figure 2-3: Water Ending Reserve Balances



3. Water Cost-of-Service Analysis

A Cost-of-Service (COS) analysis distributes a utility's revenue requirement (yearly revenue needed) to each customer class. To do so the revenue requirement is allocated to the cost causation components. The cost causation components include:

1. Water supply costs
2. Base (average) costs
3. Peaking costs (maximum day and maximum hour)
4. Meter service
5. Billing and customer service
6. Private fire protection costs
7. General and administrative costs

Peaking costs are further divided into maximum day and maximum hour demand. The maximum day demand is the maximum amount of water used in a single day in a year. The maximum hour demand is the maximum hour use on the maximum use day. Both maximum day and maximum hour peaking demand are used to calculate peaking unit rates to distribute costs to customer classes. Peaking costs are allocated in proportion to how the different customer classes use water during peak day and hour demands. Different facilities such as distribution and storage facilities are designed to meet the peaking demands of customers. Therefore, extra capacity[4] costs include the O&M and capital costs associated with meeting peak customer demand. This method is consistent with the AWWA M1 Manual and is widely used in the water industry to perform COS analyses.

3.0. Allocation of Expenses to Cost Components

In a COS analysis, a utility's functionalized expenses are allocated to the cost causation components. To do so, system-wide peaking factors must be identified (shown in Column B, Table 3-1). The system-wide peaking factors are used to derive the cost component allocation bases (i.e., percentages) shown in Columns C through E of Table 3-1. Functionalized[5] expenses are then allocated to the cost components using the allocation basis shown in Column A. To understand the interpretation of the percentages shown in Columns C through E, base use must first be established as the average daily demand during the year, which is assigned an allocation basis of 1 as shown in Line 1, Column B of Table 3-1. If the base is the allocation basis used to allocate an expense, it means that the costs associated with that expense are to meet average daily demand related costs.

[4] The terms extra capacity, peaking, and capacity costs are used interchangeably.
[5] Functions of a water utility are supply, treatment, transmission and distribution, storage, meter service, customer billing, general, conservation, and administration and fire protection. Many overlap with the cost causation components.

Table 3-1: System-wide Peaking Factors

Line No.	Allocation Factor (A)	System (B)	Base (C)	Max Day (D)	Max Hour (E)	Total (F)
1	Base	1.00	100%	0%	0%	100%
2	Max Day	1.60	63%	38%	0%	100%
3	Max Hour	3.50	29%	17%	54%	100%

Expenses that are allocated to the cost causation components using the maximum day basis (Line 2) attribute 63 percent (1.00/1.60) of the demand (and therefore costs) to base use (average daily demand) and the remaining 37 percent to maximum day (peaking) use. Expenses allocated using the maximum hour basis (Line 3) assume 29 percent (1.00/3.50) of costs are due to base demands, 17 percent due to max day ((1.60-1.00)/3.50), and 54 percent ((3.50-1.60)/3.50) are due to max hour costs. Collectively the maximum day and hour cost components are known as peaking costs.

Table 3-2 shows the derivation of the peaking factors by customer class and tier, determined by dividing the total maximum monthly usage (Column C) by the average monthly usage (Column D) for each customer class and tier. These peaking factors are used to allocate the peaking costs to each customer class and tier. Note that the tier 1 is a weighted average of Residential, Multi-family, and Leisure World tier 1 peaking factors. Tier 2 for Multi-family and Leisure World are also weighted averages. Raftelis took the weighted average of these three classes because the tier 1 peaking factors were very similar and therefore can be averaged.

Table 3-2: Customer Class Peaking Factors

Line No.	Customer Class (A)	Selected Tier Width (hcf) (B)	Max Month (C)	Average Month (D)	Peaking Factor (E)
1	**Residential**				
2	Tier 1	17	64,739	55,677	1.24
3	Tier 2	18 +	56,126	26,034	2.16
4	**Multi-Family Residential**				
5	Tier 1	17	12,697	10,944	1.24
6	Tier 2	18 +	700	354	1.98
7	**Leisure World**	Bi-monthly*			
8	Tier 1	17	101,726	78,395	1.24
9	Tier 2	18 +	0	0	1.98
10	**Commercial**		46,102	37,117	1.24
11	**Irrigation**		32,031	19,828	1.62
12	**City**		4,383	3,047	1.44

**Bi-monthly data were used for Leisure World for consistency.*

Table 3-3 shows the allocation of functionalized O&M expenses (in Column A) to the cost causation components. The resulting allocation to each cost component is shown in Line 7. The amounts shown in Line 7 are the summation of the percentages in each column multiplied by the amounts in Column B for each line (also known as the sum product).

The allocation basis, in Column C, are chosen based on the type of cost for each line item and the proportion of those costs associated with each cost causation component (max day, max hour, general, supply, etc.). For

example, transmission and distribution costs (Line 3) are allocated using the max hour basis since these costs are associated with serving average day and peak day demands in proportion to max hour allocations identified in Table 3-1. Certain cost bases are identical to the cost causation components, such as meter and billing/customer service, and, therefore, are easily allocated to the cost component with the same name. Line 8 shows the percentage allocation of all expenses to the cost causation components.

Table 3-3: O&M Allocation

Line No.	Functions	FY 2021 Budget	Allocation Basis	Supply	Base	Max Day	Max Hour	Billing/Cust Serv	Meter Maintenance	General & Admin	Total
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
1	Supply	$3,189,685	Supply	100%	0%	0%	0%	0%	0%	0%	100%
2	Treatment	$134,831	Max Day	0%	63%	38%	0%	0%	0%	0%	100%
3	Transmission & Distribution	$1,110,314	Max Hour	0%	29%	17%	54%	0%	0%	0%	100%
4	Billing/Customer Service	$315,560	Billing/Cust Serv	0%	0%	0%	0%	100%	0%	0%	100%
5	Meter Service	$148,131	Meter Maintenance	0%	0%	0%	0%	0%	100%	0%	100%
6	General & Admin	$405,053	General & Admin	0%	0%	0%	0%	0%	0%	100%	100%
7	**Total O&M Expenses**	**$5,303,573**		**$3,189,685**	**$401,502**	**$240,901**	**$602,742**	**$315,560**	**$148,131**	**$405,053**	**$5,303,573**
8	*O&M Expense Allocation*			*60%*	*8%*	*5%*	*11%*	*6%*	*3%*	*8%*	*100%*

Table 3-4: Capital Cost Allocation

Line No.	Functions	FY 2021 Budget	Allocation Basis	Supply	Base	Max Day	Max Hour	Billing/Cust Serv	Meter Maintenance	General & Admin	Total
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
1	Supply	$6,535,151	Supply	100%	0%	0%	0%	0%	0%	0%	100%
2	Pumping	$2,318,672	Max Day	0%	63%	38%	0%	0%	0%	0%	100%
3	Transimission & Distribution	$10,871,303	Max Hour	0%	29%	17%	54%	0%	0%	0%	100%
4	Treatment	$106,501	Max Day	0%	63%	38%	0%	0%	0%	0%	100%
5	Storage	$160,562	Max Day	0%	63%	38%	0%	0%	0%	0%	100%
6	Fire	$94,528	Max Hour	0%	29%	17%	54%	0%	0%	0%	100%
7	Meters	$7,001	Meter Maintenance	0%	0%	0%	0%	0%	100%	0%	100%
8	Buildings & Improvements	$53,212	General & Admin	0%	0%	0%	0%	0%	0%	100%	100%
9	General & Admin	$145,841	General & Admin	0%	0%	0%	0%	0%	0%	100%	100%
10	**Total Capital Expenses**	**$20,292,772**		**$6,535,151**	**$4,749,180**	**$2,849,508**	**$5,952,880**	**$0**	**$7,001**	**$199,053**	**$20,292,772**
11	*Capital Expense Allocation*			*32%*	*23%*	*14%*	*29%*	*0%*	*0%*	*1%*	*100%*

The total O&M expenses in Line 7, Column L equals the total FYE 2021 O&M Expenses in Table 2-15. This resulting allocation is used to allocate the City's operating revenue requirement (discussed in Section 3.1) to the cost components.

The City's functionalized assets are allocated to the same cost components as the O&M expenses, which is representative of future project costs. Capital costs are allocated using the asset base of the water system in recognition that assets need to be refurbished and replaced over time in proportion to overall investment in each cost component. Correspondingly, capital expenses over time should correlate to the asset base and mix of infrastructure. This ensures that the allocations to the cost causation components, and ultimately the rates, remain relatively stable over time.

Raftelis, with assistance from City Staff, functionalized the capital assets and then allocated them to the cost causation components with a resulting total capital allocation derived in the same manner as the O&M allocation. Part of City's revenue requirement includes rate funded capital. This capital portion of the revenue requirement is allocated to the cost causation components using the asset allocation shown in Line 11 of Table 3-4.

3.1. Revenue Requirement Determination

Raftelis calculated the revenue requirement using projected FYE 2021 expenses, which includes O&M expenses, existing debt, and capital expenses as shown in Lines 2 through 9 of Table 3-5. To arrive at the rate revenue requirement in Line 23, Column D, revenue offsets from other (non-rate) revenues (Line 16) and an adjustment for cash balances (Line 21) are subtracted from the revenue requirement in Line 10. The total revenue required from water rates in Line 23, Column D is the total amount that the City's fixed meter charges and volumetric rates are designed to collect if applied over a full fiscal year.

Table 3-5: Total Revenue Requirement

Line No.	FY 2021	Operating	Capital	Total
	(A)	(B)	(C)	(D)
1	**Revenue Requirements**			
2	Volumetric Water Supply Costs	$2,337,830	$0	$2,337,830
3	Fixed Water Supply Costs for MWDOC	$223,499	$0	$223,499
4	Fixed Water Supply Costs for SOU09, STA03, STA22	$48,730	$0	$48,730
5	General	$1,070,748	$0	$1,070,748
6	Personnel	$1,622,765	$0	$1,622,765
7	Rate Funded Capital	$0	$1,555,500	$1,555,500
8	Aquatic Park Water Line Capital	$0	$8,500	$8,500
9	West Orange County Water Board Loan	$0	$105,727	$105,727
10	**Total Revenue Requirement**	**$5,303,573**	**$1,669,727**	**$6,973,300**
11				
12	**Revenue Offsets**			
13	Miscellaneous Revenues	$1,000	$0	$1,000
14	Fees	$47,200	$0	$47,200
15	Interest	$50,904	$0	$50,904
16	**Total Revenue Offsets**	**$99,104**	**$0**	**$99,104**
17				
18	**Adjustments**			
19	Adjustment for Cash Balance	$1,980,383	$0	$1,980,383
20	Adjustment for Mid-Year Increase	($557,927)	$0	($557,927)
21	**Total Adjustments**	**$1,422,456**	**$0**	**$1,422,456**
22				
23	**Total Revenue Required from Rates**	**$3,782,013**	**$1,669,727**	**$5,451,740**

3.2. Allocation of Costs to Cost Components

The total revenue requirement shown in Table 3-5 can now be allocated to the cost causation components, as shown in Table 3-6. In Line 6, general and administrative expenses are reallocated to the other cost components in Columns D through H. In Lines 9 and 10, the public and private fire protection costs are reallocated to the meter service (Column I) and private fire (Column L) cost components, respectively.

The last adjustment is shown in Line 11 of Table 3-6. A portion of max day and max hour costs are reallocated to the meter component so that these costs can be collected through a fixed charge. These costs are reallocated so that the City can meet revenue stability goals. The final cost-of-service allocation to the cost components is shown in Line 12.

Table 3-6: Expense Allocation to Cost Components

Line No.	Cost of Service Allocation	Allocation Bases	Supply	Base	Max Day	Max Hour	Billing/Cust Serv	Meter Maintenance	Extra Capacity via Meter Charge	Aquatic Park Fixed Charge	Aquatic Park Volumetric Rate	Private Fire	General & Admin	Sub Total
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(L)	(L)
1	O&M Expenses	O&M	$2,274,586	$286,314	$171,788	$429,819	$225,028	$105,633	$0	$0	$0	$0	$288,846	$3,782,013
2	Capital Expenses	Capital	$534,802	$388,648	$233,189	$487,152	$0	$573	$0	$0	$0	$0	$16,289	$1,660,652
3	Aquatic Park Capital		$0	$0	$0	$0	$0	$0	$0	$7,260	$1,815	$0	$0	$9,075
4	**Total Cost of Service**		**$2,809,388**	**$674,961**	**$404,977**	**$916,971**	**$225,028**	**$106,206**	**$0**	**$7,260**	**$1,815**	**$0**	**$305,135**	**$5,451,740**
5														
6	Allocation of General		$0	$88,463	$53,078	$120,182	$29,493	$13,920	$0	$0	$0	$0	($305,135)	$0
7	**Subtotal**		**$2,809,388**	**$763,424**	**$458,054**	**$1,037,153**	**$254,521**	**$120,126**	**$0**	**$7,260**	**$1,815**	**$0**	**$0**	**$5,451,740**
8														
9	Allocation of Public Fire to Meter		$0	$0	($92,967)	($362,621)	$0	$0	$455,588	$0	$0	$0	$0	$0
10	Allocation to Private Fire		$0	$0	($15,344)	($59,852)	$0	$0	$0	$0	$0	$75,196	$0	$0
11	Allocation of Peak to Meter		$0	$0	($279,794)	($491,745)	$0	$0	$771,539	$0	$0	$0	$0	$0
12	**Total Adjusted Cost of Service**		**$2,809,388**	**$763,424**	**$69,949**	**$122,936**	**$254,521**	**$120,126**	**$1,227,127**	**$7,260**	**$1,815**	**$75,196**	**$0**	**$5,451,740**

3.3. Equivalent Meters

To allocate meter-related costs appropriately, the concept of equivalent meters needs to be understood. By using equivalent meters instead of a straight meter count, the analysis accounts for the fact that larger meters impose greater demands on the system and are more expensive to install, maintain, and replace than smaller meters. Equivalent meters are used in calculating meter service costs.

Equivalent meters are based on meter hydraulic capacity. Equivalent meters represent the potential demand on the water system in terms of the base or smallest meter size. A ratio of hydraulic capacity is calculated by dividing large meter capacities by the base meter capacity. The capacity ratio is calculated using the meter capacity in gallons per minute (gpm) provided in the *AWWA M1 Manual: Principles of Water Rates, Fees and Charges* (7th Edition).

Table 3-7 presents the hydraulic meter equivalents in Column E. Raftelis also calculated cost equivalent meters based on meter costs (the cost to purchase a new meter for each meter size) provided by the City (Column G). The cost equivalent meter ratios were used to distribute meter maintenance costs to each meter size.

Table 3-7: Equivalent Meters

Line No.	Meter Size - All Customer Classes	Capacity (gpm)	Ratio (3/4")	No. of Meters	Hydraulically Equivalent Meters	Cost Equivalent Meter Ratio	Cost Equivalent Meters
	(A)	(B)	(C)	(D)	(E)	(F)	(G)
1	5/8"	20	1.00	513	513	1.00	513
2	3/4"	30	1.00	3,733	3,733	1.00	3,733
3	1"	50	1.67	756	1,260	1.20	907
4	1.5"	100	3.33	116	387	4.00	464
5	2"	160	5.33	187	997	4.80	898
6	3"	300	10.00	15	150	6.00	90
7	4"	500	16.67	19	317	11.60	220
8	6"	1,000	33.33	6	200	20.80	125
9	8"	1,600	53.33	2	107	34.80	70
10	10"	2,300	76.67	2	153	48.00	96
11	6" Leisure World Adjusted	1,000	33.33	1	33	20.80	21
	Total			**5,350**	**7,850**		**7,136**

3.4. Allocation of Fire Protection Costs – Public vs. Private

Water systems provide two types of fire protection: public fire protection for firefighting, which is generally visible as hydrants on a street, and private fire protection which provides fire flow to building and other structure sprinkler systems for fire suppression within private improvements. To determine the share of total fire costs responsible to each, Raftelis analyzes the potential flow of public hydrants and private fire lines.

Table 3-8 shows the steps to allocate costs between public and private fire service. Each fire connection size has a fire flow demand factor similar to a hydraulic capacity factor of a water meter. The diameter of the connection is raised to the 2.63 power to determine the fire flow demand factor[6]. The count of connections of a specific size is multiplied by the fire flow demand factor to derive total equivalent fire demand.

The potential fire demand (known as equivalent demand) of public and private fire accounts is calculated in Lines 4 and 11 of Table 3-8, respectively. Lines 2 through 4 calculate the potential flow through public fire hydrants using the Hazen-Williams equation for pipe flow. Lines 7 through 11 calculate the potential flow through private fire connections also using the Hazen-Williams equation. The total equivalent demand units in Column D are calculated by multiplying the potential demand (Column B) by the number of connections/hydrants in service (Column C). The analysis estimates that 86 percent of fire capacity, and therefore costs, relate to public fire and will be included and recovered on the monthly fixed charges. The remaining 14 percent is attributable to private fire service and will be recovered through private fire service charges.

[6] Hazen-Williams equation via AWWA M1 Manual

Table 3-8: Derivation of Potential Flow to Private and Public Fire Connections

Line No.	Connection Size (A)	Fire Demand Potential (B)	Unit Counts (C)	Equivalent Demand (D)	Percent Allocation (E)
1	**Public Hydrants**				
2	1 x 4.0", 1 x 2.5" (Residential)	111.31	617	68,679	
3	1 x 4.0", 2 x 2.5" (Commercial)	111.31	67	7,458	
4	**Total Public Hydrants**		**684**	**76,137**	**86%**
5					
6	**Private Fire Lines**				
7	4"	38.32	20	766	
8	6"	111.31	14	1,558	
9	8"	237.21	18	4,270	
10	10"	426.58	14	5,972	
11	**Total Private Fire Lines**		**66**	**12,567**	**14%**
12					
13	**Total Fire Demand**		**750**	**88,703**	**100%**

3.5. Unit Costs Derivation

The end goal of a cost-of-service analysis is to proportionately distribute the cost components to each user class and tier. To do so, unit costs for each component must be calculated which starts by assessing the total water demanded (or equivalent service units) for each cost component. Projected water use (annual units of service) for FYE 2021 is shown in Table 3-9. Daily use is calculated as annual use divided by 365 days. The capacity or peaking factor for each customer class was derived in Table 3-2. The max day and max hour capacities (Column G and J of Table 3-9) are calculated by multiplying the average daily use by the max day or max hour peaking factor for each class and tier. This results in the total capacity, with extra capacity (Columns I & L) calculated by subtracting the average daily use from the total capacity for max day (Column H minus Column E) and by subtracting the total capacity for max day from the total capacity for max hour (Column K minus Column H), respectively. Demand requirements are detailed by proposed rate class. Values are rounded to the nearest hcf and may not equal the exact values shown in the table. The number of annual bills shown in Column M are calculated by multiplying the number of customers by 6 billing periods.

Table 3-9: Derivation of Cost Causation Component Units of Service

Line No.	Customer Class	Bi-monthly Tiers (hcf)	Percent in Tier	2021 Annual Use (hcf)	Average Daily Use (hcf/day)	Bi-monthly Peaking Factor	Max Day			Max Hour			Number of Accounts	Number of Equivalent Meters/Lines	% Total Use	Cost Equivalent Meters
							Max Day Capacity Factor	Total Capacity (hcf/day)	Extra Capacity (hcf/day)	Max Hour Capacity Factor	Total Capacity (hcf/day)	Extra Capacity (hcf/day)				
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)
1	Single Family Residential												4,676	5,288		5,006
2	Tier 1	17	68%	347,274	951	1.24	1.44	1,367	415	3.14	2,990	1,623			25%	
3	Tier 2	18 +	32%	162,379	445	2.16	2.51	1,115	670	5.48	2,440	1,324			12%	
4	Multi-Family Residential												269	603		530
5	Tier 1	17	97%	66,868	183	1.24	1.44	263	80	3.14	576	313			5%	
6	Tier 2	18 +	3%	2,163	6	1.98	2.30	14	8	5.03	30	16			0%	
7	Commercial*		0%	219,879	602	1.24	1.44	870	268	3.16	1,903	1,033	269	1,215	16%	975
8	Irrigation		0%	121,791	334	1.62	1.88	627	293	4.11	1,371	744	89	468	9%	399
9	City		0%	18,281	50	1.44	1.67	84	34	3.66	183	99	46	242	1%	207
10	Leisure World												1	33		21
11	Tier 1	17	100%	470,371	1,289	1.24	1.44	1,851	563	3.14	4,050	2,199			33%	
12	Tier 2	18 +	0%	0	0	1.98	2.30	0	0	5.03	0	0			0%	
13	**Total**			**1,409,006**	**3,860**			**6,191**	**2,331**		**13,543**	**7,352**	**5,350**	**7,850**	**100%**	**7,136**

**Aquatic Park and Navy data are included in the Commercial class.*

The calculation of public and private fire service capacity are shown in Table 3-10. Line 1 assumes the average fire lasts three hours. To fight that fire, fire flows need to be 3,000 gallons per minute (gpm). Max day capacity demanded for fire (Table 3-10, Line 4) is then determined by converting 3,000 gpm to gallons per hour, then multiplying it by the three hour duration of a typical fire. This is then converted to hcf. A similar calculation is done for the max hour capacity, multiplying the max day capacity by 24 hours less the capacity already allocated to Max Day. Public Fire is then allocated 86 percent each of those capacities as derived in Table 3-10. The values for max day and max hour total extra capacity shown in Line 8 of Table 3-10 are calculated by adding the total fire service capacity in Line 7 to the respective max day and max hour extra capacities shown in Columns H and K of Table 3-10. The percent of extra capacity required for public and private fire service are shown in Lines 9 and 10 of Table 3-10. These percentages are calculated by dividing the capacity needed for public or private fire (Lines 5 and 6) by the total extra capacity in Line 8 for both max day and max hour.

Table 3-10: Calculation of Fire Service Capacity

Line No.		Fire Estimate	Max Day	Max Hour
1	**Hours for Fire**	3		
2	**Gals/minute**	3,000		
3	**Cost to Public Fire**		86%	86%
4	**Capacity Demanded for Fire (hcf/day)**		722	5,053
5	Public Fire		620	4,337
6	Private Fire		102	716
7	**Total Fire**		**722**	**5,053**
8	**Total Extra Capacity - Fire & Potable (hcf/day)**		**3,012**	**12,293**
9	% of Extra Capacity - Public		21%	35%
10	% of Extra Capacity - Private		3%	6%

3.6. Unit Cost of Service

The next step is to derive the unit cost of service. The total cost of service (Table 3-11, Line 1) is divided by the respective units of service (Line 2) to calculate the unit cost of each cost component as shown in Line 4. Supply and base costs are calculated using total customer water use. Max day and max hour are taken from Table 3-9 (Columns I and L, Line 13). Billing and customer service costs are divided by the estimated number of annual monthly bills, from Column M of Table 3-9. Meter costs are divided by total cost-based meter equivalencies from Table 3-7 multiplied by 6 monthly bills to determine a cost per equivalent meter. The extra capacity meter charge is based on hydraulic meter equivalences from Table 3-7. The Aquatic Park fixed charge is divided by the number of Aquatic Park equivalent meters. The Aquatic Park volumetric rate is divided by annual Aquatic Park use. Fire protection costs are divided by total equivalent private fire demand to determine a cost per equivalent demand for private fire connections. The unit costs are used to distribute the cost components to the customer classes in proportion to the number and size of meters and volumetric use of each class.

Table 3-11: Units of Service

Line No.	Cost of Service Allocation	Supply	Base	Max Day	Max Hour	Billing/Cust Serv	Meter Maintenance	Extra Capacity via Meter Charge	Aquatic Park Fixed Charge	Aquatic Park Volumetric Rate	Private Fire
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
1	Total Adjusted Cost of Service	$2,809,388	$763,424	$69,949	$122,936	$254,521	$120,126	$1,227,127	$7,260	$1,815	$75,196
2	Unit of Service	1,409,006	1,409,006	2,331	7,352	5,350	7,136	7,850	27	5,229	12,567
3	Units	hcf	hcf	hcf/day	hcf/day	bills	equivalent meters	equivalent meters	Aquatic Park equiv. meters	Aquatic Park volumetric use	equivalent potential demand from private fire
4	**Unit Cost of Service**	**$1.99**	**$0.54**	**$30.01**	**$16.72**	**$7.93**	**$2.81**	**$26.05**	**$45.37**	**$0.35**	**$1.00**

3.7. Distribution of Cost Components to Customer Classes

The final step in a cost-of-service analysis is to distribute the cost components to the customer classes using the unit costs derived in Table 3-11. This is the end goal of a cost-of-service analysis and yields the cost to serve each class. Table 3-12 shows the derivation of the cost to serve each class. The supply, base, and peaking (max day and max hour) cost components are collected through the commodity (volumetric) charges ($/hcf). Billing and customer service, private fire protection, and meters are collected through the City's bi-monthly fixed service charge and private fire service charge.

Table 3-12: Derivation of Cost to Serve Each Class

Line No.	Customer Class	Supply	Base	Max Day	Max Hour	Billing/Cust Serv	Meter Maintenance	Private Fire	Extra Capacity via Meter Charge	Aquatic Park Water Line Capital	Total Proposed Cost to Serve Each Class
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
1	**Residential**					$222,456	$84,258		$826,630		$2,507,546
2	Tier 1	$692,423	$188,159	$12,468	$27,142				$0		$0
3	Tier 2	$323,764	$87,980	$20,119	$22,146				$0		$0
4	**Multi-Family Residential**					$12,797	$8,918		$94,314		$299,200
5	Tier 1	$133,327	$36,230	$2,401	$5,226						
6	Tier 2	$4,313	$1,172	$231	$271						
7	**Commercial**	$438,412	$119,134	$8,033	$17,277	$12,797	$16,405		$189,983		$802,042
8	**Irrigation**	$242,837	$65,988	$8,797	$12,447	$4,234	$6,713		$73,211		$414,227
9	**City**	$36,450	$9,905	$1,011	$1,664	$2,188	$3,481		$37,778		$92,477
10	**Leisure World**					$48	$350		$5,211		$1,251,977
11	Tier 1	$937,863	$254,855	$16,888	$36,763						
12	Tier 2	$0	$0	$0	$0						
13	Private Fire							$75,196			$75,196
14	Aquatic Park Water Capital Surcharge									$9,075	$9,075
15	**Total**	**$2,809,388**	**$763,424**	**$69,949**	**$122,936**	**$254,521**	**$120,126**	**$75,196**	**$1,227,127**	**$9,075**	**$5,451,740**

4. Water Rate Structure Proposed Revisions

4.0. Existing Rate Structure and Rates

The City assesses a meter-based fixed charge (Table 4-1) and fixed fire charges (Table 4-2). The City's existing volumetric water rate structure allocates tiers based on meter size, except for City accounts, which are assessed a flat unit rate ($/hcf) irrespective of meter size (Table 4-3).

Table 4-1: Current Bi-Monthly Fixed Charges

Meter Size	Fixed Charge ($)
5/8" - 3/4"	$37.86
1"	$47.89
1 1/2"	$72.97
2"	$103.06
3"	$183.32
4"	$273.60
6"	$524.39
8"	$825.34
10"	$1,176.45
12"	$1,577.72
Leisure World*	
Capital Fund Fixed Charge	
12"	$788.86

**Although Leisure World is billed monthly, bi-monthly rates are shown to be consistent with other classes.*

Table 4-2: Current Fire Service Charges

Meter Size	Fixed Charge ($)
4"	$50.40
6"	$113.42
8"	$201.62
10"	$315.04

Table 4-3: Current Bi-Monthly Volumetric Rates

Residential Bi-monthly		Leisure World Monthly	
All Meter Sizes	**$ / hcf**	**12"**	**$ / hcf**
Tier 1 0 - 26 hcf	$2.23	Tier 1 0 - 45,490 hcf	$2.23
Tier 2 26+	$2.88	Tier 2 45,490+	$2.88
Commercial Bi-monthly			
5/8 - 3/4"	**$ / hcf**	**4"**	**$ / hcf**
Tier 1 0 - 26 hcf	$2.25	Tier 1 0 - 686 hcf	$2.25
Tier 2 27+	$2.81	Tier 2 687+	$2.81
1"		**6"**	
Tier 1 0 - 43 hcf	$2.25	Tier 1 0 - 1,941 hcf	$2.25
Tier 2 44+	$2.81	Tier 2 1,942+	$2.81
1 1/2"		**8"**	
Tier 1 0 - 88 hcf	$2.25	Tier 1 0 - 4,951 hcf	$2.25
Tier 2 89+	$2.81	Tier 2 4,952+	$2.81
2"		**10"**	
Tier 1 0 -205 hcf	$2.25	Tier 1 0 - 7,117 hcf	$2.25
Tier 2 206+	$2.81	Tier 2 7,118+	$2.81
3"		**12"**	
Tier 1 0 -420 hcf	$2.25	Tier 1 0 - 45,490 hcf	$2.23
Tier 2 421+	$2.81	Tier 2 45,491+	$2.88
City Bi-monthly			
All Meter Sizes $/hcf	$2.42		

4.1. Proposed Rate Structure Changes

Raftelis recommends a traditional rate structure based on grouping customers by class instead of meter size. This results in more equitable rates as customers in traditional classes (e.g., single family, commercial) tend to use water more similarly. Customers grouped by meter size may use water very differently. For example, a two inch meter service a park will use water differently, with its summer peaks in water use, compared to a commercial business with a 2 inch meter. With respect to fixed charges, Raftelis recommends calculating fixed charges proportional to the American Water Works hydraulic capacity factors. These are the industry standard for setting fixed charges. An overview of changes to each customer class follows:

- Single Family Residential
    - The SFR volumetric rate shall be assessed on two tiers, irrespective of meter size.
    - The new tier 1 width shall be changed to better align with average indoor water use as estimated by winter water use.
- Multi-Family Residential
    - This is a new customer class created to be more equitable.

    - Tier widths are the same as single-family, however tier width increases in proportion to number of dwelling units. This prevents a large apartment complex's water use from being billed predominantly at the higher, tier 2 rate.
- Commercial and City
    - Both classes now have uniform rates instead of tiered rates. This is due to the non-heterogeneity of commercial customers and prevents large water use customers, who may use water wisely, from paying mostly the Tier 2 rate.
- Irrigation
    - This is a new class created because it has high peak summer water use relative to other classes, which is incorporated in a slightly higher rate.

5. Water Rate Design and Derivation

5.0. Proposed Rate Structure

In Table 3-6, the City's revenue requirement is allocated to each cost causation component. Table 5-1 shows each cost component will be collected either via fixed meter charge or volumetric rates. It also restates the amount allocated to each cost component from the cost-of-service section as well as the proposed percent fixed and volumetric revenue collection (Lines 12-13). Note that the cost components related to Aquatic Park accounts (Lines 9-10) are only assessed to Aquatic Park customers. The costs in Lines 9-10 are in addition to the fixed and volumetric charges/rates for all other customers. The costs are associated with collecting extra-ordinary distribution costs related to the undersea water pipeline required to serve Aquatic Park.

Table 5-1: Cost of Service & Fixed/Volumetric Revenue Collection

Line No.	Cost Component	Amount	Fixed/Volumetric
1	Supply	$2,809,388	Volumetric
2	Base	$763,424	Volumetric
3	Max Day	$69,949	Volumetric
4	Max Hour	$122,936	Volumetric
5	Billing/Customer Service	$254,521	Fixed
6	Meter Maintenance	$120,126	Fixed
7	Private Fire	$75,196	Fixed
8	Extra Capacity via Meter Charge	$1,227,127	Fixed
9	Aquatic Park Water Line Fixed Component*	$7,260	AP Fixed
10	Aquatic Park Water Line Volumetric Component*	$1,815	AP Volumetric
11	**Total**	**$5,451,740**	**100%**
12	**Total Fixed**	$1,684,229	31%
13	**Total Volumetric**	$3,767,511	69%

**These charges are only assessed on Aquatic Park accounts and are additional to the proposed fixed and volumetric charges/rates.*

5.1. Proposed Monthly Fixed Charge

Raftelis proposes that the City retain its schedule of bi-monthly fixed charges by meter size. There are three cost components that comprise the ***total*** proposed monthly fixed charge: 1) meter maintenance, 2) extra capacity via meter, and 3) billing/customer service. The monthly meter service charge recognizes that they City incurs fixed costs related to maintaining/replacing meters and billing customers. The extra capacity cost collects a portion of extra capacity (also known as peaking) costs through the meter service charge. The customer component recovers costs associated with meter reading, customer billing and collection as well as customer service costs. These costs are the same for all meter sizes as it costs the same to provide billing and

customer services to a small meter as it does a larger meter. Table 5-2 derives the bi-monthly fixed charge for base meter size (3/4 inch).[7] Fixed charges for all meter sizes are presented in Table 5-3.

Table 5-2: Bi-Monthly Fixed Charge Derivation for 3/4" Meter

Line No.	Bi-monthly Fixed Charge	Amount
1	**Meter Service Component**	
2	Meter Service Costs	$120,126
3	Annual Cost Equivalent Meter Units	42,818
4	**Bi-Monthly Meter Service Charge**	**$2.81**
5		
6	**Extra Capacity via Meter Component**	
7	Extra Capacity Costs	$1,227,127
8	Annual Hydraulic Equivalent Meter Units	47,100
9	**Bi-Monthly Extra Capacity Charge**	**$26.05**
10		
11	**Billing/Customer Service Component**	
12	Customer Service Costs	$254,521
13	Number of Annual Bills	32,100
14	**Bi-Monthly Customer Service Charge**	**$7.93**
15		
16	**Total Fixed Cost for 3/4" Meter***	**$36.79**

**This is the same unit rate used for 5/8" meters.*

Table 5-3: Proposed Bi-Monthly Fixed Charges

Line No.	Meter Size	Hydraulic Capacity Meter Ratio (3/4")	Cost Equivalent Meter Ratio (3/4")	Meter Maintenance	Customer Billing & Collection	Extra Capacty via Meter Charge	Aquatic Park Fixed Charge per Meter	Proposed Fixed Charge
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
1	5/8"	1.00	1.00	$2.81	$7.93	$26.05	$0.00	**$36.79**
2	3/4"	1.00	1.00	$2.81	$7.93	$26.05	$0.00	**$36.79**
3	1"	1.67	1.20	$3.37	$7.93	$43.42	$0.00	**$54.72**
4	1.5"	3.33	4.00	$11.22	$7.93	$86.85	$0.00	**$106.00**
5	2"	5.33	4.80	$13.47	$7.93	$138.95	$0.00	**$160.35**
6	3"	10.00	6.00	$16.83	$7.93	$260.54	$0.00	**$285.30**
7	4"	16.67	11.60	$32.54	$7.93	$434.23	$0.00	**$474.70**
8	6"	33.33	20.80	$58.35	$7.93	$868.45	$0.00	**$934.74**
9	8"	53.33	34.80	$97.63	$7.93	$1,389.53	$0.00	**$1,495.09**
10	10"	76.67	48.00	$134.66	$7.93	$1,997.45	$0.00	**$2,140.04**
11	6" Leisure World*	33.33	20.80	$29.18	$3.96	$434.23	$0.00	**$467.37**
12	2" Aquatic Park**	5.33	4.80	$0.00	$0.00	$0.00	$241.99	**$241.99**

**Leisure World is presented as a monthly charge.*

***Aquatic Park fixed rate includes extraordinary distribution costs associated with the undersea pipeline.*

[7] Note that 5/8 inch meters are assigned the same costs as ¾ inch meters.

Table 5-4 derives the fixed charge for Aquatic Park customers which are served through an undersea water line that is more costly to repair and replace compared to underground water mains. The proposed cost reflects the estimated capital cost to replace this undersea water line. The ¾ inch meter base charge in Line 2 was derived in Table 3-11, Column I. This base charge is multiplied by the hydraulic capacity ratio to develop fixed charges for each meter size (Table 5-4, Column E). The meter charge in Line 5 (Table 5-4) is the only Aquatic Park meter charge in Table 5-3 since no other meter sizes currently exist for this customer class.

Table 5-4: Aquatic Park Bi-Monthly Fixed Rate Calculation

Line No.	Meter Size	Hydraulic Capacity (gpm)	Hydraulic Capacity Meter Ratio (3/4")	Number of Meters	Aquatic Park Meter Charge
	(A)	(B)	(C)	(D)	(E)
1	5/8"	20	1.00	0	**$45.37**
2	3/4"	30	1.00	0	**$45.37**
3	1"	50	1.67	0	**$75.62**
4	1.5"	100	3.33	0	**$151.24**
5	2"	160	5.33	5	**$241.99**
6	3"	300	10.00	0	**$453.73**
7	4"	500	16.67	0	**$756.22**
8	6"	1000	33.33	0	**$1,512.43**
9	8"	1600	53.33	0	**$2,419.89**
10	10"	2300	76.67	0	**$3,478.60**

5.2. Proposed Private Fire Charges

Table 5-5 lists the proposed private fire charges. The unit cost of private fire in Column B is derived in Table 3-11. This is multiplied by the fire demand ratio in Column C, which is the diameter size of a given connection raised to the power of 2.63 (derived from the Hazen-Williams equation). Note that the private charges in Column D are slightly lower than the direct multiplication of the values in Columns B and C due to rounding.

Table 5-5: Proposed Bi-Monthly Private Fire Charges

Line No.	Private Fire Connection Size	Unit Cost	Fire Demand Ratio	Private Fire Cost ($)
	(A)	(B)	(C)	(D)
1	**4"**	$1.00	38.32	**$38.22**
2	**6"**	$1.00	111.31	**$111.01**
3	**8"**	$1.00	237.21	**$236.57**
4	**10"**	$1.00	426.58	**$425.43**

5.3. Volumetric Rates

The term volumetric rate is often used interchangeably with commodity rate or commodity charge. Line 13 of Table 5-1 shows the total amount of revenue the volumetric rates are designed to collect. Each component of the volumetric rate will be derived for each customer class. First, the proposed SFR, MFR, and Leisure World tier breakpoints must be defined.

5.3.1. VOLUMETRIC RATE DERIVATION

The total volumetric rate is the summation of unit rates for each cost component. These include:

1. Supply
2. Base Delivery
3. Peaking (max day and hour)

Each unit rate is derived and summed to get the total volumetric rate for each tier and customer class. First, each cost component (unit rate component) must be derived.

5.3.1.1. Cost Component Definitions

Water Supply costs are costs associated with obtaining from each water source including groundwater and imported purchased water from MWDOC.

Base Delivery costs are the operating and capital costs associated with delivering water to all customers through the distribution system (not including distribution storage) at a constant average rate of use, also known as serving customers under average daily demand conditions (base use). Therefore, delivery costs are spread over all units of water which results in an equal delivery unit cost for all classes and tiers.

Peaking costs, or extra-capacity costs, are costs incurred to meet customer peak demands in excess of base use (or in excess of average daily demand). For the portion of peaking costs collected through the volumetric rate, peaking costs are distributed to each tier and class using peaking factors derived from customer use data, which are discussed later in this section (Table 5-8). For the portion of peaking costs collected through the meter service charge, AWWA hydraulic capacity factors are used to distribute peaking costs to the various meter sizes.

5.3.1.2. Unit Cost Derivation by Cost Component

Supply Unit Costs

Table 5-6 shows the supply cost derivation by source. The water supply unit costs (Line 7) are derived by dividing the water supply revenue requirement (Line 6) by Annual Water Use (Line 3). As shown in Line 7, the unit supply cost for imported water from MWDOC is more than 2.5 times greater than groundwater from OCWD. The blended supply cost in Column D is ultimately used as the water supply unit cost for each customer class and tier. This is calculated by dividing Line 6 by Line 3.

Table 5-6: Supply Cost Derivation

Line No.	Water Supply Costs (A)	OCWD Groundwater (B)	MWDOC Water (C)	Total (D)
1	Volume (hcf)	2,637	879	3,516
2	Percent from each source	75%	25%	100%
3	Annual Water Use (hcf)	1,056,755	352,252	1,409,006
4	Water Supply Costs	$1,367,438	$1,193,891	$2,561,330
5	Pecent of Water Purchase Costs	53%	47%	100%
6	Total Water Supply Revenue Requirement	$1,499,871	$1,309,517	$2,809,388
7	**Unit Cost ($/hcf)**	**$1.42**	**$3.72**	**$1.99**

Delivery Cost

The delivery rate is derived in Table 5-7 by dividing the delivery (Base) costs identified shown in Line 1 the total water use in Line 2. The delivery rate is the unit cost to deliver water under ***average daily demand (ADD)*** conditions. This delivery cost is the same for all classes and for all tiers.

Table 5-7: Delivery Cost Derivation

Line No.	Delivery Rate Derivation	
1	Delivery Costs	$763,424
2	Total Use	1,409,006
3	**Delivery Rate**	**$0.54**

Peaking Rate

Peaking costs represent the cost of providing max day and max hour capacity (also known as peaking capacity) to each customer class based on the demand characteristics of each. Table 5-8 combines the max day and max hour costs in Table 3-12, respectively, into peaking costs. These costs are divided by total annual use by class and tier to arrive at the peaking unit cost for each.

Table 5-8: Derivation of Peaking Costs

Line No.	Customer Class	2021 Annual Use (hcf)	Peaking Costs	Unit Cost ($/hcf)
	(A)	(B)	(C)	(D)
1	**Single Family Residential**			
2	Tier 1	347,274	$39,610	$0.11
3	Tier 2	162,379	$42,266	$0.26
4	**Multi-Family Residential**			
5	Tier 1	66,868	$7,627	$0.11
6	Tier 2	2,163	$502	$0.23
7	**Leisure World***			
8	Tier 1	470,371	$53,651	$0.11
9	Tier 2	0	$0	$0.23
10	**Commercial**	219,879	$25,310	$0.12
11	**Irrigation**	121,791	$21,244	$0.17
12	**City**	18,281	$2,675	$0.15

**Although it is unlikely that Leisure World will have use in tier 2, they have a blended tier 2 rate with MFR.*

5.3.2. FINAL RATE DERIVATION

Table 5-9 shows the total volumetric rate derivation for all customer classes in Column F. This is the summation of the supply, base delivery, and peaking rate components (Columns C, D and E) derived in earlier tables in this section. The Aquatic Park volumetric rate (Line 16) is the sum of the Commercial rate (Line 7 or Line 14) and the additional volumetric unit rate for the Aquatic Park water pipelines (Line 15). This volumetric cost was derived in Table 3-11, Column J. This additional rate for Aquatic Park partially reflects the additional replacement cost for an undersea pipeline, which is more costly compared to underground pipelines. The City should set this additional revenue aside for the eventual replacement of this pipe.

Table 5-9: Final Volumetric Rate Derivation

Line No.	Customer Class	Tier Breakpoint	Supply	Base Delivery	Peaking	Proposed Rate ($/hcf)
	(A)	(B)	(C)	(D)	(E)	(F)
1	**Residential**					
2	Tier 1	17	$1.99	$0.54	$0.11	**$2.65**
3	Tier 2	18 +	$1.99	$0.54	$0.26	**$2.80**
4	**Multi-Family Residential**					
5	Tier 1	17	$1.99	$0.54	$0.11	**$2.65**
6	Tier 2	18 +	$1.99	$0.54	$0.23	**$2.77**
7	**Leisure World***					
8	Tier 1	17	$1.99	$0.54	$0.11	**$2.65**
9	Tier 2	18 +	$1.99	$0.54	$0.23	**$2.77**
10	**Commercial**		$1.99	$0.54	$0.12	**$2.65**
11	**Irrigation**		$1.99	$0.54	$0.17	**$2.71**
12	**City**		$1.99	$0.54	$0.15	**$2.68**
13						
14	Aquatic Park Base Rate (equals Commercial rate in Line 7))					$2.65
15	Aquatic Park Water Line Capital Rate					$0.35
16	**Total Aquatic Park Volumetric Rate (Line 14 + Line 15)**					**$3.00**

**Although Leisure World is billed monthly, bi-monthly rates are shown to be consistent with other classes.*

5.4. Proposed Five-Year Water Rates

The proposed revenue adjustments (Table 2-21) have been applied to the five-year rates are shown in this section. Table 5-10 shows the five-year fixed charges, Table 5-11 the private fire charges, and Table 5-12 the volumetric rates ($/hcf).

Table 5-10: Proposed Five-Year Water Bi-Monthly Fixed Charges

Meter Size	May 2021	January 2022	January 2023	January 2024	January 2025
5/8"	$36.79	$41.20	$44.91	$48.50	$52.38
3/4"	$36.79	$41.20	$44.91	$48.50	$52.38
1"	$54.72	$61.28	$66.80	$72.14	$77.92
1.5"	$106.00	$118.72	$129.40	$139.75	$150.93
2"	$160.35	$179.59	$195.75	$211.41	$228.33
3"	$285.30	$319.53	$348.29	$376.16	$406.25
4"	$474.70	$531.66	$579.51	$625.87	$675.94
6"	$934.74	$1,046.91	$1,141.13	$1,232.42	$1,331.01
8"	$1,495.09	$1,674.50	$1,825.20	$1,971.22	$2,128.92
10"	$2,140.04	$2,396.84	$2,612.56	$2,821.56	$3,047.29
6" Leisure World*	$467.37	$1,046.91	$1,141.13	$1,232.42	$1,331.01
2" Aquatic Park	$241.99	$271.03	$295.42	$319.05	$344.58

**Although Leisure World is billed monthly, bi-monthly rates are shown to be consistent with other classes.*

Table 5-11: Proposed Five-Year Bi-Monthly Fire Service Charges

Meter Size	May 2021	January 2022	January 2023	January 2024	January 2025
4"	$38.22	$42.80	$46.65	$50.39	$54.42
6"	$111.01	$124.33	$135.52	$146.36	$158.07
8"	$236.57	$264.95	$288.80	$311.90	$336.86
10"	$425.43	$476.48	$519.36	$560.91	$605.79

Table 5-12: Proposed Five-Year Bi-Monthly Water Volumetric Charges ($/hcf)

Customer Class	Tier Breakpoint	May 2021	January 2022	January 2023	January 2024	January 2025
Single Family Residential						
Tier 1	0 to 17 hcf	$2.65	$2.97	$3.24	$3.49	$3.77
Tier 2	>17 hcf	$2.80	$3.14	$3.42	$3.69	$3.99
Multi-Family Residential*						
Tier 1	0 to 17 hcf	$2.65	$2.97	$3.24	$3.49	$3.77
Tier 2	>17 hcf	$2.77	$3.10	$3.38	$3.65	$3.94
Leisure World*						
Tier 1	0 to 17 hcf	$2.65	$2.97	$3.24	$3.49	$3.77
Tier 2	>17 hcf	$2.77	$3.10	$3.38	$3.65	$3.94
Commercial		$2.65	$2.97	$3.24	$3.49	$3.77
Irrigation		$2.71	$3.04	$3.31	$3.57	$3.86
City		$2.68	$3.00	$3.27	$3.53	$3.82
Aquatic Park		$3.00	$3.36	$3.66	$3.95	$4.27

** Tier 1 width increases in proportion to number of dwelling units served*

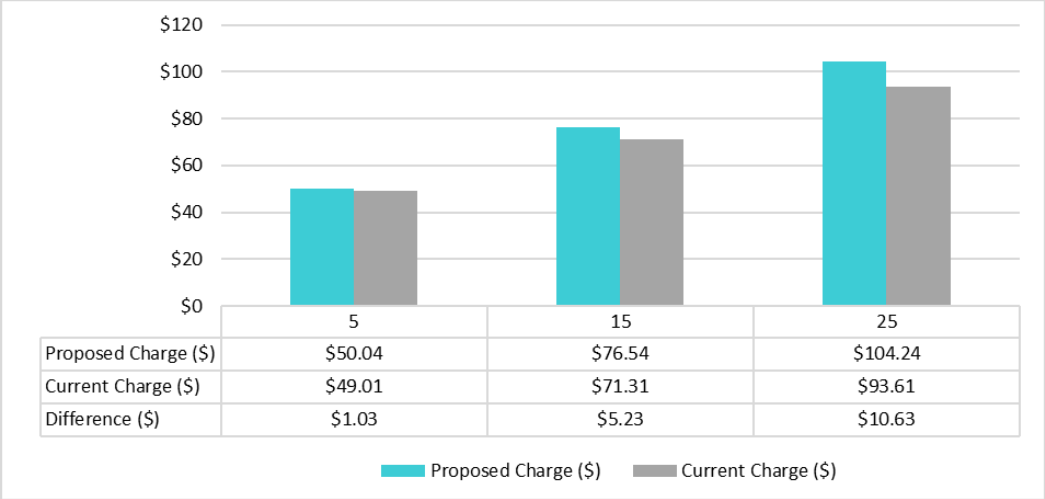
6. Water Bill Impacts

Note that customer bill impacts will vary with each customers' meter size and volumetric water use. For illustrative purposes, this section focuses on the median water use for the most prevalent meter size for select customer classes.

6.0. Single-Family Residential (SFR)

The SFR wastewater bill impacts for the most prevalent meters (i.e., ¾") are presented in Figure 6-1, with the median use graphed in the middle.

Figure 6-1: Water Bill Impacts SFR, 3/4"

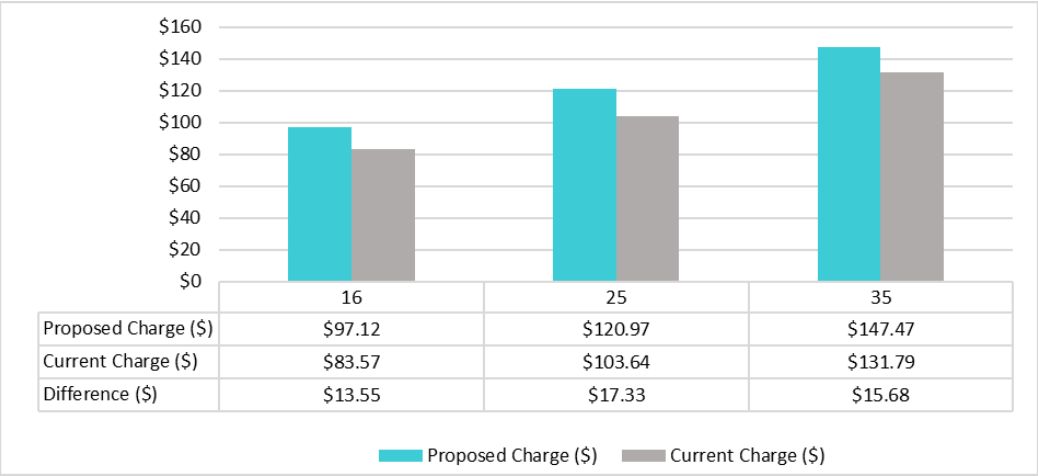


	5	15	25
Proposed Charge ($)	$50.04	$76.54	$104.24
Current Charge ($)	$49.01	$71.31	$93.61
Difference ($)	$1.03	$5.23	$10.63

6.1. Multi-Family Residential (MFR)

The MFR wastewater bill impacts for the most prevalent meters (i.e., 1") are presented in Figure 6-2, with the median use graphed in the middle.

Figure 6-2: Water Bill Impacts MFR, 1"

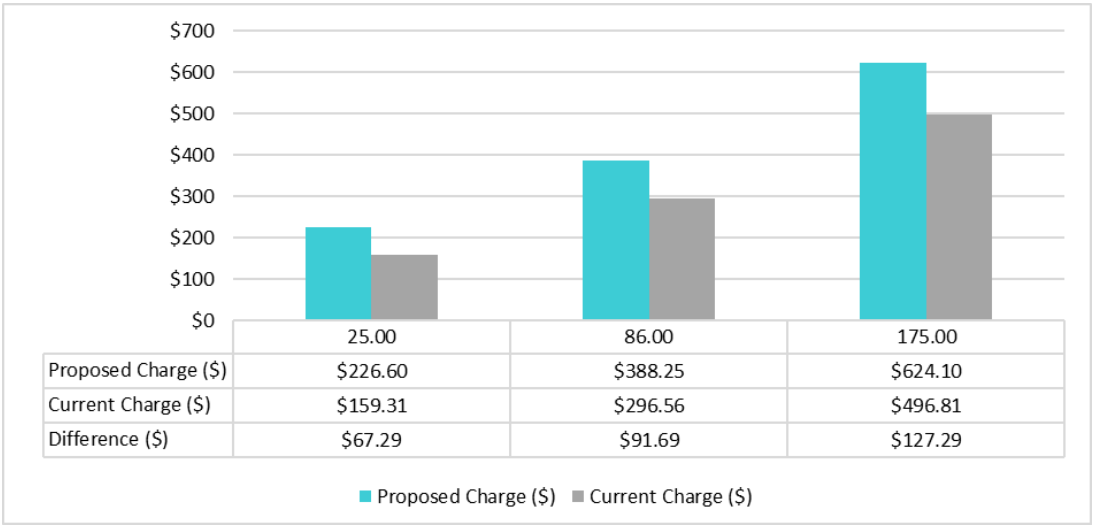


	16	25	35
Proposed Charge ($)	$97.12	$120.97	$147.47
Current Charge ($)	$83.57	$103.64	$131.79
Difference ($)	$13.55	$17.33	$15.68

6.2. Commercial

The Commercial wastewater bill impacts for the most prevalent meters (i.e., 2") are presented in Figure 6-3, with the median use graphed in the middle.

Figure 6-3: Water Bill Impacts Commercial, 2"

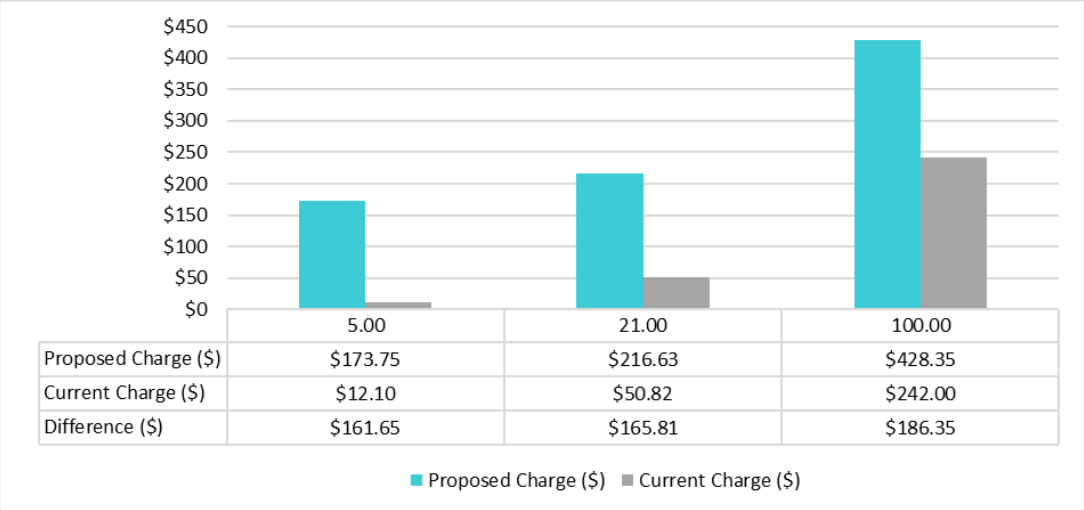


	25.00	86.00	175.00
Proposed Charge ($)	$226.60	$388.25	$624.10
Current Charge ($)	$159.31	$296.56	$496.81
Difference ($)	$67.29	$91.69	$127.29

6.3. City

City wastewater bill impacts for the most prevalent meters (i.e., 2") are presented in Figure 6-4, with the median use graphed in the middle.

Figure 6-4: Water Bill Impacts City, 2"



	5.00	21.00	100.00
Proposed Charge ($)	$173.75	$216.63	$428.35
Current Charge ($)	$12.10	$50.82	$242.00
Difference ($)	$161.65	$165.81	$186.35

7. Wastewater Financial Plan

This section describes the Wastewater Financial Plan assumptions to project operating and capital expenses as well as reserve policies and debt coverage requirements that determine the overall revenue adjustments to promote financial stability. Revenue adjustments represent the average increase in rates for the City's wastewater enterprise.

7.0. Wastewater System Background

The City collects wastewater and transmits it to the Orange County Sanitation District (OCSD) for treatment. The wastewater system is made up of approximately 181,000 feet of gravity sewers, 780 manholes, and 6 pump stations and their force mains. Note that the City does not maintain sewers serving the Naval Weapons Station but accepts flows from the base at Pump Station 35[8].

7.1. Key Assumptions

7.1.1. INFLATIONARY COST ASSUMPTIONS

The inflation factors are used to project costs across the study period. The factors are applied to all years beginning in FY 2021. Raftelis worked with City staff to escalate individual budget line items according to appropriate escalation factors. Inflationary factors are presented in Table 7-1.

The general inflation rate is based on the long-term change in the Consumer Price Index (CPI). Salaries and benefits tend to outpace general inflation, and City staff have estimated annual increases of 3 percent. Capital cost escalation is based on historical construction cost index (CCI) inflation. To maintain conservative estimates of future revenues, the Study assumes that all recurring non-rate revenues will remain flat in future years. Interest rates earned on reserves are based on conservative estimates in a low interest financial environment.

Table 7-1: Wastewater Inflation Assumptions

Escalation Factors	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
General	2.2%	2.2%	2.2%	2.2%	2.2%
Personnel	3.0%	3.0%	3.0%	3.0%	3.0%
Capital	3.2%	3.2%	3.2%	3.2%	3.2%
Non-Rate Revenues	0.0%	0.0%	0.0%	0.0%	0.0%
Reserve Interest Rate	0.8%	0.8%	0.8%	0.8%	0.8%

[8] City of Seal Beach 2018 Draft Sewer System Master Plan.

7.1.2. ACCOUNT GROWTH AND WASTEWATER DEMAND ASSUMPTIONS

Two factors are used to estimate future wastewater rate revenue: (1) account growth from new connections; and (2) changes in annual wastewater demand (Table 7-2). Raftelis assumed zero account growth and constant demand during the Study Period.

Table 7-2: Wastewater Account and Demand Growth

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Account Growth	0.0%	0.0%	0.0%	0.0%	0.0%
Demand Factor	100.0%	100.0%	100.0%	100.0%	100.0%

7.2. Revenues from Current Rates

Raftelis developed a five-year Wastewater Financial Plan, which models anticipated revenues and expenses. Sewer customers are assessed a sewer capital charge and a sewer service charge. To calculate the projected revenue (without rate adjustments), the number of accounts is multiplied by the bi-monthly sewer capital charge (Table 7-3). Note that Aquatic Park accounts are currently assessed service and capital charges additional to the meter-based charges[9]. The bi-monthly sewer service charge is calculated as a percentage of the total water bill:

$$Sewer\ Service\ Charge = 22\% \times (Water\ Fixed\ Charge + Water\ Volumetric\ Charge)$$

The sewer service charge is added to the sewer capital charge. Note that the water fixed charge is presented in Table 2-4 and water volumetric charge in Table 2-6. The revenues generated from existing rates and charges are compared to expenses. This serves as the basis for any required revenue adjustments. In other words, if revenues are not sufficient to cover expenses, revenues are adjusted.

[9] "Sewer Rate Adjustment Report", City of Seal Beach, October 2005.

Table 7-3: Current Wastewater Bi-Monthly Fixed Charges

Residential Capital Charge	
5/8"	$43.32
3/4"	$43.32
1"	$59.88
1 1/2"	$110.26
2"	$173.46
3"	$1,228.60
4"	$2,055.54
Commerical and City Capital Charge	
5/8"	$47.26
3/4"	$47.26
1"	$102.38
1 1/2"	$133.88
2"	$535.54
3"	$1,480.62
4"	$2,669.84
6"	$3,772.42
8"	$7,875.62
10"	$7,875.62
Aquatic Park Equity Charges*	
Service Equity Charge	$1,322
Capital Equity Charge	$998

**Aquatic Park Equity Charges are presented per account.*

The current monthly rate for the Navy is $97.91 per million gallons of sewer discharge. Table 7-4 presents the number of accounts across the 5-year study period. Note that these remain constant due to the assumption of zero account growth (Table 7-2).

Table 7-4: Projected Wastewater Account Growth

Meter Size (in)	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
5/8"	472	472	472	472	472
3/4"	3,268	3,268	3,268	3,268	3,268
1"	646	646	646	646	646
1 1/2"	96	96	96	96	96
2"	112	112	112	112	112
3"	10	10	10	10	10
4"	15	15	15	15	15
6"	6	6	6	6	6
8"	6	6	6	6	6
10"	2	2	2	2	2
12"	1	1	1	1	1
Total	**4,634**	**4,634**	**4,634**	**4,634**	**4,634**

Table 7-5 summarizes the projected revenues from current rates. Volumetric revenues are 22% of the total water bill for each customer[10]. Fixed charges (Table 7-3) are multiplied by number of accounts (Table 7-4) and six billing periods to obtain total fixed charge revenues. Fixed revenues also include the sewer service and capital equity charges to Aquatic Park accounts.

Table 7-5: Projected Wastewater Rate Revenue with Current Rates

Revenue Source	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Volumetric Revenue	$690,463	$690,463	$690,463	$690,463	$690,463
Fixed Revenue	$2,180,303	$2,180,303	$2,180,303	$2,180,303	$2,180,303
Total	**$2,870,765**	**$2,870,765**	**$2,870,765**	**$2,870,765**	**$2,870,765**

The utility also derives revenues from other non-rate sources. These revenues consist of miscellaneous revenues and interest income as summarized in Table 7-6.

Table 7-6: Projected Wastewater Non-Rate Revenues

Revenue Source	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Miscellaneous Revenue	$27,000	$27,000	$27,000	$27,000	$27,000
Interest	$65,213	$53,138	$40,836	$36,467	$28,534
Total	**$92,213**	**$80,138**	**$67,836**	**$63,467**	**$55,534**

7.3. Operating and Maintenance Expenses

Total projected O&M expenses are shown in Table 7-7 based on assumptions in Table 7-1.

[10] Not all water customers are sewer customers. Volumetric revenues also include the monthly $/million gallon charge to the Navy.

Table 7-7: Total Wastewater O&M Costs

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
General	$334,500	$341,761	$349,179	$356,759	$364,503
Personnel	$1,170,300	$1,205,409	$1,241,571	$1,278,818	$1,317,183
Total O&M	**$1,504,800**	**$1,547,170**	**$1,590,751**	**$1,635,577**	**$1,681,686**

7.4. Capital Improvement Plan (CIP)

The projected five-year inflated CIP is provided in Table 7-8. This was inflated by City staff prior to sending to Raftelis.

Table 7-8: Five-Year Wastewater CIP

Line No.	Project	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
1	SCADA System Upgrades	$50,000	$50,000	$50,000	$0	$0
2	6th St. Alley Sewerline Replacement Project	$0	$2,050,000	$0	$0	$0
3	Annual Collection System Improvement	$600,000	$600,000	$600,000	$600,000	$600,000
4	Annual Manhole Rehabilitation	$20,000	$20,000	$20,000	$20,000	$20,000
5	Pump Station 35 Improvements (Phase 1)	$650,000	$0	$0	$0	$0
6	Boeing Pump Station Improvements	$0	$0	$0	$0	$900,000
7	8th St Pump Station Force Main Replacement	$0	$130,000	$0	$0	$0
8	**Total**	**$1,320,000**	**$2,850,000**	**$670,000**	**$620,000**	**$1,520,000**

7.5. Existing and Proposed Debt Service

The City's Wastewater Enterprise has three outstanding debt obligations, with the total annual debt service shown in Line 16 of Table 7-9. There is no proposed sewer debt for the five-year study period.

Table 7-9: Current Wastewater Debt Service

Line No.	Debt Service	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
1	**2011 Sewer Bond**					
2	Principal	$175,000	$185,000	$195,000	$205,000	$215,000
3	Interest	$91,080	$82,560	$73,560	$64,080	$54,120
4	**Total 2011 Sewer Bond**	**$266,080**	**$267,560**	**$268,560**	**$269,080**	**$269,120**
5						
6	**State Clean Water Revolving Loan #1**					
7	Principal	$124,772	$128,016	$131,345	$134,760	$138,263
8	Interest	$45,008	$41,764	$38,435	$35,020	$31,517
9	**Total State Clean Water Revolving Loan #1**	**$169,780**	**$169,780**	**$169,780**	**$169,780**	**$169,780**
10						
11	**State Clean Water Revolving Loan #2**					
12	Principal	$74,506	$76,443	$78,430	$80,470	$82,562
13	Interest	$32,216	$30,279	$28,292	$26,252	$24,160
14	**Total State Clean Water Revolving Loan #2**	**$106,722**	**$106,722**	**$106,722**	**$106,722**	**$106,722**
15						
16	**Total Debt Service**	**$542,582**	**$544,062**	**$545,062**	**$545,582**	**$545,622**

7.6. Financial Reserve Policy

Currently, the City does not have formal reserve targets. Raftelis recommends that the City establishes reserve policies to meet its cash flow needs, ensure adequate funding of repairs and replacements in the event of asset failure or other unforeseen circumstances or events, and protect ratepayers from rate spikes.

Raftelis recommends establishing an operating reserve equal to 90 days of operating expenses in cash to meet cash flow needs. Raftelis also recommends establishing a capital reserve with a minimum target balance of one year of average capital costs.

Table 7-10: Wastewater Reserve Policies

Reserve	Policy	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Operating	90 days of operating expenses	$376,200	$386,792	$397,688	$408,894	$420,421
Capital	1 year of average CIP*	$1,396,000	$1,256,000	$1,030,000	$1,100,000	$1,080,000
Total		**$1,772,200**	**$1,642,792**	**$1,427,688**	**$1,508,894**	**$1,500,421**

**Average CIP = 5-year moving average*

7.7. Status Quo Financial Plan (No Revenue Change)

Table 7-11 displays the operating cash flows assuming no revenue increases. The cash flow incorporates the revenues from current rates (Table 7-5), non-rate revenues (Table 7-6), O&M expenses (Table 7-7), capital improvement projects (Table 7-8), and annual debt service payments (Table 7-9) to project the debt coverage ratio (Line 24) and projected ending balances (Line 21). All projections shown in the table are based upon the City's current rate structure and do not include rate adjustments. Under the "status-quo" financial plan

scenario, the City will face negative net cashflow[11] starting in FY 21 (Line 17). However, since the wastewater enterprise has healthy reserve balances the City intends to draw down reserves and proposes a revenue decrease as discussed in Section 7.8.

Table 7-11: Wastewater Status Quo Financial Plan

Line No.		FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
1	**Revenue**					
2	Existing Rate Revenue	$2,870,765	$2,870,765	$2,870,765	$2,870,765	$2,870,765
3	Miscellaneous Revenues	$27,000	$27,000	$27,000	$27,000	$27,000
4	Interest	$65,662	$56,730	$49,838	$50,918	$48,477
5	**Total Revenues**	**$2,963,427**	**$2,954,496**	**$2,947,603**	**$2,948,684**	**$2,946,242**
6						
7	**O&M Expenses**					
8	General	$334,500	$341,761	$349,179	$356,759	$364,503
9	Personnel	$1,170,300	$1,205,409	$1,241,571	$1,278,818	$1,317,183
10	**Total O&M**	**$1,504,800**	**$1,547,170**	**$1,590,751**	**$1,635,577**	**$1,681,686**
11						
12	Existing Debt Service	$542,582	$544,062	$545,062	$545,582	$545,622
13	Rate-Funded CIP	$1,320,000	$2,850,000	$670,000	$620,000	$1,520,000
14						
15	**Total Expenses**	**$3,367,382**	**$4,941,232**	**$2,805,813**	**$2,801,159**	**$3,747,308**
16						
17	**Net Cashflow**	**($403,955)**	**($1,986,736)**	**$141,790**	**$147,525**	**($801,065)**
18						
19	**Beginning Balance**	$8,989,726	$8,585,771	$6,599,035	$6,740,826	$6,888,350
20	Net Cashflow	($403,955)	($1,986,736)	$141,790	$147,525	($801,065)
21	**Ending Balance**	**$8,585,771**	**$6,599,035**	**$6,740,826**	**$6,888,350**	**$6,087,285**
22	*Target Balance*	*$1,772,200*	*$1,642,792*	*$1,427,688*	*$1,508,894*	*$1,500,421*
23						
24	Calculated Debt Coverage Ratio	548%	526%	505%	488%	470%
25	Required Debt Coverage Ratio	125%	125%	125%	125%	125%

7.8. Proposed Financial Plan

Table 7-12 shows the proposed revenue adjustment plan for the Wastewater Enterprise. The proposed revenue adjustments attain adequate revenue to fund operating expenses, achieve reserve policy targets, fund the long-term capital program, and pay debt service. Revenue adjustments represent the average increase in rates for the utility as a whole. Actual percentage increases (or decreases) in rates are dependent upon the cost-of-service analysis and are unique to each customer class and meter size. The revenue adjustment for FY 21 is proposed to take effect on May 1, 2021, while all subsequent adjustments are assumed to take effect on January 1st of each fiscal year. The City is proposing a one-time revenue decrease, as shown in Table 7-12 due to healthy reserve balances.

[11] Net Cashflow = Total Revenues – Total Expenses

Table 7-12: Wastewater Revenue Adjustments

FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
May 2021	Jan 2022	Jan 2023	Jan 2024	Jan 2025
-25.0%	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Similar to the Status Quo Financial Plan (Table 7-11), Table 7-13 shows the proposed financial plan with the revenue adjustments (decrease) shown in Table 7-12. The cash flow incorporates the revenues from current rates (Table 7-5), the revenue from decreases in rates consistent with the proposed adjustments (Table 7-12), non-rate revenues (Table 7-6), O&M expenses (Table 7-7), capital improvement projects (Table 7-8), and existing annual debt service payments (Table 7-9).

Net cashflow (Line 17) remains negative throughout the study period, however the reserve balance is sufficient to offset the negative cashflow amplified by the proposed rate revenue decline in FY 21 (Table 7-12). The debt service coverage ratio (Line 24) is sufficient across all study years. In summary, the proposed financial plan, due to current healthy reserves, ensures financial sufficiency and solvency for the City to meet projected expenditures and financial obligations including debt service, debt coverage, and reserve targets while funding CIP projects.

Table 7-13: Wastewater Proposed Financial Plan

Line No.		FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
1	**Revenue**					
2	Proposed Rate Revenue	$2,751,150	$2,153,074	$2,153,074	$2,153,074	$2,153,074
3	Miscellaneous Revenue	$27,000	$27,000	$27,000	$27,000	$27,000
4	Interest	$65,213	$53,138	$40,836	$36,467	$28,534
5	**Total Revenues**	**$2,843,363**	**$2,233,212**	**$2,220,910**	**$2,216,541**	**$2,208,608**
6						
7	**O&M Expenses**					
8	General	$334,500	$341,761	$349,179	$356,759	$364,503
9	Personnel	$1,170,300	$1,205,409	$1,241,571	$1,278,818	$1,317,183
10	**Total O&M**	**$1,504,800**	**$1,547,170**	**$1,590,751**	**$1,635,577**	**$1,681,686**
11						
12	Existing Debt Service	$542,582	$544,062	$545,062	$545,582	$545,622
13	Rate-Funded CIP	$1,320,000	$2,850,000	$670,000	$620,000	$1,520,000
14						
15	**Total Expenses**	**$3,367,382**	**$4,941,232**	**$2,805,813**	**$2,801,159**	**$3,747,308**
16						
17	**Net Cashflow**	**($524,019)**	**($2,708,019)**	**($584,902)**	**($584,618)**	**($1,538,700)**
18						
19	**Beginning Balance**	$8,989,726	$8,465,708	$5,757,688	$5,172,786	$4,588,168
20	Net Cashflow	($524,019)	($2,708,019)	($584,902)	($584,618)	($1,538,700)
21	**Ending Balance**	**$8,465,708**	**$5,757,688**	**$5,172,786**	**$4,588,168**	**$3,049,468**
22	*Target Balance*	*$376,200*	*$386,792*	*$397,688*	*$408,894*	*$420,421*
23						
24	Calculated Debt Coverage Ratio	503%	256%	235%	216%	196%
25	Required Debt Coverage Ratio	125%	125%	125%	125%	125%

Figure 7-1 through Figure 7-3 display the proposed financial plan information shown in Table 7-13 in graphical format. Figure 7-1 shows the City's expenses in stacked bars and the current and proposed revenue in solid and dashed black lines, respectively. Note that the proposed revenue is lower than the current revenue because of the negative revenue adjustment in FY 21 (Table 7-12). The stacked bars show the expenses broken down into the categories displayed in the legend. The gray portion of the stacked bar below the x-axis shows the operating yearly deficit. In these years, the City will minimize customer bill impacts by drawing down reserves.

Figure 7-1: Wastewater Operating Financial Plan

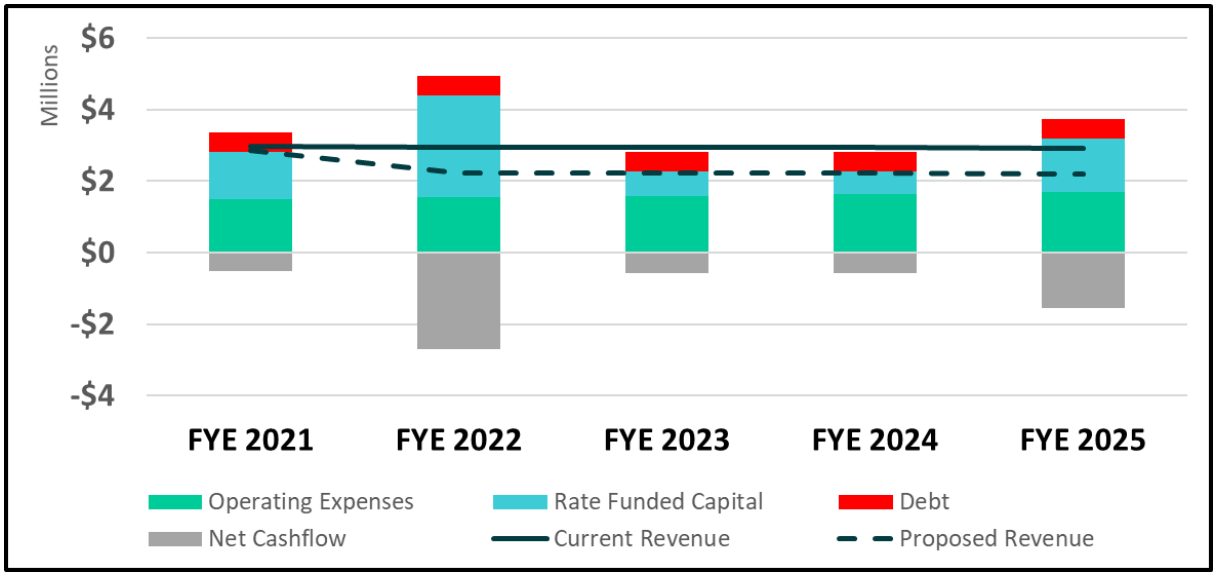


Figure 7-2 shows the total annual CIP over the study period and designates the portion to be funded by reserves in blue. The City anticipates fully funding capital projects through reserves.

Figure 7-2: Capital Funding Sources

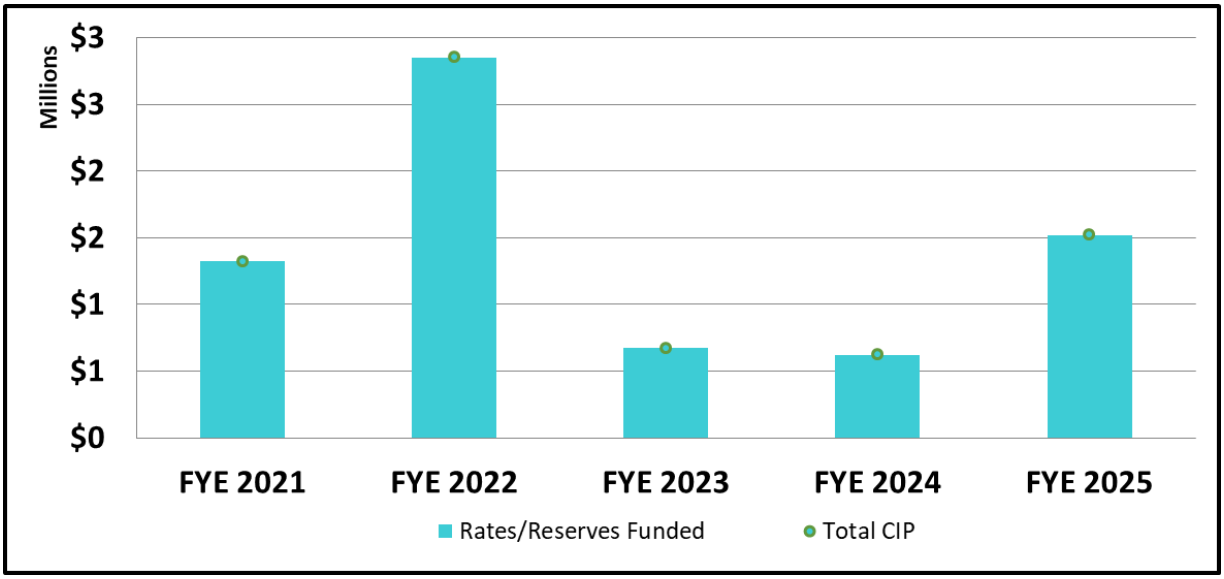
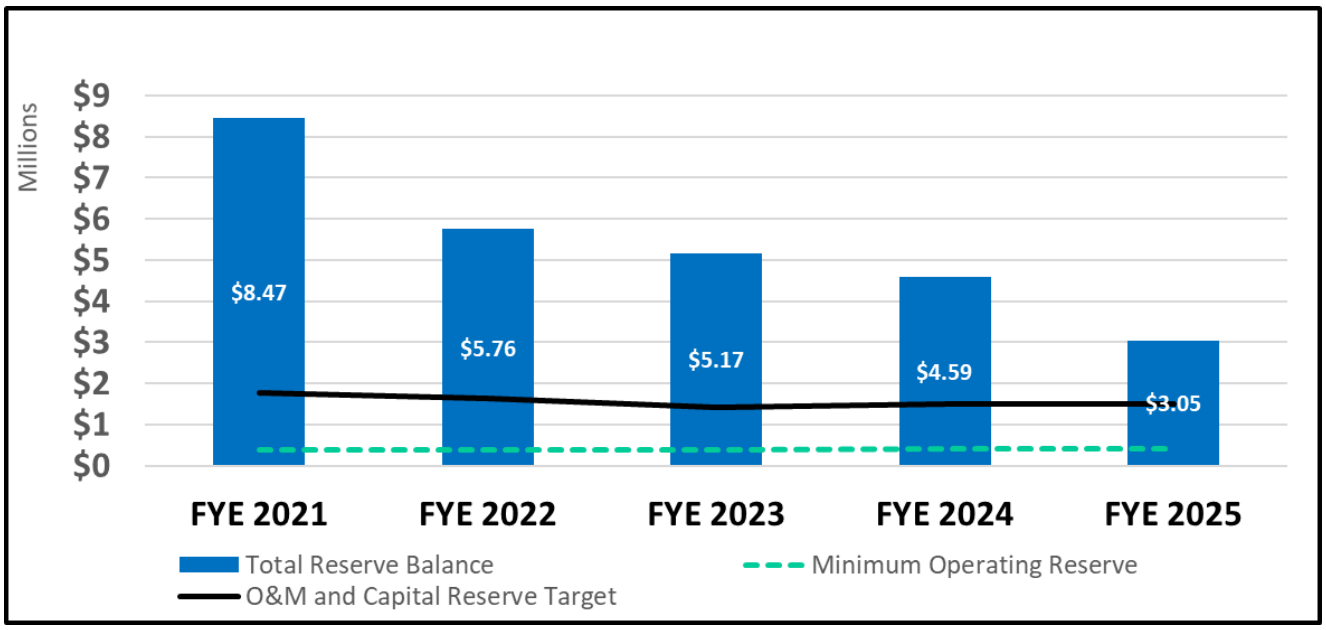


Figure 7-3 shows the ending total reserve balances. The minimum reserve target shown in Table 7-10 is represented by the dashed blue line and is equal to 90 days of operating expenses. The total minimum reserve target for both the operating and capital reserves is represented by the solid black line in Figure 7-3 and is equal to the sum of operating and capital reserve targets. The City draws down its reserves across the Study Period.

Figure 7-3: Wastewater Ending Reserve Balances (All Reserves)



8. Wastewater Cost-of-Service Analysis

As stated earlier, a Cost-of-Service (COS) analysis distributes the yearly revenue needed (i.e., revenue requirement) to each customer class. Due to the City's relatively straightforward, collection-only wastewater system, the only cost causation components are: (1) billing/customer service and (2) collection. Note that Leisure World is currently not assessed a sewer charge. The Navy is charged a unique sewer rate, and Aquatic Park accounts are assessed capital and equity fees[12] in addition to the standard sewer rate.

8.0. Allocation of Expenses to Cost Components

Wastewater O&M and CIP expenses are allocated to two cost causation components: (1) billing/customer service, and (2) collection. Costs for Leisure World, Navy, and the sewer charges for Aquatic Park are also listed as cost components in Table 8-1 and Table 8-2. While O&M Costs are split between billing/customer service and collection, Capital Costs are only allocated to collection (Table 8-2).

Table 8-1: O&M Cost Allocation

Functions	FY 2021 Budget	Collection	Billing/ Cust Serv	Leisure World	Navy	Aquatic Park (SSEC & SCEC)*	Total
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
General (Supplies, Vehicles, Utilities)	$341,761	75.3%	0.0%	0.1%	0.6%	24.0%	100.0%
Personnel (Labor, Benefits)	$1,205,409	60.3%	15.0%	0.1%	0.6%	24.0%	100.0%

Table 8-2: Capital Cost Allocation

Functions	FY 2021 Budget	Collection	Billing/ Cust Serv	Leisure World	Navy	Aquatic Park (SSEC & SCEC)*	Total
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Collection	$16,608,385	98.7%	0.0%	0.7%	0.6%	0.0%	100.0%

**SSEC=Sewer Service Equity Charge; SCEC=Sewer Capital Equity Charge*

8.1. Revenue Requirement Determination

Table 8-3 shows the revenue requirement calculation for the wastewater enterprise. The total revenue required from rates is shown in Line 20, Column D. The total in Line 20, Column B is the O&M revenue requirement that is allocated to the cost components using the percentages derived in Table 8-1. Similarly, the capital revenue requirement in Line 20, Column C is allocated to the cost components using the percentages derived in Table 8-2.

Raftelis calculated the revenue requirement using projected FYE 2021 expenses, which includes O&M expenses, rate-funded capital, and existing debt, as shown in Lines 2-7. To arrive at the rate revenue

[12] "Sewer Rate Adjustment Report", City of Seal Beach, October 2005.

requirement in Line 20, revenue offsets from other (non-rate) revenues (Line 13) and an adjustment for cash balances (Line 18) are subtracted from the revenue requirement in Line 8.

Table 8-3: Wastewater Revenue Requirement

Line No.	FY 2021 (A)	Operating (B)	Capital (C)	Total (D)
1	**Revenue Requirement**			
2	General	$334,500	$0	$334,500
3	Personnel	$1,170,300	$0	$1,170,300
4	Rate Funded Capital	$0	$1,320,000	$1,320,000
5	2011 Sewer Bond	$0	$266,080	$266,080
6	State Clean Water Revolving Loan #1	$0	$169,780	$169,780
7	State Clean Water Revolving Loan #2	$0	$106,722	$106,722
8	**Total Revenue Requirement**	**$1,504,800**	**$1,862,582**	**$3,367,382**
9				
10	**Revenue Offsets**			
11	Miscellaneous Revenues	$27,000	$0	$27,000
12	Interest	$65,213	$0	$65,213
13	**Total Revenue Offsets**	**$92,213**	**$0**	**$92,213**
14				
15	**Adjustments**			
16	Adjustment for Cash Balance	$524,019	$0	$524,019
17	Adjustment for Mid-Year Increase	$598,076	$0	$598,076
18	**Total Adjustments**	**$1,122,095**	**$0**	**$1,122,095**
19				
20	**Total Revenue Required from Rates**	**$290,492**	**$1,862,582**	**$2,153,074**

8.2. Allocation of Costs to Cost Components

The total revenue requirement in Table 8-3 can now be allocated to the cost causation components. Table 8-4, Line 3 represents this allocation. Column G (Lines 1-3) represent the operating, capital, and total revenue requirements in Line 20 of Table 8-3.

Table 8-4: Allocation of Costs to Cost Components

Line No.	Cost of Service Allocation	Collection / Flow	Billing/ Customer Service	Leisure World	Navy	Aquatic Park (SSEC & SCEC)*	Total
	(A)	(B)	(C)	(D)	(E)	(F)	(G)
1	Operating Expenses	$184,736	$33,949	$363	$1,859	$69,585	$290,492
2	Capital Expenses	$1,838,952	$0	$12,818	$10,812	$0	$1,862,582
3	**Subtotal**	**$2,023,688**	**$33,949**	**$13,181**	**$12,671**	**$69,585**	**$2,153,074**
4	**Units of Service**	**506,392**	**27,768**	**12**	**51,835**	**NA**	**NA**
5	**Units**	hcf	bills per year	months	hcf	**NA**	**NA**
6							
7	**Unit Rate**	**$4.00**	**$1.22**	**$1,098**	**$0.24**	**$13,917**	**NA**
8		$/hcf	per bi-monthly billing period	monthly	$/hcf	per account annually	

**SSEC=Sewer Service Equity Charge; SCEC=Sewer Capital Equity Charge*

8.3. Unit Costs Derivation

Table 8-4, Line 4 lists the units of service for each cost causation component. Line 5 lists the units of measure for Line 4. The unit rate in Line 7 is calculated by dividing Line 3 by Line 4.

8.4. Distribution of Cost Components to Customer Classes

The goal of a cost-of-service analysis is to proportionately distribute cost causation components to each user class. Since individual sewer flow meters are uncommon, sewer flow must be estimated using winter water use which is expressed as a return to sewer factor (Table 8-5). Sewer use is calculated by annualizing the billing period with the lowest water use (i.e., March-April). Table 8-5 shows the Return to Sewer factor for each customer class. For example, we found that MFR's water use does not vary significantly throughout the year, implying minimal outdoor water use and thus the 100% RTS factor. We found that the City's water use drops by half in the winter, thus the 50% Return to Sewer factor. Leisure World and Navy rates are discussed in Section 9.

Table 8-5: Estimated Sewer Flow and Meter Count

Line No.	Customer Class	Number of Meters	Return to Sewer Factor	Estimated Sewer Flow (hcf)
	(A)	(B)	(C)	(D)
1	SFR	4,074	70%	286,368
2	MFR	260	100%	67,152
3	Commercial	267	90%	142,484
4	City	32	50%	10,388

The values for collection/flow in Table 8-6 (Column B) are calculated by multiplying estimated sewer flow (Table 8-5, Column C) and the unit rate for collection/flow (Table 8-4, Line 7). The billing/customer service cost (Table 8-6, Column C) is derived by multiplying the number of meters (Table 8-5, Column D) by the billing/customer service unit rate (Table 8-4, Line 7) and the number of bills per year. The small difference

between the total cost to serve each class (Column G, Line 8 in Table 8-6) and the total revenue requirement (Column D, Line 20, Table 8-3) is due to rounding.

Table 8-6: Derivation of Cost to Serve Each Class

Line No.	Customer Class	Collection / Flow	Billing/ Customer Service	Leisure World	Navy	Aquatic Park SSEC & SCEC	Total Cost to Serve Each Class
	(A)	(B)	(C)	(D)	(E)	(F)	(G)
1	SFR	$1,144,408	$29,885	NA	NA	NA	$1,174,293
2	MFR	$268,359	$1,907	NA	NA	NA	$270,266
3	Commercial	$569,408	$1,959	NA	NA	NA	$571,367
4	City	$41,513	$235	NA	NA	NA	$41,748
5	Leisure World	NA	NA	$13,181	NA	NA	$13,181
6	Navy	NA	$7.34	NA	$12,671	NA	$12,678
7	Aquatic Park*	NA	NA	NA	NA	$69,585	$69,585
8	**Total**	**$2,023,688**	**$33,993**	**$13,181**	**$12,671**	**$69,585**	**$2,153,118**

9. Wastewater Rate Structure Proposed Revisions

The current wastewater rate structure is the sum of two components; 1) 22% of the sum of the water service and capital charges, plus 2) a sewer capital charge. The sewer capital charge is assessed by meter size as shown in Table 9-1. The Navy is assessed a charge of $0.07 per hcf (or $97.91 per million gallons). Leisure World is currently not charged for sewer service.

Table 9-1: Current Sewer Capital Charge

Residential Capital Charge	
5/8"	$43.32
3/4"	$43.32
1"	$59.88
1 1/2"	$110.26
2"	$173.46
3"	$1,228.60
4"	$2,055.54
Commerical and City Capital Charge	
5/8"	$47.26
3/4"	$47.26
1"	$102.38
1 1/2"	$133.88
2"	$535.54
3"	$1,480.62
4"	$2,669.84
6"	$3,772.42
8"	$7,875.62
10"	$7,875.62
Aquatic Park Equity Charges*	
Service Equity Charge	$1,322
Capital Equity Charge	$998

**Aquatic Park Equity Charges are presented per account.*

9.0. Proposed Rate Structure Changes

Raftelis worked with City staff to refine the proposed rate structures.

- Residential (SFR and MFR), Commercial, City:
  - Raftelis recommends removing the complex sewer charge, and instead calculating rates based on the estimated flow from each class.
- SFR:
  - Raftelis recommends a fixed charge per dwelling unit. Since the City provides sewer collection only, and not treatment, a fixed charge per SFR is equitable.

- MFR: Raftelis recommends creating a multi-family residential class.
- Leisure World will now be assessed a sewer charge.
- Navy will be assessed a sewer charge based on capital and O&M costs associated with the collection main that runs along Seal Beach Boulevard and transmits sewage to the OCSD.

10. Rate Design and Derivation

10.0. Proposed Rate Structure

The proposed sewer rates are presented below in Table 10-1. This proposed sewer rate structure is more equitable as it charges in proportion to estimated sewer flow rather than meter size. The rate also poses less of an administrative burden by removing the complex 22% of water fee service charge currently imposed on customers.

Leisure World currently does not pay sewer charges even though it discharges sewage through a City-owned pipe connected to the Orange County Sanitation District (OCSD). Under the proposed rate structure, Leisure World is assessed a monthly sewer charges based on its proportionate share of wastewater O&M and capital costs (see Appendix C). The proposed naval rate is based on the Navy's portion of O&M and capital costs for the portion of the sewer collection system it uses. The cost, for this portion of the sewer system, is also prorated based on the Navy's proportion of sewer flow relative to total customer flow (see Appendix D).

Table 10-1: Proposed Sewer Rates

Customer Class	Billing Frequency	Flat Charge	Billing/Customer Service Charge (per account)	Volumetric Rate ($/hcf)
Single Family	Bi-monthly	$48.04	NA	NA
Multi-family	Bi-monthly	NA	$1.22	$4.00
Commercial	Bi-monthly	NA	$1.22	$4.00
City	Bi-monthly	NA	$1.22	$4.00
Leisure World	Monthly	$1,098.42	$0.61	NA
Navy	Monthly	NA	$0.61	$0.24

Note that most customer classes (SFR, MFR, Commercial, and City) are billed bi-monthly, whereas Leisure World and Navy are billed monthly. The proposed Leisure World sewer rate is based on its proportionate share of O&M and capital costs. The proposed Navy volumetric rate is also based on its proportionate share of O&M and capital costs. In addition, naval accounts are charged the same customer service fee as the other customer classes.

10.1. Proposed Five-Year Rates

Table 10-2 through Table 10-4 present the five-year sewer rates by customer class. SFR and Leisure World are both assessed a flat charge per account, with the former charged bi-monthly and the latter monthly (Table 10-3).

Table 10-2: Proposed Five-Year Sewer Flat Charges ($/account)

Customer Class	Billing Frequency	May 2021	January 2022	January 2023	January 2024	January 2025
Single Family	Bi-monthly	$48.04	$48.04	$48.04	$48.04	$48.04
Leisure World	Monthly	$1,099.03	$1,099.03	$1,099.03	$1,099.03	$1,099.03

Table 10-3 shows the Billing/Customer Service Charge per account for the applicable customer classes (MFR, Commercial, City, and Navy). Note that Navy is charged monthly, thus the charge is 50% of the charge to all other customer classes in the table.

Table 10-3: Proposed Five-Year Sewer Billing/Customer Service Charges ($/account)

Customer Class	May 2021	January	January	January	January
Multi-family	$1.22	$1.22	$1.22	$1.22	$1.22
Commercial	$1.22	$1.22	$1.22	$1.22	$1.22
City	$1.22	$1.22	$1.22	$1.22	$1.22
Leisure World*	$0.61	$0.61	$0.61	$0.61	$0.61
Navy*	$0.61	$0.61	$0.61	$0.61	$0.61

**Billed monthly. Leisure World fixed charge included in Table 10-2.*

Table 10-4 shows the volumetric or flow rate assessed per hcf of flow. Naval accounts have a unique rate based on their proportionate share of O&M and capital costs.

Table 10-4: Proposed Five-Year Sewer Volumetric Rate ($/hcf)

Customer Class	May 2021	January 2022	January 2023	January 2024	January 2025
Multi-family	$4.00	$4.00	$4.00	$4.00	$4.00
Commercial	$4.00	$4.00	$4.00	$4.00	$4.00
City	$4.00	$4.00	$4.00	$4.00	$4.00
Navy*	$0.24	$0.24	$0.24	$0.24	$0.24

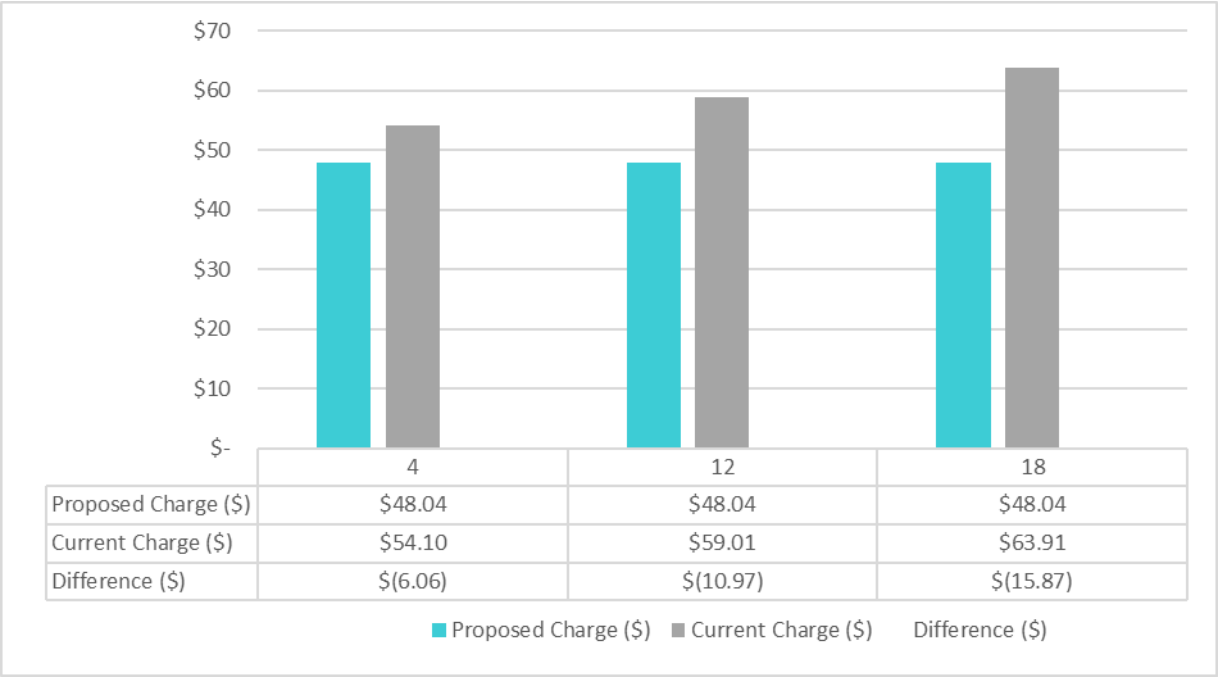
**Billed monthly*

11. Wastewater Bill Impacts

11.0. Single-Family Residential (SFR)

The SFR wastewater bill impacts for the most prevalent meters (i.e., ¾") are presented in Figure 11-1, with the median use graphed in the middle.

Figure 11-1: Wastewater Bill Impacts SFR, 3/4"

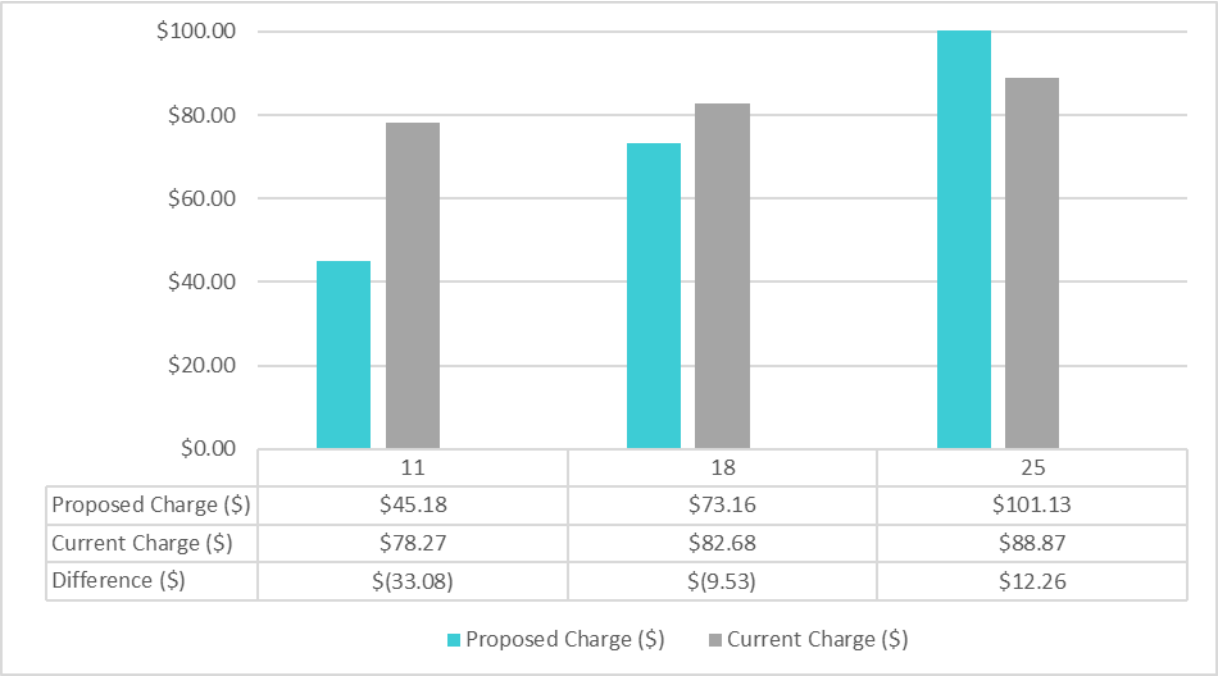


	4	12	18
Proposed Charge ($)	$48.04	$48.04	$48.04
Current Charge ($)	$54.10	$59.01	$63.91
Difference ($)	$(6.06)	$(10.97)	$(15.87)

11.1. Multi-Family Residential (MFR)

The MFR wastewater bill impacts for the most prevalent meters (i.e., 1") are presented in Figure 11-2, with the median use graphed in the middle.

Figure 11-2: Wastewater Bill Impacts MFR, 1"

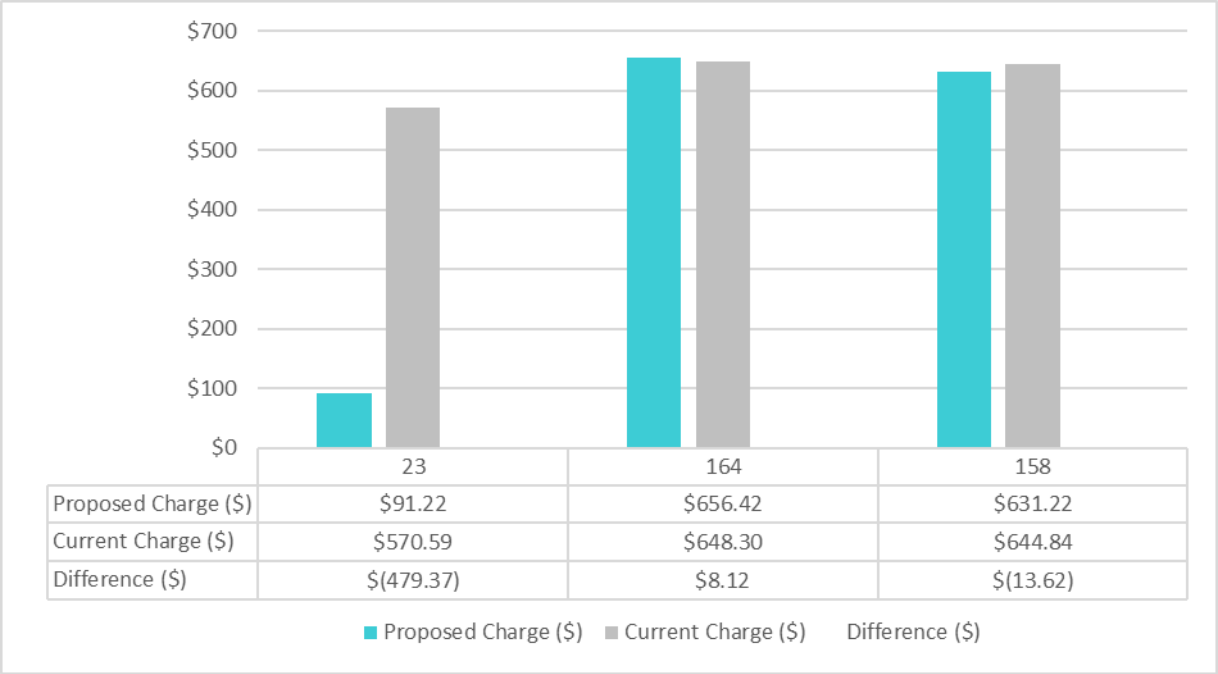


	11	18	25
Proposed Charge ($)	$45.18	$73.16	$101.13
Current Charge ($)	$78.27	$82.68	$88.87
Difference ($)	$(33.08)	$(9.53)	$12.26

11.2. Commercial

The Commercial wastewater bill impacts for the most prevalent meters (i.e., 2") are presented in Figure 11-3, with the median use graphed in the middle.

Figure 11-3: Wastewater Bill Impacts Commercial, 2"

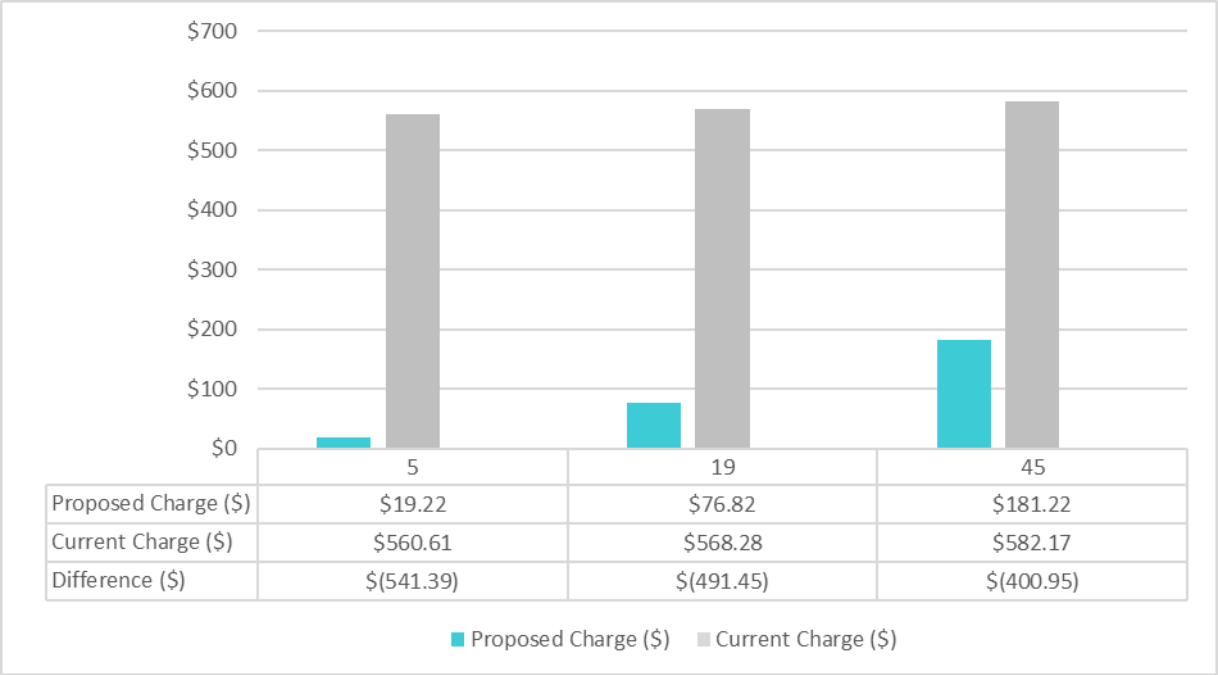


	23	164	158
Proposed Charge ($)	$91.22	$656.42	$631.22
Current Charge ($)	$570.59	$648.30	$644.84
Difference ($)	$(479.37)	$8.12	$(13.62)

11.3. City

City wastewater bill impacts for the most prevalent meters (i.e., 2") are presented in Figure 11-4, with the median use graphed in the middle.

Figure 11-4: Wastewater Bill Impacts City, 2"



	5	19	45
Proposed Charge ($)	$19.22	$76.82	$181.22
Current Charge ($)	$560.61	$568.28	$582.17
Difference ($)	$(541.39)	$(491.45)	$(400.95)

APPENDIX A:

Metropolitan Water District of Southern California Rate Resolution

Appendix A

Rates & Charges Effective January 1st	Current 2020	Proposed 2021	% Change	Proposed 2022	% Change
Tier 1 Supply Rate ($/AF)	$208	$243	17%	$243	0%
Tier 2 Supply Rate ($/AF)	$295	$285	(3%)	$285	0%
System Access Rate ($/AF)	$346	$373	8%	$389	4%
Water Stewardship Rate ($/AF)*	$65	-	(100%)	-	
System Power Rate ($/AF)	$136	$161	18%	$167	4%
Full Service Untreated Volumetric Cost ($/AF)					
Tier 1	$755	$777	3%	$799	3%
Tier 2	$842	$819	(3%)	$841	3%
Treatment Surcharge ($/AF)	$323	$327	1%	$344	5%
Full Service Treated Volumetric Cost ($/AF)					
Tier 1	$1,078	$1,104	2%	$1,143	4%
Tier 2	$1,165	$1,146	(2%)	$1,185	3%
Readiness-to-Serve Charge ($M)	$136	$130	(4%)	$140	8%
Capacity Charge ($/cfs)	$8,800	$10,700	22%	$12,200	14%
Overall Rate Increase			3.0%		4.0%

Source: Resolution of the Board of Directors of the Metropolitan Water District of Southern California, Fixing and Adopting Water Rates to be Effective January 1, 2021 and 2022, MWD Resolution 9265.

http://www.mwdh2o.com/PDF_Who_We_Are/Resolution%209265%20%E2%80%93%20Fixing%20and%20Adopting%20Water%20Rates%20to%20Be%20Effective%20January%201,%202021%20and%202022.pdf

APPENDIX B:

Water System Functionalized O&M Costs

Appendix B

O&M Costs were allocated to functional categories by percentages in conjunction with City staff.

Account No.	Account Description	Supply	Treatment	Transmission/ Distribution	Billing/Customer	Meter Service	Gen & Admin	Total
017-900-40001	Full-time Salaries	20%	7%	41%	25%	7%		100%
017-900-40003	Over-time	33%	7%	40%	0%	20%		100%
017-900-40004	Part-time	24%		71%	0%	5%		100%
017-900-40007	Tuition Reimbursement	0%		0%	0%		100%	100%
017-900-40002	Over-time PT	45%		50%	0%	5%		100%
017-900-40008	Auto Allowance Engineering	0%		0%	0%		100%	100%
017-900-40009	Cell Phone Allowance	0%		0%	0%		100%	100%
017-900-40010	Deferred Comp - Cafeteria	20%	7%	41%	25%	7%		100%
017-900-40011	Deferred Comp	20%	7%	41%	25%	7%		100%
017-900-40012	Pers Retirement	24%		71%	0%	5%		100%
017-900-40013	PARS Retirement	20%	7%	41%	25%	7%		100%
017-900-40014	Medical Insurance	20%	7%	41%	25%	7%		100%
017-900-40015	AFLAC Cafeteria	20%	7%	41%	25%	7%		100%
017-900-40017	Medicare Insurance	20%	7%	41%	25%	7%		100%
017-900-40018	Life Insurance & Disability	20%	7%	41%	25%	7%		100%
017-900-40019	FICA	20%	7%	41%	25%	7%		100%
017-900-40022	Flex Spending	0%		100%	0%			100%
017-900-40023	Cafeteria - Taxable	20%	7%	41%	25%	7%		100%
017-900-40026	Comp time Buy/Payout	0%		55%	40%	5%		100%
017-900-40027	Vacation Buy/Payout	20%	7%	41%	25%	7%		100%
017-900-40028	Sick Payout	20%	7%	41%	25%	7%		100%
017-900-40032	Health and Wellness Fitness	20%	7%	41%	25%	7%		100%
017-900-40033	Medical Waiver	20%	7%	41%	25%	7%		100%
017-900-40034	Retiree Health Savings	43%	7%	45%	0%	5%		100%
017-900-40100	Office Supplies						100%	100%
017-900-40300	Memberships and Dues						100%	100%
017-900-40400	Trainings & Meetings						100%	100%
017-900-40700	Equipment/Materials	15%	7%	65%	3%	10%		100%
017-900-40800	Special Departmental	43%	7%	50%	0%			100%
017-900-40900	Depreciation	50%		50%	0%			100%
017-900-41000	Telephone				0%		100%	100%
017-900-41010	Gas						100%	100%
017-900-41020	Electricity	60%	5%	35%	0%			100%
017-900-44000	Contract Professional	28%	7%	60%	0%	5%		100%
017-900-44050	Water Overhead						100%	100%
017-900-45000	Water Purchases	100%		0%	0%			100%

The percentages in the previous table were then applied to the O&M expenses to arrive at the functionalized costs in Table 3-3.

Account Description	Supply	Treatment	Transmission/ Distribution	Billing/Customer	Meter Service	General & Admin	Total
Full-time Salaries	$206,577	$72,302	$423,482	$258,221	$72,302	$0	$1,032,884
Over-time	$23,793	$5,047	$28,840	$0	$14,420	$0	$72,100
Part-time	$18,688	$0	$55,286	$0	$3,893	$0	$77,868
Tuition Reimbursement	$0	$0	$0	$0	$0	$4,120	$4,120
Over-time PT	$1,391	$0	$1,545	$0	$155	$0	$3,090
Auto Allowance Engineering	$0	$0	$0	$0	$0	$927	$927
Cell Phone Allowance	$0	$0	$0	$0	$0	$927	$927
Deferred Comp - Cafeteria	$0	$0	$0	$0	$0	$0	$0
Deferred Comp	$4,038	$1,413	$8,277	$5,047	$1,413	$0	$20,188
Pers Retirement	$52,159	$0	$154,304	$0	$10,867	$0	$217,330
PARS Retirement	$206	$72	$422	$258	$72	$0	$1,030
Medical Insurance	$28,572	$10,000	$58,573	$35,715	$10,000	$0	$142,861
AFLAC Cafeteria	$124	$43	$253	$155	$43	$0	$618
Medicare Insurance	$3,564	$1,247	$7,306	$4,455	$1,247	$0	$17,819
Life Insurance & Disability	$1,833	$642	$3,758	$2,292	$642	$0	$9,167
FICA	$0	$0	$0	$0	$0	$0	$0
Flex Spending	$0	$0	$103	$0	$0	$0	$103
Cafeteria - Taxable	$2,225	$779	$4,561	$2,781	$779	$0	$11,124
Comp time Buy/Payout	$0	$0	$0	$0	$0	$0	$0
Vacation Buy/Payout	$1,277	$447	$2,618	$1,597	$447	$0	$6,386
Sick Payout	$0	$0	$0	$0	$0	$0	$0
Health and Wellness Fitness	$165	$58	$338	$206	$58	$0	$824
Medical Waiver	$680	$238	$1,394	$850	$238	$0	$3,399
Retiree Health Savings	$0	$0	$0	$0	$0	$0	$0
Office Supplies	$0	$0	$0	$0	$0	$32,695	$32,695
Memberships and Dues	$0	$0	$0	$0	$0	$10,626	$10,626
Trainings & Meetings	$0	$0	$0	$0	$0	$2,759	$2,759
Equipment/Materials	$19,923	$9,298	$86,334	$3,985	$13,282	$0	$132,822
Special Departmental	$0	$0	$0	$0	$0	$0	$0
Depreciation	$0	$0	$0	$0	$0	$0	$0
Telephone	$0	$0	$0	$0	$0	$16,347	$16,347
Gas	$0	$0	$0	$0	$0	$5,109	$5,109
Electricity	$91,954	$7,663	$53,640	$0	$0	$0	$153,256
Contract Professional	$102,330	$25,583	$219,279	$0	$18,273	$0	$365,464
Water Overhead	$0	$0	$0	$0	$0	$331,544	$331,544
City of Huntington Beach	$20,128						$20,128
Water Purchases	$2,610,060	$0	$0	$0	$0	$0	$2,610,060
Total O&M Expenses	**$3,189,685**	**$134,831**	**$1,110,314**	**$315,560**	**$148,131**	**$405,053**	**$5,303,573**

APPENDIX C:

Leisure World Wastewater Rate Estimate

Appendix C

Note that these calculations are based on approximate values based on best available data at the time of analysis.

Line No.	Capital Cost Derivation	
1	Capital Cost for LW Pipeline*	$1,030,000
2	Leisure World Sewer Flow through Pipeline*	95%
3	Leisure World Portion of Capital Costs (Line 1 x Line 2)	$978,500
4	Useful Life of Pipeline (years)	80
5	**Leisure World Yearly Capital Costs**	**$12,231**

Line No.	O&M Cost Derivation	
1	Annual O&M Cost of LW Pipeline*	$1,000
2	Leisure World Sewer Flow through Pipeline*	95%
3	**Leisure World Portion of Capital Costs (Line 1 x Line 2)**	**$950**

Line No.	Final Monthly Rate Derivation	
1	LW O&M in proportion to Sewer Flow	$950.00
2	Yearly Capital	$12,231.25
3	**Total**	**$13,181.25**
4	Monthly Flat Charge (Line 3 ÷ 12)	$1,098

**Estimated by City Staff*

APPENDIX D:

Navy Wastewater Rate Estimate

Appendix D

Note that these calculations are based on approximate values based on best available data at the time of analysis.

Line No.	Portion of Navel Pipe Relative to System	Value	Source
1	Total Length of Sewer Collection System	195,360	Per CAFR
2	Length of the 16" force main from P.S. 35	4,224	City map measurement 0.8 miles
3	Length of 24" gravity sewer to OCSD P.S.	6,336	map measurement 1.2 miles
4	**Total Sewer Length to OCSD P.S. (feet)**	**10,560**	
5	Portion of Total Sewer Collection (line 5 / line 1)	5%	

Line No.	Portion of Navel Flow Relative to System	Value	Source
6	Navy Flow (MGD)	0.11	City billing records
7	Annual Navy Flow (HCF)	51,835	City billing records
8	Total Flow to OCSD Seal Beach P.S. (MGD)	0.70	Table 5-1 Sewer Master Plan
9	Navy's Portion of Flow to Seal Beach P.S. (line 6/ line 7)	15%	

Line No.	Final Monthly Rate Derivation		Source
10	Revenue Requirement for O&M of the Collection System	$184,736	FY 2021 Revenue Requirement
11	Revenue Requirement for Capital of the Collection System	$1,320,000	FY 2021 Revenue Requirement
12	Navy O&M Cost (Line 9 x Line 5 x Line 8)	$1,513	
13	Navy Capital Cost (Line 10 x Line 5 x Line 8)	$10,812	
14	**Total Navy Charge**	**$12,325**	
15	Monthly Navy Rate per HCF (Line 14 ÷ Line 7)	$0.24	