City of Manhattan Beach

Water Cost of Service and Rate Design Study

Final Report / May 5, 2022

RAFTELIS

RAFTELIS

May 5, 2022

Mr. Erick Lee
Public Works Director
City of Manhattan Beach
1400 Highland Ave.
Manhattan Beach, CA 90266

Subject: Water Cost of Service and Rate Design Study

Dear Mr. Lee,

Raftelis is pleased to provide this Water Cost of Service and Rate Study Report to the City of Manhattan Beach. The study's purpose was to develop a five-year proposed water rate schedule for the City for Fiscal Year (FY) 2023 through FY 2027 that is fair and equitable.

The study's major goals are to:

- Develop a five-year financial plan to ensure financial sufficiency, meet operating costs, fund the long-term Capital Improvement Plan (CIP), and maintain prudent reserves.
- Conduct a cost-of-service analysis to ensure a strong nexus between proposed water rates and the cost to provide service to customers.

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

Sincerely,

Steve Gagnon
Project Manager

445 S Figueroa St, Suite 1925
Los Angeles CA 90071
www.raftelis.com

Table of Contents

List of Tables

List of Figures

This page intentionally left blank to facilitate two-sided printing.

1. Executive Summary

1.1. Study Overview

Public water agencies in California typically conduct cost-of-service and rate studies to ensure there is a strong nexus between rates charged to customers and costs incurred to provide service, as required by Proposition 218. The City of Manhattan Beach (City) last conducted a cost-of-service study in 2008, which established proposed water rates through Fiscal Year (FY) 2014; rates have not been increased since then. The City engaged Raftelis in 2020 to conduct this Water Cost of Service and Rate Design Study to establish proposed water rates over a five-year period from FY 2023 to FY 2027. Note that the proposed rates presented in this study report may not be implemented until formally adopted by the City Council after a public hearing.

The major study objectives are to:

- Develop a five-year financial plan that sufficiently funds the City's operations and maintenance (O&M) expenses, debt service payments, and Capital Improvement Plan (CIP) while adequately funding reserves and meeting debt coverage requirements.
- Conduct a cost-of-service analysis that establishes a clear nexus between the cost to serve customers and the water rates charged to customers, per Proposition 218 requirements.
- Review the City's existing water rate structure and recommend changes as necessary.
- Develop a five-year schedule of water rates that is fair, equitable, and compliant with Proposition 218.

1.2. Proposed Financial Plan

Raftelis conducted a status quo cash flow analysis to evaluate whether existing water rates can adequately fund the City's various expenses over the five-year study period. With the assistance of City staff, annual revenues, O&M expenses, debt service payments, and capital expenditures were projected through FY 2027. Raftelis projects that with no rate increases over the five-year study period, the City will fully deplete its reserves by the end of FY 2025. This demonstrates a clear need for revenue adjustments (i.e. water rate revenue increases relative to the status quo). Raftelis worked with City staff to develop the following proposed revenue adjustments over the five-year study period (see Table 1-1). The proposed revenue adjustments were selected to provide financial sufficiency for the City while minimizing impacts to City customers. Additionally, the City has strategically reduced future capital spending during the next five years, when compared to its Water Master Plan, to catch up on a backlog of existing projects. This adjustment also minimizes bill impacts to customers.

Table 1-1: Proposed Revenue Adjustments

Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
Effective Date	Nov 1, 2022	Nov 1, 2023	Nov 1, 2024	Nov 1, 2025	Nov 1, 2026
Revenue Adjustment	9.5%	9.0%	8.5%	4.0%	4.0%

Key factors influencing the need for proposed revenue adjustments include:

- **Planned capital expenditures:** Projects scheduled over the next five years total about $23M.
- **Increases in purchased water costs from Metropolitan Water District (MWD):** The City's cost to purchase treated water is expected to increase substantially. This is partially mitigated by the City's plan to begin producing more local water.

Figure 1-1 shows the proposed capital financing plan over the study period. Capital expenditures significantly increase beginning in FY 2024, after a pause in FY 2023 for City staff to complete work on a backlog of current projects. The proposed financial plan assumes that all capital projects over the study period will be cash funded by rates and reserves.

Figure 1-1: Capital Financing

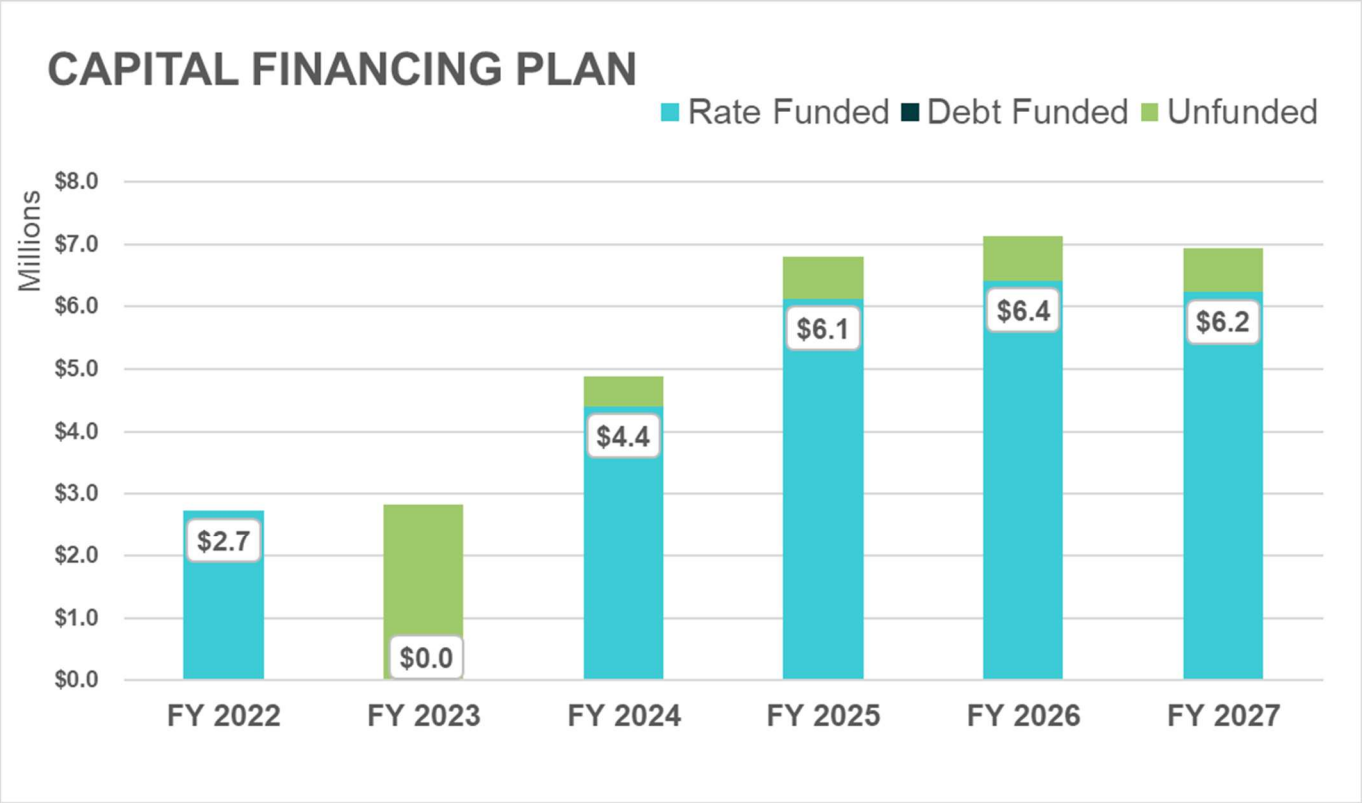


Figure 1-2 shows the status quo and proposed five-year financial plans. Status Quo revenue is shown by the dark blue line. The proposed revenue is shown by the light gray line. Although current rates result in adequate recovery of O&M expenses in most years, revenue adjustments are required to generate sufficient revenue to cover cash-funded capital projects over the study period. Even under the proposed financial plan, reserves are drawn down in some years to cover a portion of cash-funded capital projects.

Figure 1-2: Status Quo vs. Proposed Financial Plan

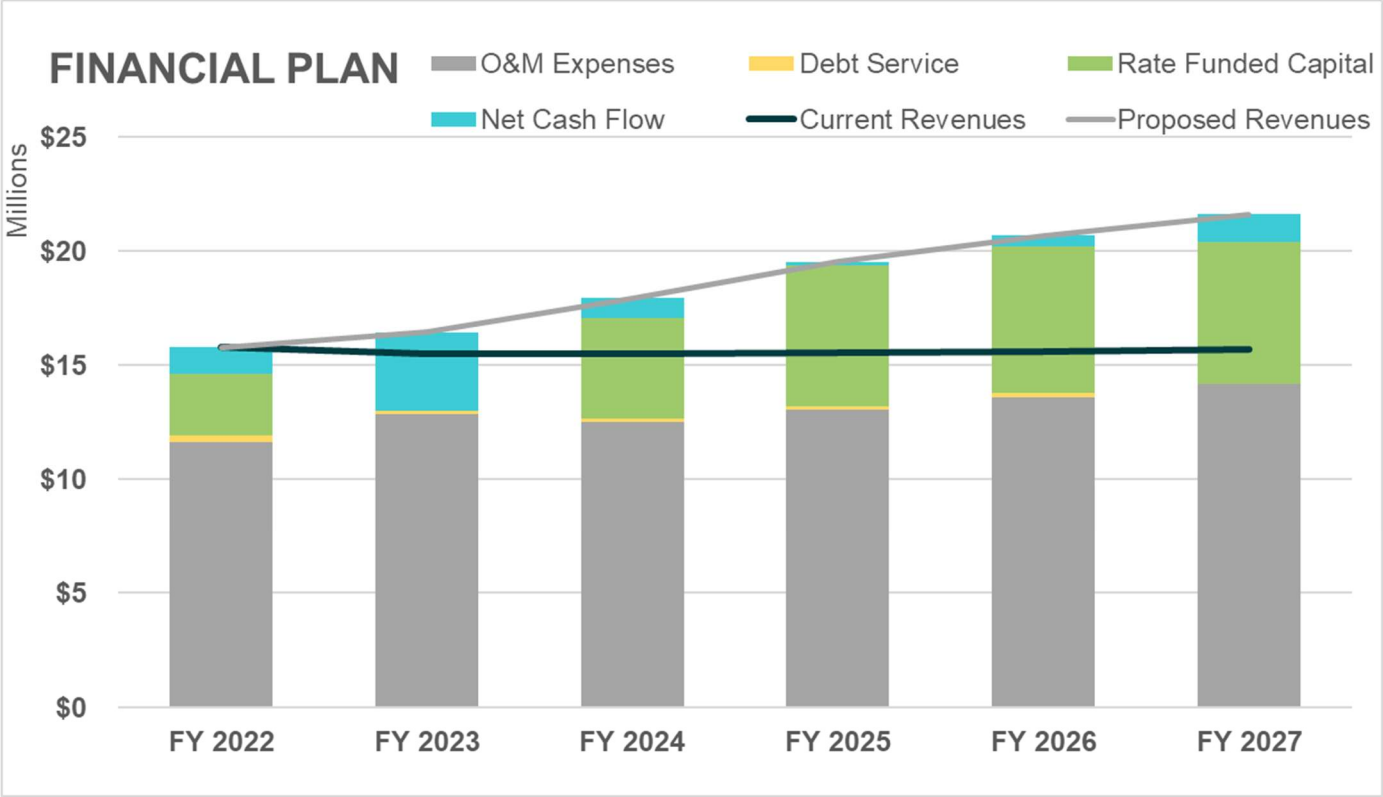
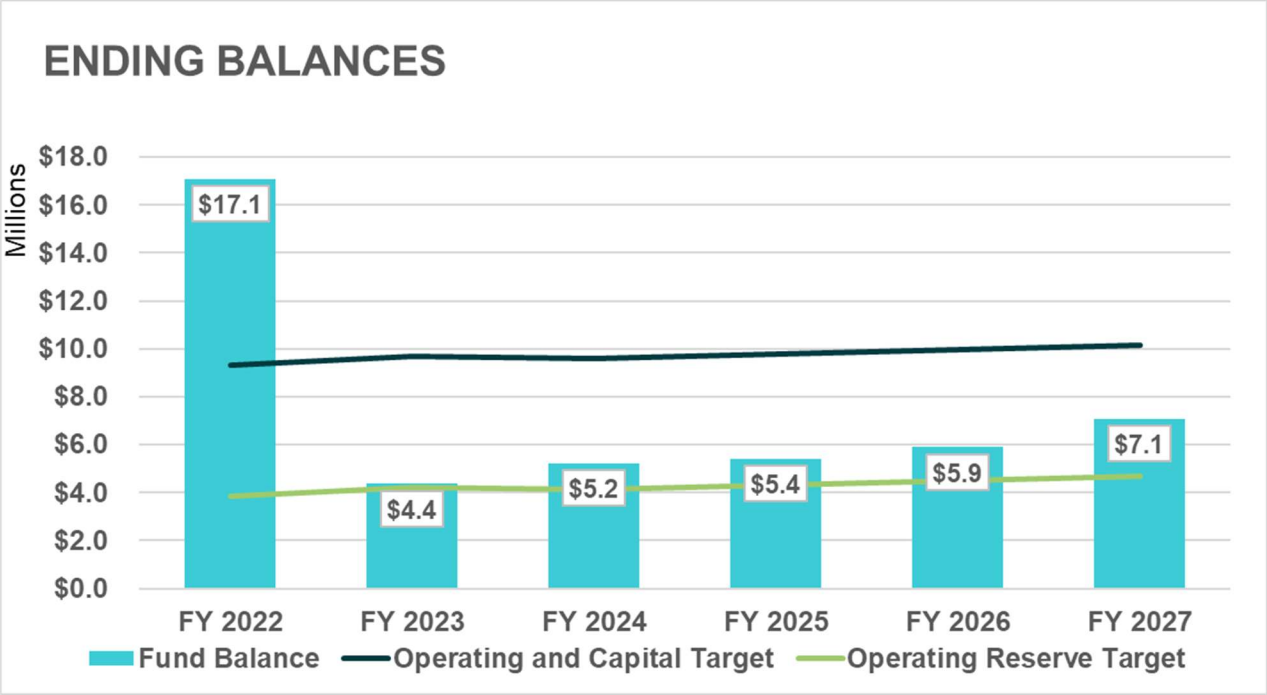


Figure 1-3 shows projected ending balances over the study period relative to the City's operating and total reserve targets under the proposed financial plan. Reserves are drawn down in FY 2023 as ongoing capital projects are completed and replenished over the subsequent years. Although not displayed on the chart below, the City is projected to meet its debt coverage requirement under the proposed financial plan in all years.

Figure 1-3: Proposed Financial Plan – Projected Ending Balances



1.3.Proposed Rate Structure Changes

The City's customers are currently subject to two primary charges:

1. **Fixed Meter Charges** are charged bi-monthly and vary by meter size.
2. **Volume Charges** per hundred cubic feet[1] (HCF) of water delivered that vary by meter size.

Elimination of Tiered Rate Structure

Customers with a 1" or smaller water meter are currently subject to a three-tier Volume charge rate structure; customers with larger meters pay a uniform water rate (a rate that does not vary with the volume of water used). It is common to use a uniform rate for commercial and institutional customers. Though tiered rates for single-family residential customers are very common in southern California, the project team decided to implement a uniform rate for each class for a few reasons:

3. The team evaluated tiered rates, and the rate differential between tiers was small; therefore, tiered rates would likely not provide a strong conservation message,
4. Manhattan Beach customers have relatively small irrigation needs,
5. Uniform rates are easier for customers to understand.

Rates by Customer Class

Different types of customers use water in different ways, which impact the sizing, operation, and maintenance of water facilities and therefore have a different cost impact on the water system. Establishing separate water rates for each class allows the City to recognize these differences and more fairly recover its costs.

[1] One HCF equals approximately 748 gallons.

1.4.Proposed Water Rates

Table 1-2 shows the proposed five-year water rate schedule through FY 2027. Proposed FY 2023 rates are calculated based on the results of the cost of service analysis. Overall, FY 2023 rates are designed to collect 9.5 percent more rate revenue than current FY 2022 rates in accordance with the proposed FY 2023 revenue adjustment. Proposed rates beginning in FY 2024 are calculated by simply increasing the prior year's proposed rates by the proposed annual revenue adjustments.

Table 1-2: Proposed Five-Year Water Rate Schedule

Description	Tiers	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
		Current	Nov 1, 2022	Nov 1, 2023	Nov 1, 2024	Nov 1, 2025	Nov 1, 2026
Bi-Monthly Fixed Charges							
5/8" or 3/4"		$40.46	$28.93	$31.54	$34.23	$35.60	$37.03
1"		$63.64	$40.62	$44.28	$48.05	$49.98	$51.98
1.5"		$101.48	$69.86	$76.15	$82.63	$85.94	$89.38
2"		$147.26	$104.95	$114.40	$124.13	$129.10	$134.27
3"		$296.30	$216.05	$235.50	$255.52	$265.75	$276.38
4"		$406.60	$379.79	$413.98	$449.17	$467.14	$485.83
6"		$787.98	$771.58	$841.03	$912.52	$949.03	$987.00
8"		$1,245.64	$1,414.82	$1,542.16	$1,673.25	$1,740.18	$1,809.79
10"		$1,779.60	$2,233.50	$2,434.52	$2,641.46	$2,747.12	$2,857.01
Volume Rates							
1" and Smaller, All Classes							
Tier 1	1-14	$4.28					
Tier 2	15-48	$5.86					
Tier 3	>48	$9.38					
1 1/2" and Larger, All Classes	Uniform	$5.51					
Single Family Residential			$6.56	$7.16	$7.77	$8.09	$8.42
Multi-Family Residential			$6.53	$7.12	$7.73	$8.04	$8.37
Commercial			$6.54	$7.13	$7.74	$8.05	$8.38
City / LA County			$6.55	$7.14	$7.75	$8.06	$8.39
Schools			$6.66	$7.26	$7.88	$8.20	$8.53
Private Fire			$5.41	$5.90	$6.41	$6.67	$6.94
Bi-Monthly Private Fire Line Charges							
5/8" or 3/4"			$13.19	$14.38	$15.61	$16.24	$16.89
1"			$17.46	$19.04	$20.66	$21.49	$22.35
1.5"			$26.97	$29.40	$31.90	$33.18	$34.51
2"		$43.52	$37.76	$41.16	$44.66	$46.45	$48.31
3"		$61.82	$71.34	$77.77	$84.39	$87.77	$91.29
4"		$82.42	$121.92	$132.90	$144.20	$149.97	$155.97
6"		$139.62	$249.22	$271.65	$294.75	$306.54	$318.81
8"		$208.28	$443.52	$483.44	$524.54	$545.53	$567.36
10"		$288.36	$702.25	$765.46	$830.53	$863.76	$898.32

Many residential customers will see a bill increase due to the higher uniform volume charge compared to the current Tier 1 charge for the first 14 HCF per billing period; however, this is partially offset by the reduction in the fixed meter charge. Note that beyond FY 2023, estimated bi-monthly bill increases in each year simply equal the proposed annual revenue adjustment.

2. Introduction

2.1. Agency Overview

The City of Manhattan Beach (City) provides water service to a population of approximately 35,000 people through about 13,600 metered water connections within a service area of approximately 4 square miles in Los Angeles County. The City delivers potable water from the Metropolitan Water District of Southern California (MWD) through 114 miles of distribution pipeline. With the completion of the water treatment facility at Peck Reservoir, the City will expand its capacity to provide treated groundwater to customers at a lower cost than purchasing water from MWD.

2.2. Study Overview

Public water agencies in California typically perform a cost-of-service analysis to ensure that customers are appropriately charged for water service commensurate with the cost to provide service. The City last conducted a cost-of-service study in 2008, which established proposed rates over a five-year period through Fiscal Year (FY) 2014. The City has not raised rates since then. Over this period, the Consumer Price Index, an official measure of inflation, has increased by 21.9%. The City engaged Raftelis in 2020 to conduct this Water Cost of Service and Rate Design Study to establish proposed water rates for FY 2023 through FY 2027. Note that proposed rates cannot be implemented until formally adopted by the City Council after a public hearing. Proposition 218 requires that City customers must be mailed a public hearing notice detailing any proposed rate changes no fewer than 45 days before the public hearing.

Study Objectives

The major study objectives are to:

- Develop a five-year financial plan that sufficiently funds the City's operations and maintenance (O&M) expenses, debt service payments, and capital expenditures while adequately funding reserves and meeting debt coverage requirements.
- Conduct a cost of service analysis that establishes a clear nexus between the cost to serve customers and the water rates charged to customers, per Proposition 218 requirements.
- Review the City's existing water rate structure and recommend changes as necessary to ensure that proposed rates achieve financial sufficiency while furthering the City's policy goals of affordability and conservation.
- Develop a five-year schedule of water rates that are fair, equitable, and compliant with Proposition 218 requirements.

3. Legal Requirements and Rate Setting Methodology

3.1. Legal Requirements

California Constitution - Article XIII D, Section 6 (Proposition 218)

Proposition 218, reflected in the California Constitution as Article XIII D, was enacted in 1996 to ensure that rates and fees are reasonable and proportional to the cost of providing service. The principal requirements, as they relate to public water service, are as follows:

1. A property-related charge (such as water rates) imposed by a public agency on a parcel shall not exceed the costs required to provide the property-related service.
2. Revenues derived by the charge shall not be used for any purpose other than that for which the charge was imposed.
3. The amount of the charge imposed upon any parcel shall not exceed the proportional cost of service attributable to the parcel.
4. No charge may be imposed for a service unless that service is actually used or immediately available to the owner of the property.
5. A written notice of the proposed charge shall be mailed to both the customer of record and owner of record of each parcel at least 45 days prior to the public hearing, when the agency considers all written protests against the charge.

As stated in the American Water Works Association's (AWWA) *Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices - M1 Seventh Edition* (Manual M1), "water rates and charges should be recovered from classes of customers in proportion to the cost of serving those customers." Raftelis follows industry-standard rate-setting methodologies set forth by the AWWA Manual M1 to ensure this study meets Proposition 218 requirements and establishes rates that do not exceed the proportionate cost of providing water services on a parcel basis. The methodology in the Manual M1 is a nationally recognized industry rate-making standard that courts have recognized as consistent with Proposition 218.

California Constitution Article X, Section 2

California Constitution Article X, Section 2 mandates that water resources be put to beneficial use and that the waste or unreasonable use of water be prevented through conservation. Section 106 of the Water Code declares that the highest priority use of water is for domestic purposes, with irrigation secondary. Thus, the management of water resources is part of the property-related service provided by public water suppliers to ensure the resource is available over time.

3.2. Rate-Setting Methodology

This study was conducted using industry-standard principles outlined by the AWWA Manual M1. The process and approach Raftelis utilized in the study to determine water rates is informed by the City's policy objectives, the current water system and rates, and the legal requirements in California (namely, Proposition 218). The resulting

financial plan, cost of service analysis, and rate design process follows five key steps, outlined below, to determine proposed rates that fulfill the City's objectives, meet industry standards, and comply with relevant regulations.

1. **Financial Plan:** The first study step is to develop a multi-year financial plan that projects the City's revenues, expenses, capital project financing, annual debt service, and reserve funding. The financial plan is used to determine the revenue adjustment, which allows the City to recover adequate revenues to fund expenses and reserves.

2. **Revenue Requirement Determination:** After completing the financial plan, the rate-making process begins by determining the revenue requirement for the test year, also known as the rate-setting year. The test year for this study is FY 2023. The revenue requirement should sufficiently fund the City's operating costs, annual debt service (including coverage requirements), capital expenditures, and reserve funding as projected based on the annual budget estimates.

3. **Cost of Service Analysis:** The annual cost of providing water service, or the revenue requirement, is then distributed to customer classes and tiers commensurate with their use of and burden on the water system. A cost of service analysis involves the following steps:

    - Functionalize costs – the different components of the revenue requirement are categorized into functions such as supply, transmission, storage, customer service, etc.
    - Allocate to cost causation components – the functionalized costs are then allocated to cost causation components such as supply, base delivery, peaking, etc.
    - Develop unit costs – unit costs for each cost causation component are determined using units of service, such as total use, peaking units, equivalent meters, number of customers, etc., for each component.
    - Distribute cost components – the cost components are allocated to each customer class and tier using the unit costs in proportion to their demand and burden on the system.

    A cost of service analysis considers both the average water demand and peak demand. Peaking costs are incurred during periods of peak consumption, most often coinciding with summer water use. There are additional capacity-related costs associated with designing, constructing, operating, maintaining, and replacing facilities to meet peak demand. Patterns of use impose additional costs on a water utility and are used to determine the cost burden on peaking-related facilities.

4. **Rate Design**: After allocating the revenue requirement to each customer class, the project team designs and calculates rates. Rates do more than simply recover costs; within the legal framework and industry standards, properly designed rates should support and optimize the City's policy objectives. Rates also act as a public information tool in communicating these policy objectives to customers. This process also includes a rate impact analysis and sample customer bill impacts.

5. **Administrative Record Preparation and Rate Adoption:** The final step in a rate study is to develop the administrative record in conjunction with the rate adoption process. This report serves as the administrative record for this study. The administrative record documents the study results and presents the methodologies, rationale, justifications, and calculations used to determine the proposed rates. A thorough and methodological administrative record serves two important functions: maintaining defensibility in a stringent legal environment and communicating the rationale for revenue adjustments and proposed rates to customers and key stakeholders.

4. Key Inputs and Assumptions

Raftelis developed a water rate model in Microsoft Excel to project financial and rate calculations over a five-year study period through FY 2027. The City's fiscal year spans from July 1 through June 30. Projections in future years were generally made based on actual or estimated FY 2021 or FY 2022 data using key assumptions outlined below. All assumptions were discussed with and reviewed by City staff to ensure that the City's unique characteristics were incorporated. Note that most table values shown throughout this report are rounded to the last digit shown and may therefore not add precisely to the totals shown.

4.1. Current Water Rates

Table 4-1 shows the current adopted rate schedule developed during the prior rate study. Customers are currently subject to two primary charges: 1) bi-monthly Fixed Meter Charges and 2) Volume Charges per hundred cubic feet (HCF)[2] of water delivered. Fixed Meter Charges vary based on meter size. The volumetric structure depends on the meter size as well. Customers with a 1" or smaller meter are subject to a three-tier structure. The first 14 HCF used each month is charged at the lowest rate, the next 34 HCF at an intermediate rate, and additional use at the highest rate. All water used by customers with larger meter sizes is subject to a uniform Volume Charge as shown by the uniform rate at the bottom of the table.

Table 4-1: Current Water Rate Schedule

Description	Tiers	FY 2022 Current
Bi-Monthly Fixed Charges		
5/8" or 3/4"		$40.46
1"		$63.64
1.5"		$101.48
2"		$147.26
3"		$296.30
4"		$406.60
6"		$787.98
8"		$1,245.64
10"		$1,779.60
Volume Rates		
Tier 1	1-14	$4.28
Tier 2	15-48	$5.86
Tier 3	>48	$9.38
Uniform		$5.51

[2] One HCF equals approximately 748 gallons.

4.2. Financial Assumptions

Inflationary assumptions shown in **Table 4-2** were used to project O&M expenses beyond FY 2022. All inflationary factors were reviewed by City staff and are based on historical and anticipated cost increases. Over 96 percent of City revenues are generated by water rates. Other miscellaneous revenues (excluding interest earned on cash reserves) are forecasted to remain constant.

For O&M expenses, a general inflation rate of 3 percent is consistent with long-term changes in the Consumer Price Index (CPI), though recent inflation is above 3%. The inflationary factors shown below are used to project most O&M expenses over the study period. However, projections for imported water supply costs are based on historical wholesale water rate increases, as shown in detail below in **Table 5-6**.

Table 4-2: Inflationary Assumptions

Inflationary Categories	Annual Inflation
Expenses	
Gen & Admin	3.0%
Salary & Benefits	4.0%
Insurance	3.0%
Internal Cost Allocation	3.5%
Electricity	3.5%

Interest earnings on cash reserves are projected assuming a 1/2 percent annual interest rate.

4.3. Projected Service Connections

Customer account growth projections are necessary to estimate water demand and rate revenues over the study period. City staff provided Raftelis with the number of water meters and fire lines by connection size for FY 2020; based on discussions with staff, Raftelis assumed there would be zero customer growth from FY 2021 through FY 2027. **Table 4-3** shows the projected number of water meters by customer class and meter size in FY 2020 and each year of the study period.

Table 4-3: Projected Number of Water Meters Under Existing Rate Structure

Description	A	B	C	D	E	F
	SFR	MFR	Comm.	City/ County	Schools	Total
Meter Size						
5/8" or 3/4"	7,551	678	191	20	1	8,441
1"	3,599	412	132	27	1	4,171
1.5"	573	90	67	12	1	743
2"	7	18	128	43	3	199
3"	-	-	19	3	7	29
4"	2	-	3	2	2	9
6"	-	-	3	3	3	9
8"	-	-	1	-	1	2
10"	-	-	1	-	-	1
Subtotal	**11,732**	**1,198**	**545**	**110**	**19**	**13,604**

Table 4-4 shows the projected number of fire lines by connection size over the study period. The total number of fire lines is projected to remain constant over the study period.

Table 4-4: Projected Number of Fire Lines

Description	FY 2022 Projected
Private Fire Lines	
5/8" or 3/4"	2
1"	-
1.5"	-
2"	13
3"	2
4"	47
6"	26
8"	5
10"	2
Total	**97**

4.4. Projected Water Use and Supply

City staff provided Raftelis with total annual water use data by customer class for FY 2019 and FY 2020. Raftelis worked closely with City staff to develop water use projections for FY 2021 through FY 2027. Water demand projections depend on two key assumptions: account growth and water demand factor (i.e., water use per account). Beginning in FY 2021, annual water use was projected at the customer class level using an annual water demand growth rate to determine total annual water use. **Table 4-5** shows projected water use by customer class over the study period. The growth rate is forecasted at 0 percent for FY 2021 to FY 2023, meaning water use will remain constant at FY 2020 levels. Beginning in FY 2024, water demand is expected to increase at 1/2 percent per year.

Table 4-5: Projected Water Use Under Existing Rate Structure

Description	FY 2022 Projected	FY 2023 Projected	FY 2024 Projected	FY 2025 Projected	FY 2026 Projected	FY 2027 Projected
Single Family Residential						
Tier 1	754,918	754,918	758,693	762,486	768,205	773,966
Tier 2	499,202	499,202	501,698	504,207	507,988	511,798
Tier 3	23,212	23,212	23,328	23,445	23,621	23,798
Uniform	122,077	122,077	122,687	123,301	124,226	125,157
Subtotal	**1,399,409**	**1,399,409**	**1,406,406**	**1,413,438**	**1,424,039**	**1,434,719**
Multi Family						
Tier 1	74,195	74,195	74,566	74,939	75,501	76,067
Tier 2	42,196	42,196	42,407	42,619	42,939	43,261
Tier 3	2,471	2,471	2,483	2,496	2,514	2,533
Uniform	37,123	37,123	37,309	37,495	37,776	38,060
Subtotal	**155,985**	**155,985**	**156,765**	**157,549**	**158,730**	**159,921**
Commercial						
Tier 1	15,077	15,077	15,152	15,228	15,342	15,457
Tier 2	20,969	20,969	21,074	21,179	21,338	21,498
Tier 3	17,413	17,413	17,500	17,588	17,719	17,852
Uniform	339,970	339,970	341,127	342,289	344,042	345,808
Subtotal	**393,429**	**393,429**	**394,853**	**396,284**	**398,442**	**400,616**
City / County						
Tier 1	1,654	1,654	1,662	1,671	1,683	1,696
Tier 2	2,305	2,305	2,317	2,328	2,346	2,363
Tier 3	2,767	2,767	2,781	2,795	2,816	2,837
Uniform	38,781	38,781	38,975	39,170	39,464	39,760
Subtotal	**45,507**	**45,507**	**45,735**	**45,963**	**46,308**	**46,655**
Schools						
Tier 1	1	1	1	1	1	1
Tier 2	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-
Uniform	58,430	58,430	58,722	59,016	59,458	59,904
Subtotal	**58,431**	**58,431**	**58,723**	**59,017**	**59,459**	**59,905**
Private Fire Lines	10,383	10,383	10,435	10,487	10,566	10,645
Total (HCF)	**2,063,144**	**2,063,144**	**2,072,917**	**2,082,738**	**2,097,544**	**2,112,461**
Total (AF)	*4,736*	*4,736*	*4,759*	*4,781*	*4,815*	*4,850*

Raftelis calculated projected water purchase volumes from each water source based on direction from City Staff, as shown in **Table 4-6**. The City purchased 100 percent of its water from the MWD in recent years. However, the City has undertaken work to be able to provide treated groundwater to its residents, with plans to begin drawing water in FY 2022 and to provide approximately 25% of the City's water needs by FY 2024.

Table 4-6 shows the water supply mix projected to meet water demand over the study period. Total water use (from **Table 4-5**) is converted into acre-feet and adjusted to account for estimated water loss resulting from leaks in the water distribution system. City staff provided Raftelis with the anticipated amount of MWD water and groundwater available each year to meet the required water demand. Costs to purchase this water are forecasted in **Table 5-6.**

Table 4-6: Projected Water Supply Mix

Description	FY 2022 Projected	FY 2023 Projected	FY 2024 Projected	FY 2025 Projected	FY 2026 Projected	FY 2027 Projected
Required Water Supply						
Water Use	4,736	4,736	4,759	4,781	4,815	4,850
Water Loss Factor	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Total Water	**5,093**	**5,093**	**5,117**	**5,141**	**5,178**	**5,215**
Water Sources						
MWD	4,463	4,476	3,748	3,793	3,822	3,852
Groundwater	630	617	1,369	1,348	1,355	1,362
Total Water	**5,093**	**5,093**	**5,117**	**5,141**	**5,178**	**5,215**

5. Financial Plan

Section 5 details the development of a proposed five-year financial plan over the study period. The following subsections include estimates and projections of annual revenues, O&M expenses, debt service payments, capital expenditures, and reserve funding through FY 2027. The overall purpose of the financial plan is to determine the annual rate revenue needed to achieve sufficient cash flow, maintain adequate reserves, and meet debt coverage requirements.

5.1. Revenues From Current Rates

The City's revenues consist of rate revenues, interest earnings on cash reserves, and other miscellaneous revenues. The rate revenue projections shown below assume that current FY 2022 rates are effective throughout the study period and therefore represent estimated revenues in the absence of any rate increase. This status quo scenario provides a baseline from which Raftelis evaluates the need for revenue adjustments (i.e., rate increases).

Calculated Water Rate Revenues

Raftelis projected water rate revenues from Fixed Meter Charges and Volume Charges for FY 2022 through FY 2027 based on current FY 2022 water rates, the projected number of water meters/private fire lines, and projected annual water use.

Table 5-1 shows projected Fixed Meter Charge revenues under current rates over the study period. Fixed Meter Charge revenues are calculated by connection size/type in each year as follows based on current FY 2022 water rates (from **Table 4-1**), the projected number of water meters (from **Table 4-3**), and the projected number of fire lines (from **Table 4-4**):

Annual Fixed Meter Charge Revenue = [FY 2022 bi-monthly rate] × [Number of connections] × [6 Bills per year]

Table 5-1: Projected Fixed Meter Charge Revenues under Current Rates

Description	FY 2022 Projected	FY 2023 Projected	FY 2024 Projected	FY 2025 Projected	FY 2026 Projected	FY 2027 Projected
Customer Class						
Residential	$3,567,275	$3,567,275	$3,567,275	$3,567,275	$3,567,275	$3,567,275
Multi Family	$392,613	$392,613	$392,613	$392,613	$392,613	$392,613
Commercial	$324,093	$324,093	$324,093	$324,093	$324,093	$324,093
City / County	$84,861	$84,861	$84,861	$84,861	$84,861	$84,861
Schools	$42,865	$42,865	$42,865	$42,865	$42,865	$42,865
Private Fire	$58,868	$58,868	$58,868	$58,868	$58,868	$58,868
Total	**$4,470,575**	**$4,470,575**	**$4,470,575**	**$4,470,575**	**$4,470,575**	**$4,470,575**

Table 5-2 shows projected Volume Charge revenues under current rates over the study period. Volume Charge revenues are calculated by customer class in each year as follows based on current FY 2022 water rates (from **Table 4-1**) and projected water use (from **Table 4-5**):

Annual Volume Charge Revenue = [FY 2022 rate per HCF] × [Annual Water Use in HCF]

Table 5-2: Projected Volume Charge Revenues Under Current Rates

Description	FY 2022 Projected	FY 2023 Projected	FY 2024 Projected	FY 2025 Projected	FY 2026 Projected	FY 2027 Projected
Customer Class						
Residential	$7,046,746	$7,046,746	$7,081,979	$7,117,389	$7,170,770	$7,224,550
Multi Family	$792,549	$792,549	$796,512	$800,494	$806,498	$812,547
Commercial	$2,223,977	$2,223,977	$2,232,104	$2,240,273	$2,252,587	$2,264,993
City / County	$260,224	$260,224	$261,525	$262,833	$264,804	$266,790
Schools	$321,954	$321,954	$323,563	$325,181	$327,620	$330,077
Private Fire	$97,393	$97,393	$97,880	$98,369	$99,107	$99,850
Total	**$10,742,841**	**$10,742,841**	**$10,793,563**	**$10,844,539**	**$10,921,385**	**$10,998,808**

Other Revenues

Table 5-3 shows all other revenues. All FY 2022 other revenues are based on the City's FY 2022 budget. Additional revenues from FY 2023 through FY 2027 were projected by Raftelis. Interest revenue is estimated beginning in FY 2023 based on estimated fund balances and an assumed interest rate[3]. All other revenues are forecasted to remain constant.

Table 5-3: Projected Other Revenues

Description	FY 2022 Projected	FY 2023 Projected	FY 2024 Projected	FY 2025 Projected	FY 2026 Projected	FY 2027 Projected
Other Revenues						
Interest Earnings	$388,832	$85,424	$17,015	$8,998	($10,169)	($33,272)
Services	$192,000	$192,000	$192,000	$192,000	$192,000	$192,000
Miscellaneous	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000
Total	**$586,832**	**$283,424**	**$215,015**	**$206,998**	**$187,831**	**$164,728**

Table 5-4 shows a summary of projected revenues under current rates over the study period. This represents expected revenues in the absence of any rate increase over the study period. Note that rate revenues (i.e., Fixed Meter Charges and Volume Charges) constitute over 96 percent of the City's total revenue.

[3] Interest Earnings become negative due to the projected fund balance falling below zero under current rates.

Table 5-4: Summary of Projected Revenues Under Current Rates

Description	FY 2022 Projected	FY 2023 Projected	FY 2024 Projected	FY 2025 Projected	FY 2026 Projected	FY 2027 Projected
Revenue						
Fixed Charges	$4,470,575	$4,470,575	$4,470,575	$4,470,575	$4,470,575	$4,470,575
Commodity Charges	$10,742,841	$10,742,841	$10,793,563	$10,844,539	$10,921,385	$10,998,808
Misc. Other	$586,832	$283,424	$215,015	$206,998	$187,831	$164,728
Total	**$15,800,248**	**$15,496,841**	**$15,479,154**	**$15,522,113**	**$15,579,792**	**$15,634,111**

5.2. Operations and Maintenance Expenses

Table 5-5 shows O&M expenses by department over the study period. O&M expenses shown in FY 2022 are from the City's adopted FY 2022 budget. All other projections beyond FY 2022 were developed based on inflationary assumptions (from **Table 4-2**) and applying the impact of several known changes, including additional expenses (staff additions) and cost savings (directly conducting certain operations rather than contracting) as estimated by City staff.

Table 5-5: O&M Summary by Department

Description	FY 2022 Budget	FY 2023 Projected	FY 2024 Projected	FY 2025 Projected	FY 2026 Projected	FY 2027 Projected
O&M Department						
Water Administration	$1,989,596	$2,050,023	$2,112,289	$2,176,450	$2,242,563	$2,310,689
Water Source Of Supply	$6,784,247	$7,512,130	$7,002,610	$7,367,126	$7,738,055	$8,128,799
Water Pumping	$1,209,818	$1,249,417	$1,290,334	$1,332,613	$1,376,301	$1,421,445
Water Treatment	$154,515	$159,168	$163,962	$168,901	$173,988	$179,229
Water Maintenance	$1,514,606	$1,866,599	$1,932,414	$2,000,596	$2,071,232	$2,144,412
Total	**$11,652,782**	**$12,837,337**	**$12,501,609**	**$13,045,686**	**$13,602,139**	**$14,184,573**

Table 5-6 shows the detailed forecast of water purchase costs. The City is subject to several charges from MWD, including a fixed annual charge, a capacity charge based on the City's three-year peak use, and a volumetric rate based on the amount of water used. The City is also responsible for a groundwater replenishment fee applied to the amount of water extracted from its wells.

Table 5-6: Water Purchase Cost Detail

Description	FY 2023 Projected	FY 2024 Projected	FY 2025 Projected	FY 2026 Projected	FY 2027 Projected
Water Purchased	4,476	3,748	3,793	3,822	3,852
Water Produced	617	1,369	1,348	1,355	1,362
Purchased Water Rates					
RTS Charge per Year	$360,313	$396,031	$435,289	$478,438	$525,865
Capacity Cost per Year	$82,796	$85,897	$89,115	$92,453	$95,916
Volume Charge per AF					
Jul - Dec	$1,497	$1,555	$1,615	$1,677	$1,742
Jan - Jun	$1,555	$1,615	$1,677	$1,742	$1,810
Groundwater Replenishment	$413	$433	$454	$476	$499
Water Costs					
MWD RTS	$360,313	$396,031	$435,289	$478,438	$525,865
MWD Capacity	$82,796	$85,897	$89,115	$92,453	$95,916
MWD Volume	$6,811,121	$5,924,882	$6,227,365	$6,518,733	$6,823,732
Groundwater Replenishment	$254,943	$592,730	$612,170	$645,119	$679,847
Total	**$7,509,173**	**$6,999,540**	**$7,363,938**	**$7,734,744**	**$8,125,361**

5.3. Debt Service

Table 5-7 shows the City's existing debt service obligations associated with its outstanding 2012 Refunding Certificates of Participation. These obligations are secured by a pledge of City revenues and are scheduled to be paid off in FY 2026. The proposed financial plan assumes that no additional debt will be issued by the City over the study period.

Table 5-7: Schedule of Debt Service Payments

Description	FY 2022 Budget	FY 2023 Projected	FY 2024 Projected	FY 2025 Projected	FY 2026 Projected	FY 2027 Projected
2012 COP						
Principal	$147,455	$154,157	$157,508	$167,562	$174,264	$0
Interest	$31,332	$24,397	$18,231	$11,930	$5,228	$0
Total	**$178,787**	**$178,554**	**$175,739**	**$179,492**	**$179,492**	**$0**

5.4. Infrastructure Improvement Plan

The City's adopted FY 2022 budget includes approximately $2.7M in capital project costs in FY 2022. The City has also developed a long-term capital plan that outlines capital project expenditures required over the study period to address current and future system needs. These projects are shown in detail in **Table 5-8** and amount to approximately $23M over the next five years. The projects are associated with distribution system reliability, aging infrastructure replacement, fire flow improvements, or system-wide reliability and safety.

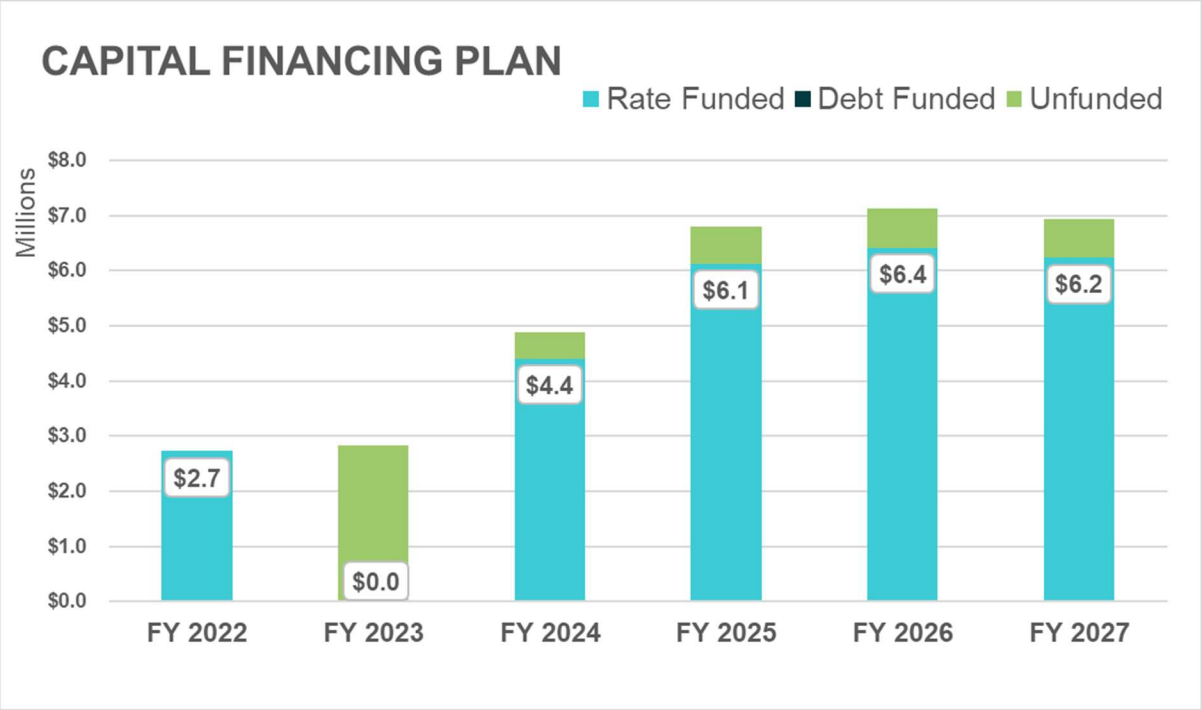
The proposed capital plan includes no new projects to begin in FY 2023 in order to minimize rate impacts and allow City staff to complete a number of ongoing projects. Future years also include a completion factor (90%) – this assumes the City executes 90% of planned expenditures as a way to minimize customer bill increases. The capital costs assume an annual capital inflation factor of 4% per year. The final line of Table 5-8 presents the total proposed annual new capital spending to be funded from rates.

Table 5-8: Capital Improvement Plan

Description	FY 2022 Budget	FY 2023 Projected	FY 2024 Projected	FY 2025 Projected	FY 2026 Projected	FY 2027 Projected
Project Category						
Facility Improvements	$101,250	$81,000	$168,750	$337,500	$337,500	$0
Fire Flow Improvements	$1,190,440	$1,331,979	$2,936,582	$4,225,642	$4,516,763	$4,179,278
Pipe Replacement Program	$1,434,540	$1,309,669	$1,420,048	$1,492,303	$1,242,212	$1,516,563
Total	**$2,726,230**	**$2,722,649**	**$4,525,380**	**$6,055,445**	**$6,096,475**	**$5,695,841**
Completion Rate	100%	0%	90%	90%	90%	90%
Cumulative Inflation	100%	104%	108%	112%	117%	122%
Proposed Capital Spending	**$2,726,230**	**$0**	**$4,405,186**	**$6,130,397**	**$6,418,812**	**$6,236,875**

Figure 5-1 shows the proposed capital financing plan over the study period. Total capital expenditures in each year (from **Table 5-8**) are represented by the blue stacked bars below. All capital projects over the study period are assumed to be cash funded (i.e., funded by water rates and cash reserves). CIP expenditures significantly increase beginning in FY 2024, demonstrating the need for revenue adjustments to sufficiently fund the City's planned capital expenditures.

Figure 5-1: Capital Financing Plan



5.5. Financial Policies

Agency-specific financial policies must be considered during the financial planning process. Financial policies typically define key financial metrics that an agency strives to meet or exceed. **Table 5-9** shows the City's current financial policies pertaining to debt coverage and reserve targets.

Required Debt Coverage

The City must meet the minimum coverage requirements on its outstanding debt to ensure that it meets the associated debt covenants. The required debt service coverage ratio (DSCR) is 1.5, which means that the City's net revenue must amount to at least 1.5 times annual debt service. Net revenues equal revenues less O&M expenses. Annual debt service includes annual principal and interest payments on all outstanding debt.

Reserve Targets

Prudent fiscal management requires that the City maintain reserve balances to provide sufficient working capital, maintain necessary cash on hand to efficiently award construction contracts, and provide funding during emergencies. The reserve policy recommended by Raftelis consists of two targets:

- **O&M Reserve target**: The City's adopted O&M reserve target is four months of annual O&M expenses and debt service. This is intended to ensure sufficient working capital during short-term fluctuations in cash flow.
- **Capital Reserve target**: The recommended target balance is the average yearly capital spending from FY 2021 to FY 2025.

Table 5-9: Financial Policies

Financial Policy	Target
Debt Coverage Ratio	1.50
Reserve Targets	
Operating Reserve	4 months
Capital Reserve	1 Year
FY 2023 Total Target	$9,690,624

5.6. Status Quo Financial Plan

In order to evaluate the need for revenue adjustments (i.e., rate increases), Raftelis first developed a status quo financial plan. The status quo financial plan assumes that current FY 2022 rates remain unchanged over the study period. **Table 5-10** combines projected revenues (from **Table 5-4**), O&M expenses (from **Table 5-6**), debt service (from **Table 5-7**), capital expenditures (from **Table 5-8**), and reserve targets (from **Table 5-9**) to generate cash flow, ending balance, and debt coverage projections under the status quo. It also includes an estimate of capital carryover, which represents continued spending on previously approved, ongoing capital projects, including at Peck Reservoir.

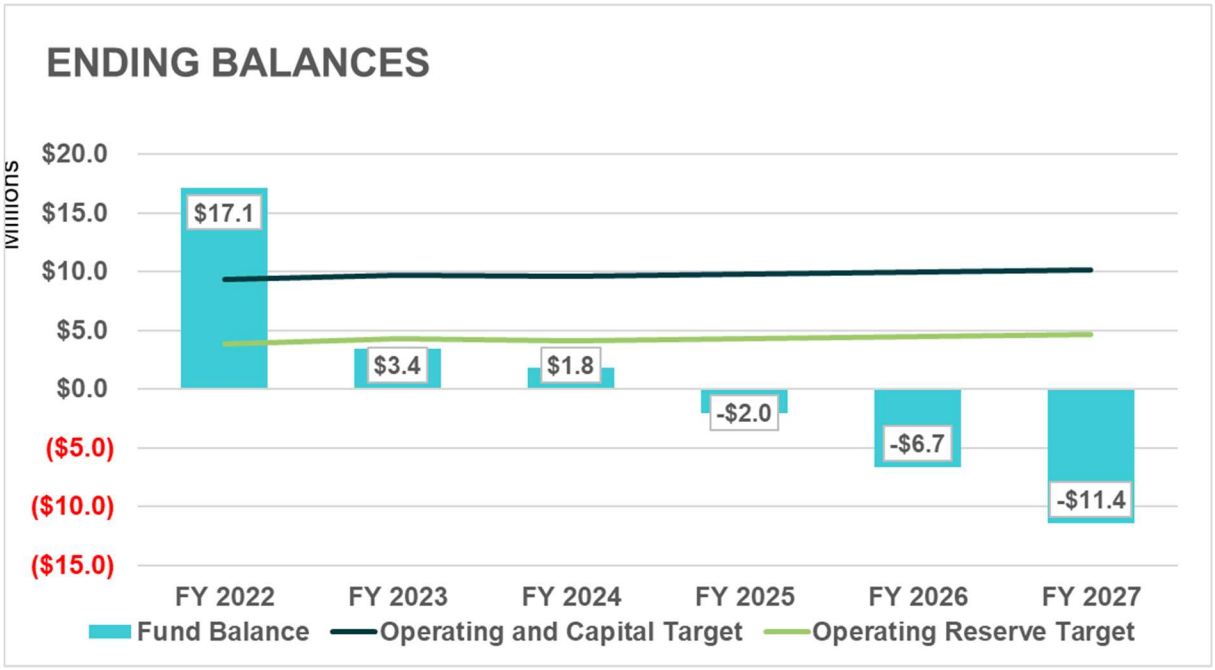
Under the status-quo financial plan, net cash change (revenue less total cash expenses) is negative for most years of the study period and results in a depletion of reserves by the end of FY 2025. The status quo financial plan is insufficient to meet the City's needs. This demonstrates a clear need for revenue adjustments over the study period to increase rate revenues and achieve financial sustainability.

Table 5-10: Status Quo Financial Plan

Description	FY 2022 Budget	FY 2023 Projected	FY 2024 Projected	FY 2025 Projected	FY 2026 Projected	FY 2027 Projected
Revenue						
Rate Revenue	$15,213,416	$15,213,416	$15,264,139	$15,315,114	$15,391,960	$15,469,383
Additional Rate Revenue	$0	$0	$0	$0	$0	$0
Misc.	$586,832	$283,424	$215,015	$206,998	$187,831	$164,728
Total	**$15,800,248**	**$15,496,841**	**$15,479,154**	**$15,522,113**	**$15,579,792**	**$15,634,111**
Expenses						
O&M	$11,652,782	$12,837,337	$12,501,609	$13,045,686	$13,602,139	$14,184,573
Debt Service	$259,547	$178,554	$175,739	$179,492	$179,492	$0
Rate Funded Capital	$2,726,230	$0	$4,405,186	$6,130,397	$6,418,812	$6,236,875
Total	**$14,638,559**	**$13,015,891**	**$17,082,534**	**$19,355,575**	**$20,200,443**	**$20,421,448**
Contribution to Reserves	$1,161,690	$2,480,950	($1,603,380)	($3,833,462)	($4,620,651)	($4,787,338)
Capital Carryover	*(16,162,731)*	*(16,162,731)*				
Beginning Balance	$32,085,901	$17,084,860	$3,403,078	$1,799,699	($2,033,763)	($6,654,415)
Ending Balance	17,084,860	3,403,078	1,799,699	(2,033,763)	(6,654,415)	(11,441,752)
Target	*9,299,721*	*9,690,624*	*9,579,834*	*9,759,379*	*9,943,008*	*10,135,212*
DSCR	15.98	14.89	16.94	13.80	11.02	N/A

Figure 5-2 shows the City's projected ending balances under the status quo (from **Table 5-10**). The operating reserve and total reserve targets are represented by the green and blue lines, respectively. Projected ending balances are represented by light blue bars. The FY 2022 fund balance includes funds already dedicated for the completion of ongoing capital projects including the Peck Reservoir. The City is projected to fall below its Operating Target in FY 2023, with reserves to be fully depleted by the end of FY 2025.

Figure 5-2: Status Quo Financial Plan – Projected Ending Balances



5.7. Proposed Financial Plan

The status quo financial plan demonstrates that the City must increase its revenues from water rates over the study period in order to adequately fund its operating and capital expenditures, meet required debt coverage, and generate sufficient reserve funding. Raftelis worked closely with City staff to select the proposed annual revenue adjustments shown in **Table 5-11**. Revenue adjustments represent annual percentage increases in rate revenue relative to how much rate revenue would have been collected under the prior year's water rates.

Table 5-11: Proposed Revenue Adjustments

Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
Effective Date	Nov 1, 2022	Nov 1, 2023	Nov 1, 2024	Nov 1, 2025	Nov 1, 2026
Revenue Adjustment	9.5%	9.0%	8.5%	4.0%	4.0%

Table 5-12 shows the proposed financial plan pro forma. This combines projected revenues (from **Table 5-4**), O&M expenses (from **Table 5-6**), debt service (from **Table 5-7**), capital expenditures (from **Table 5-8**), and reserve targets (from **Table 5-9**) to generate cash flow, ending balance, and debt coverage projections under the proposed financial plan. Revenue adjustments over the study period generate significant increases in rate revenues over the study period. This results in positive net operating cash flow and sufficient debt coverage in all years.

Table 5-12: Proposed Financial Plan - Pro Forma

Description	FY 2022 Budget	FY 2023 Projected	FY 2024 Projected	FY 2025 Projected	FY 2026 Projected	FY 2027 Projected
Revenue						
Rate Revenue	$15,213,416	$15,213,416	$15,264,139	$15,315,114	$15,391,960	$15,469,383
Additional Rate Revenue	$0	$963,516	$2,452,947	$4,000,071	$5,072,192	$5,920,389
Misc.	$586,832	$283,424	$219,833	$224,105	$225,023	$227,467
Total	**$15,800,248**	**$16,460,357**	**$17,936,919**	**$19,539,290**	**$20,689,176**	**$21,617,238**
Expenses						
O&M	$11,652,782	$12,837,337	$12,501,609	$13,045,686	$13,602,139	$14,184,573
Debt Service	$259,547	$178,554	$175,739	$179,492	$179,492	$0
Rate Funded Capital	$2,726,230	$0	$4,405,186	$6,130,397	$6,418,812	$6,236,875
Total	**$14,638,559**	**$13,015,891**	**$17,082,534**	**$19,355,575**	**$20,200,443**	**$20,421,448**
Contribution to Reserves	1,161,690	3,444,466	854,385	183,715	488,732	1,195,790
Capital Carryover	*(16,162,731)*	*(16,162,731)*				
Beginning Balance	$32,085,901	$17,084,860	$4,366,595	$5,220,980	$5,404,695	$5,893,427
Ending Balance	17,084,860	4,366,595	5,220,980	5,404,695	5,893,427	7,089,217
Target	*9,299,721*	*9,690,624*	*9,579,834*	*9,759,379*	*9,943,008*	*10,135,212*
DSCR	15.98	20.29	30.93	36.18	39.48	N/A

Figure 5-3 shows the City's projected ending balance under the proposed financial plan. The light blue bars indicate the ending balance. The operating reserve and total reserve targets are represented by the green and dark blue lines, respectively. The City is projected to continue to draw down its reserves through FY 2023 in order to complete ongoing capital projects. By the end of the study period, the City's reserves are projected to be on track to eventually meet the combined operating and capital reserve targets.

Figure 5-3: Proposed Financial Plan – Projected Ending Balances

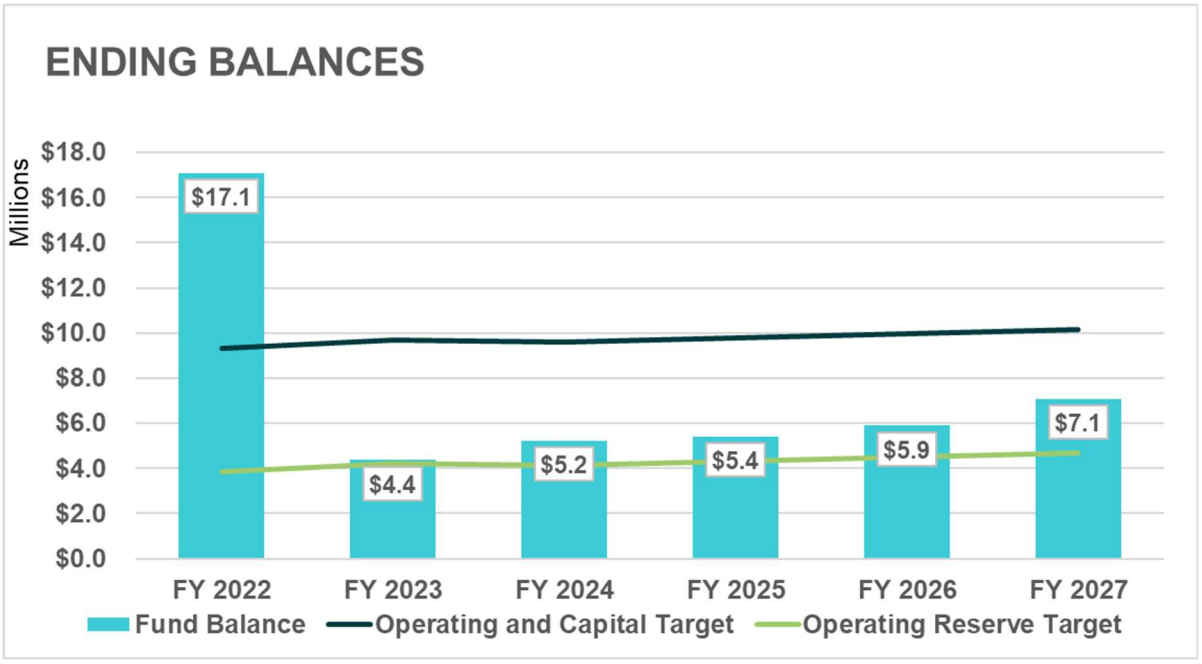
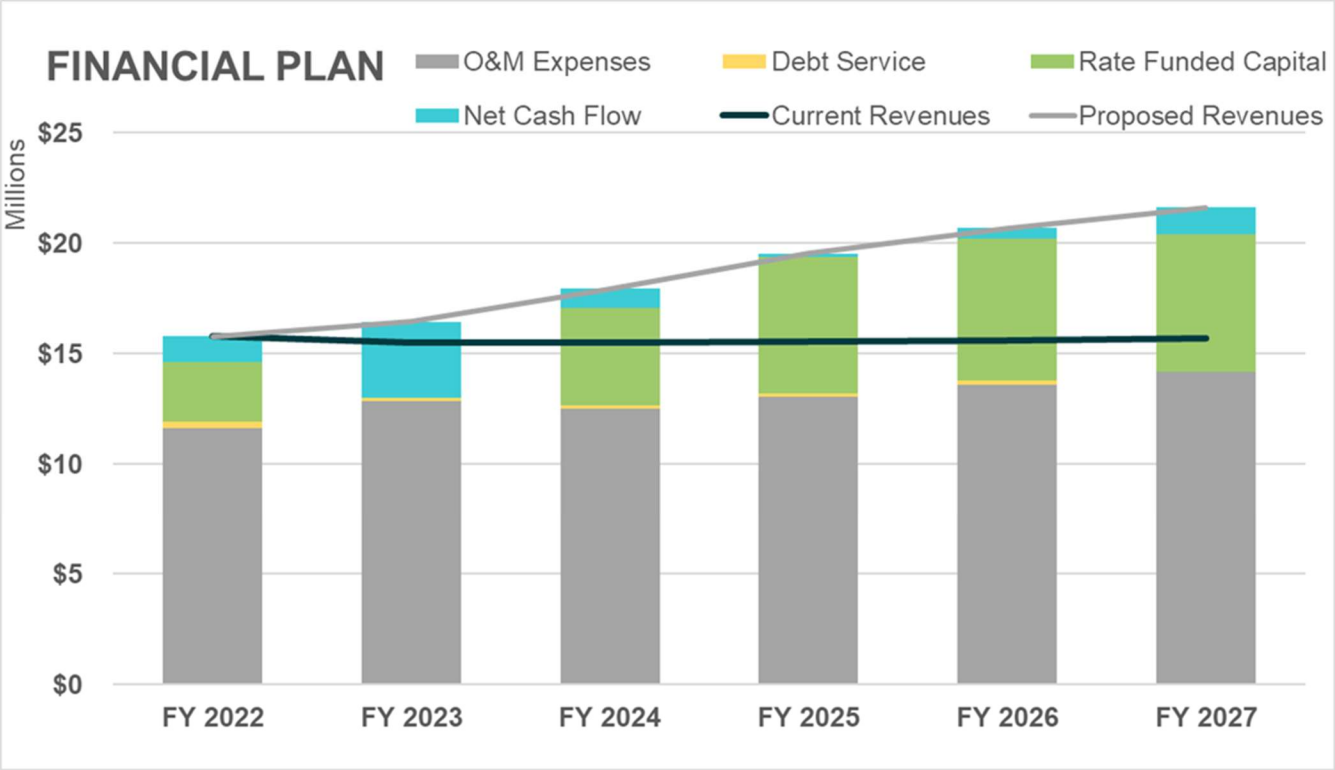


Figure 5-4 shows the proposed versus status quo revenue and expenses, also known as the financial plan. Revenues under the proposed rates and status quo rates are represented by the dark blue and light gray lines, respectively. Revenue requirements, including O&M expenses, debt service, cash-funded capital, and reserve funding, are represented by the various stacked bars. Although current rates result inadequate recovery of O&M expenses in most years, revenue adjustments are clearly required to generate sufficient revenue to cover debt service payments and cash-funded capital.

Figure 5-4: Proposed vs. Status Quo Financial Plan – Revenue vs. Expenses



6. Cost of Service Analysis

Section 6 details the cost of service (COS) analysis performed for FY 2023. The COS analysis allocates the overall rate revenue requirement to customer classes based on their proportion of use of and burden on the City's water system. This provides the basis for the development of proposed FY 2023 water rates.

6.1. Methodology

The first step in the COS analysis is to determine the revenue required from rates. The total revenue requirement is determined in the financial plan and the proposed revenue adjustments in **Section 5**. The framework and methodology utilized to develop the COS analysis and to apportion the revenue requirement to each customer class and tier is informed by the processes outlined in the AWWA Manual M1.

COS analyses are tailored specifically to meet the unique needs of each water system. However, there are four distinct steps in every COS analysis to recover costs from customers in an accurate, equitable, and defensible manner:

1. **Cost functionalization:** O&M expenses and capital assets are categorized by their function in the system. Sample functions may include supply, treatment, distribution, transmission, customer service, etc.
2. **Cost causation component allocation:** Functionalized costs are then allocated to cost causation components based on their burden on the system. The cost causation components include supply, base delivery, peaking, meter service, and customer service, amongst others. The revenue requirement is allocated accordingly to the cost causation components and results in the total revenue requirement for each cost causation component.
3. **Unit cost development:** The revenue requirement for each cost causation component is divided by the appropriate units of service to determine the unit cost for each cost causation component.
4. **Revenue requirement distribution:** The unit cost is utilized to distribute the revenue requirement for each cost causation component to customer classes based on each customer ' 'class's individual service units.

This method of functionalizing costs is consistent with the AWWA Manual M1 and is widely used in the water industry to perform COS analyses.

6.2. Revenue Requirement

Table 6-1 shows the rate revenue requirement for FY 2023 (also referred to as the test year or rate-setting year). The revenue requirement is split into operating and capital categories (Columns A and B), which are later allocated based on O&M expenses and capital assets, respectively. The expenses (Lines 1-4) are equal to FY 2023 expenses. The miscellaneous revenue (Line 5) includes interest earnings and miscellaneous revenues that are applied as offsets to the final rate revenue requirement. The contribution to reserves adjustment (Line 6) is equal to FY 2023 net cash change and represents the increase in the rate revenue requirement resulting from an addition to reserves in FY 2023. All aforementioned values are from the proposed financial plan pro forma (**Table 5-12**). The mid-year adjustment (Line 7) is required to annualize the revenue requirement since the City plans to implement the new rates in November rather than July, the first month of the fiscal year. The adjustment represents the revenue that is foregone by not applying the proposed rates to that four-month period at the beginning of the fiscal year; this revenue is not collected but is a necessary part of the rate calculation. The final rate revenue requirement (Line 9) is calculated as follows:

Total revenue required from rates (Line 9) = Revenue requirements (Line 4) + Adjustments (Line 8)

Table 6-1: FY 2023 Revenue Required from Rates

Line	Revenue Requirements	A	B	C
		Operating	Capital	Total
	Expenses			
1	O&M	$12,837,337		$12,837,337
2	Debt Service		$178,554	$178,554
3	Rate Funded Capital		$0	$0
4	**Subtotal**	**$12,837,337**	**$178,554**	**$13,015,891**
	Adjustments			
5	Misc. Revenue	($232,424)	($51,000)	($283,424)
6	Contribution to Reserves	$3,444,466		$3,444,466
7	Mid-Year Adjustment	$481,758		$481,758
8	**Subtotal**	**$3,693,800**	**($51,000)**	**$3,642,800**
9	**Total Revenue Required**	**$16,531,137**	**$127,554**	**$16,658,691**

6.3. System Peaking Factors

Different functions of a water system (such as distribution storage and distribution piping) are designed to meet different peaking requirements. Peaking costs are divided into maximum day (Max Day) and maximum hour (Max Hour) demand. The Max Day demand is the maximum amount of water used in a single day over a full year. The Max Hour demand is the maximum use in an hour on the Max Day. For example, storage and treatment components of the water system are designed to handle Max Day requirements, while the distribution system is designed for Max Hour demands.

Table 6-2 shows the system-wide peaking factors provided by the City's master plan, which are used to derive the cost component allocation bases for Base Delivery, Max Day, and Max Hour costs. Base Delivery use is considered average daily demand over one year, which has been normalized to a factor of 1.00 (Column A, Line 1). The Max Day peaking factor (Column A, Line 2) indicates that the Max Day demand is 1.50 times greater than the average daily demand. Similarly, the Max Hour peaking factor (Column A, Line 3) shows that the Max Hour demand is 2.31 times greater than the average demand. The allocation bases (Columns B to D) are calculated using the equations outlined below. Columns are represented in these equations as letters, and rows are represented as numbers. For example, Column D, Line 2 is shown as D2.

The Max Day allocations are calculated as follows:

- Base Delivery: *A1 / A2 x 100% = B2*
- Max Day: *(A2 - A1) / A2 x 100% = C2*

The Max Hour allocations are calculated as follows:

- Base Delivery: *A1 / A3 x 100% = B3*
- Max Day: *(A2 - A1) / A3 x 100% = C3*

» Max Hour: *(A3 - A2) / A3 x 100% = D3*

Table 6-2: System Peaking Factor Allocations

Line	Description	A	B	C	D	E
		Factor	Base	Max Day	Max Hour	Total
1	**Base**	1.00	100%	0%	0%	100%
2	**Base, Max Day**	1.50	67%	33%	0%	100%
3	**Base, Max Day, Max Hour**	2.31	43%	22%	35%	100%

6.4. Functionalization and Allocation of Expenses

After determining the revenue requirement and system-wide peaking allocation basis, the next step of the COS analysis is to allocate O&M expenses and capital assets to the following functional categories:

- **Supply**: purchased water from MWD and groundwater extraction costs, as well as other minor miscellaneous supply costs
- **Treatment**: costs associated with the City's groundwater water treatment system
- **Pumping:** costs related to operating the City's water pumping stations
- **Storage**: costs related to the City's water storage system
- **T&D**: costs associated with the City's water transmission and distribution system
- **Customer**: costs of meter reading, billing, and other customer services
- **Meters**: costs of meter maintenance/repair and some capacity-related costs
- **Direct Private Fire**: costs of maintaining backflow devices associated with private fire connections
- **General:** costs for general administration and operational expenses or any other costs that do not clearly relate to a specific functional category

After functionalization costs, we allocate the functionalized costs to cost causation components. Some cost causation components correspond directly to a functional category listed above. The cost causation components include:

- **Supply**: directly associated with the Supply functional category
- **Base**: costs associated with providing water under average water demand conditions
- **Peaking** (Max Day and Max Hour): extra-capacity costs associated with providing water under peak demand conditions
- **Customer**: directly associated with the customer functional category
- **Fire Protection**: costs associated with providing water for fire protection purposes, both public and private
- **Meters**: directly associated with the meters functional category
- **General**: directly associated with the general functional category

Table 6-3 shows the basis for allocating each functional category to the various cost causation components. This is the basis for allocating O&M and capital expenses in the following subsections. Most functional categories are allocated entirely to the corresponding cost causation component. The allocation basis for functional categories not allocated entirely to a single cost causation component is as follows:

- **Treatment**: Because groundwater treatment facilities will only provide a portion of the City's water needs and will not meet the maximum day supply, Treatment costs are allocated to the Base Delivery cost causation component based on the Base allocation from **Table 6-2**.

- **Storage**: Because storage/reservoir facilities are typically designed to accommodate maximum day water demand, all Storage costs are allocated to the Base Delivery and Max Day cost causation components based on the Max Day allocation from **Table 6-2**.

- **Pumping**: Because pumping stations are typically designed to accommodate maximum day water demand, these costs are allocated to the Base Delivery and Max Day cost causation components based on the Max Day allocation from **Table 6-2**.

- **Transmission and Distribution**: Because transmission systems are typically designed to accommodate maximum day water demand, all Transmission costs are allocated to the Base Delivery, Max Day, and Max Hour cost causation components based on the Max Day allocation from **Table 6-2**.

Table 6-3: Allocation of Functional categories to Cost Causation Components

Line	Description	A	B	C	D	E	F	G	H	I	J
		Supply	Base Delivery	Max Day	Max Hour	Customer Service	Meter Service	General & Admin	Private Fire - Backflow	Private Fire - Admin	Total
	Function										
1	Supply	100%	0%	0%	0%	0%	0%	0%	0%	0%	100%
2	Treatment	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%
3	Pumping	0%	67%	33%	0%	0%	0%	0%	0%	0%	100%
4	Storage	0%	67%	33%	0%	0%	0%	0%	0%	0%	100%
5	T&D	0%	43%	22%	35%	0%	0%	0%	0%	0%	100%
6	Customer	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%
7	Meter Service	0%	0%	0%	0%	0%	100%	0%	0%	0%	100%
8	Direct Fire Backflow Repair	0%	0%	0%	0%	0%	0%	0%	100%	0%	100%
9	G&A	0%	0%	0%	0%	0%	0%	100%	0%	0%	100%

6.5. O&M Expense Allocation

The next step of the COS analysis is to develop an allocation basis for the operating revenue requirement based on the functionalization of the City's O&M expenses. **Table 6-4** shows the City's FY 2023 O&M expenses by department in Column B (from **Table 5-5**). Each department was assigned to the most closely associated functional category (see Column A) after a detailed review of costs by Raftelis and City staff.

Table 6-4: Functionalization of O&M Expenses by Department

Line	Description	A	B
		Functional Categories	FY 2023 Forecast
	Department		
1	Water Administration	Customer Service, G&A	$2,050,023
2	Water Source Of Supply	Supply	$7,512,130
3	Water Pumping	Pumping	$1,249,417
4	Water Treatment	Treatment	$159,168
5	Water Maintenance	Storage, T&D, Meters, Fire Backflow, Customer	$1,866,599
6	**Total**		**$12,837,337**

Table 6-5 shows a summary of FY 2023 expenses by function based on the assignment of cost centers to functional categories (from **Table 6-4**). This intermediate step is necessary in order to allocate total O&M expenses to the cost causation components.

Table 6-5: Summary of O&M Expenses by Functional Category

Line	Description	A
		FY 2023 Forecast
	Function	
1	Supply	$7,512,130
2	Treatment	$159,168
3	Pumping	$1,249,417
4	Storage	$130,662
5	T&D	$1,175,957
6	Customer	$627,681
7	Meter Service	$242,658
8	Direct Fire Backflow Repair	$37,332
9	G&A	$1,702,332
10	**Total**	**$12,837,337**

Table 6-6 shows the allocation of FY 2023 O&M expenses by function to each cost causation component. The percentage allocation of each function to the various cost causation components was determined in **Table 6-3**. Total O&M expenses associated with each function (Column J) were determined in **Table 6-5**. The total dollar

amount allocated to each cost causation component (Line 10) is determined by multiplying the total expense associated with each function by the corresponding percentage allocation and summing across all functions.

The final O&M Allocation percentages (Line 11) represent the proportion of total O&M expenses allocated to each cost causation component. These O&M allocation percentages are later used to allocate the total operating miscellaneous revenues.

Table 6-6: Allocation of O&M Expenses to Cost Causation Components

Line	Description	A	B	C	D	E	F	G	H	I	J
		Supply	Base Delivery	Max Day	Max Hour	Customer Service	Meter Service	General & Admin	Private Fire - Backflow	Private Fire - Admin	Total
	Function										
1	Supply	$7,512,130	$0	$0	$0	$0	$0	$0	$0	$0	$7,512,130
2	Treatment	$0	$159,168	$0	$0	$0	$0	$0	$0	$0	$159,168
3	Pumping	$0	$832,945	$416,472	$0	$0	$0	$0	$0	$0	$1,249,417
4	Storage	$0	$87,108	$43,554	$0	$0	$0	$0	$0	$0	$130,662
5	T&D	$0	$509,072	$254,536	$412,349	$0	$0	$0	$0	$0	$1,175,957
6	Customer	$0	$0	$0	$0	$626,426	$0	$0	$0	$1,255	$627,681
7	Meter Service	$0	$0	$0	$0	$0	$242,658	$0	$0	$0	$242,658
8	Direct Fire Backflow Repair	$0	$0	$0	$0	$0	$0	$0	$37,332	$0	$37,332
9	G&A	$0	$0	$0	$0	$0	$0	$1,702,332	$0	$0	$1,702,332
10	**Total**	**$7,512,130**	**$1,588,293**	**$714,563**	**$412,349**	**$626,426**	**$242,658**	**$1,702,332**	**$37,332**	**$1,255**	**$12,837,337**
11	*Percent*	*58.5%*	*12.4%*	*5.6%*	*3.2%*	*4.9%*	*1.9%*	*13.3%*	*0.3%*	*0.0%*	*100.0%*

6.6. Capital Allocation

Capital assets are utilized in COS analyses to allocate the capital revenue requirement to the various cost causation components. The distribution of a short-term capital plan can be heavily weighted to specific cost causation components based on the type of project. Using short-term planned capital projects to allocate capital costs would cause rates to fluctuate and cause customer confusion. The overall capital asset base, however, is considerably more stable in the long term and therefore is more representative of long-term capital investment in the City's water system. Thus, functionalized capital assets are used to allocate capital costs.

City staff provided Raftelis with a detailed asset listing that included the original cost of each individual asset. Raftelis calculated the replacement cost of each asset based on the original cost and acquisition year using the Engineering News-' 'Record's 20-City Average Cost Construction Index (CCI) to account for capital cost inflation. As part of the capital asset analysis, Raftelis assigned each group of asset types to a functional category. Total asset value (replacement cost) by functional category is shown in **Table 6-7**.

Table 6-7: Summary of Capital Assets by Functional Category

Line	Description	A Asset Value
	Function	
1	Supply	$2,074,317
2	Treatment	$0
3	Pumping	$3,094,578
4	Storage	$3,484,763
5	T&D	$32,016,011
6	Customer	$0
7	Meter Service	$0
8	Direct Fire Backflow Repair	$0
9	G&A	$301,439
10	**Total**	**$40,971,107**

Table 6-8 shows the allocation of capital assets by function to each cost causation component. The percentage allocation of each function to the various cost causation components was determined in **Table 6-3**. Total asset value associated with each function (Column J) was determined in **Table 6-7**. The total dollar amount allocated to each cost causation component (Line 10) is determined by multiplying the total asset value associated with each function by the corresponding percentage allocation and summing across all functions. This is consistent with the methodology used to determine the allocation of O&M expenses to cost causation components in **Table 6-6** (described in detail in **Section 6.5**). The final capital allocation percentages (Line 11) represent the proportion of total capital assets allocated to each cost causation component (Line 10).

The capital allocation percentages (Line 11) are later used to allocate some miscellaneous revenues.

Table 6-8: Allocation of Functionalized Capital Assets to Cost Causation Components

Line	Description	A	B	C	D	E	F	G	H	I	J
		Supply	Base Delivery	Max Day	Max Hour	Customer Service	Meter Service	General & Admin	Private Fire - Backflow	Private Fire - Admin	Total
	Function										
1	Supply	$2,074,317	$0	$0	$0	$0	$0	$0	$0	$0	$2,074,317
2	Treatment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3	Pumping	$0	$2,063,052	$1,031,526	$0	$0	$0	$0	$0	$0	$3,094,578
4	Storage	$0	$1,508,556	$754,278	$1,221,930	$0	$0	$0	$0	$0	$3,484,763
5	T&D	$0	$13,859,745	$6,929,872	$11,226,393	$0	$0	$0	$0	$0	$32,016,011
6	Customer	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
7	Meter Service	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
8	Direct Fire Backflow Repair	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
9	G&A	$0	$0	$0	$0	$0	$0	$301,439	$0	$0	$301,439
10	**Total**	**$2,074,317**	**$17,431,352**	**$8,715,676**	**$12,448,323**	**$0**	**$0**	**$301,439**	**$0**	**$0**	**$40,971,107**
11	*Percent*	*5.1%*	*42.5%*	*21.3%*	*30.4%*	*0.0%*	*0.0%*	*0.7%*	*0.0%*	*0.0%*	*100.0%*

6.7. Preliminary Cost of Service Allocation

Table 6-9 shows the preliminary allocation of the total FY 2023 rate revenue requirement to the various cost causation components. The preliminary COS allocations (Line 10) are subject to further adjustments based on additional reallocations developed in the following subsections. The results shown in **Table 6-9** are calculated as follows based on intermediate results developed in the preceding subsections:

1. **Operating Revenue Requirement** (Line 1): The total operating revenue requirement consists solely of the City's O&M expenses. The allocation of the total operating revenue requirement to each cost causation component was previously determined in **Table 6-6**, Line 10.

2. **Capital Revenue Requirement** (Line 2): The total capital revenue requirement consists of capital expenditures and debt service payments. The allocation of the total capital revenue requirement to each cost causation component is determined by multiplying the percentage allocations of assets in **Table 6-8**, Line 11 by the capital expenses shown in **Table 6-9**, Column J, Line 2, as previously determined in **Table 6-1**, Column B, Line 4.

3. **Revenue Offsets** (Lines 3 and 4)**:** Total revenue offsets (from **Table 6-1**, Columns A and B, Line 5) are allocated to the cost components using the operating and capital allocation percentages determined in **Table 6-6** and **Table 6-8.**

4. **Contribution to Reserves and Mid-Year Adjustment** (Lines 5 and 6): These adjustments, previously shown in **Table 6-1**, Lines 6, and 7, are allocated using the operating cost allocation percentages from **Table 6-6.**

5. **Reallocation of General Costs** (Lines 9 and 10): The total General revenue requirement (Column G, Line 7) is fully reallocated to all other cost causation components on a proportional basis using the percentages developed on Line 9. Note that the reallocation results in a shifting of costs between cost causation components but does not change the total rate revenue requirement.

6. **Preliminary Cost of Service Allocation** (Line 10): The preliminary COS allocation to each cost causation component equals the sum of Lines 7 and 10. Note that the total COS allocation (Column J, Line 10) equals the total FY 2023 rate revenue requirement (from **Table 6-1**, Column C, Line 9).

Table 6-9: Preliminary Cost of Service Allocation

Line	Description	A	B	C	D	E	F	G	H	I	J
		Supply	Base Delivery	Max Day	Max Hour	Customer Service	Meter Service	General & Admin	Private Fire - Backflow	Private Fire - Admin	Total
	Expenses										
1	Operating Expenses	$7,512,130	$1,588,293	$714,563	$412,349	$626,426	$242,658	$1,702,332	$37,332	$1,255	$12,837,337
2	Capital Expenses	$9,040	$75,967	$37,983	$54,250	$0	$0	$1,314	$0	$0	$178,554
3	Operating Revenue Offset	($136,010)	($28,757)	($12,937)	($7,466)	($11,342)	($4,393)	($30,821)	($676)	($23)	($232,424)
4	Capital Revenue Offset	($2,582)	($21,698)	($10,849)	($15,495)	$0	$0	($375)	$0	$0	($51,000)
5	Contribution to Reserves	$2,015,626	$426,165	$191,729	$110,640	$168,080	$65,109	$456,763	$10,017	$337	$3,444,466
6	Mid-Year Adjustment	$281,914	$59,605	$26,816	$15,475	$23,508	$9,106	$63,885	$1,401	$47	$481,758
7	**Subtotal**	**$9,680,119**	**$2,099,575**	**$947,304**	**$569,752**	**$806,673**	**$312,480**	**$2,193,097**	**$48,074**	**$1,617**	**$16,658,691**
9	*Percent Expenses less G&A*	*66.9%*	*14.5%*	*6.5%*	*3.9%*	*5.6%*	*2.2%*	*-100.0%*	*0.3%*	*0.0%*	*0.0%*
10	**Reallocation of G&A**	$1,467,582	$318,312	$143,619	$86,379	$122,298	$47,374	($2,193,097)	$7,288	$245	$0
10	**Preliminary Cost of Service**	**$11,147,700**	**$2,417,888**	**$1,090,923**	**$656,131**	**$928,971**	**$359,854**	**$0**	**$55,362**	**$1,862**	**$16,658,691**

6.8. Allocation of Public and Private Fire Protection Costs

Water systems provide two types of fire protection: public fire protection for firefighting (i.e., fire hydrants) and private fire protection (i.e., fire lines for private structures with sprinkler systems for fire suppression). Raftelis performed a fire demand analysis to determine the share of Fire Protection costs allocated to public versus private fire protection. The City provided Raftelis with a count of fire hydrants. The number of private fire lines is shown in **Table 4-4**.

Table 6-10 shows the calculation of equivalent fire demand associated with public hydrants and private fire lines. Each connection size has a fire flow demand factor similar to the hydraulic capacity factor of a water meter. The diameter of the connection (in inches) is raised to the 2.63 power to determine the fire flow demand factor (Column A).[4] The fire flow demand factor is multiplied by the number of connections or hydrants by size (Column B) to calculate equivalent fire demand (Column C). Total equivalent fire demand is shown for public hydrants, and private fire lines are shown in Lines 6 and 16, respectively.

Raftelis also uses equivalent cost meters for private fire connections in a later step of the rate calculation process. These ratios, shown in Column E, are calculated by dividing the cost of a meter at each meter size (Column D) by the cost of a ¾" meter (Column D, Line 7). The resulting ratios are multiplied by the number of meters in Column B to derive the total equivalent cost meters shown in Column F.

Table 6-10: Equivalent Fire Meters

Line	Connection Size	A	B	C	D	E	F
		Demand Factor	Units	Eq. Fire Demand	Meter Cost	Meter Cost Ratio	Eq. Cost Meters
	Public Hydrants						
1	5/8" or 3/4"	-	-	-			
2	2"	6.19	-	-			
3	3"	17.98	-	-			
4	4"	38.32	-	-			
5	6"	111.31	775	86,266.0			
6	**Subtotal**		**775**	**86,266.0**			
	Private Fire Connections						
7	5/8" or 3/4"	0.47	2	0.9	$143	1.00	2.00
8	1"	1.00	-	-	$199	1.39	-
9	1.5"	2.90	-	-	$313	2.19	-
10	2"	6.19	13	80.5	$425	2.97	38.64
11	3"	17.98	2	36.0	$750	5.24	10.49
12	4"	38.32	47	1,801.0	$1,200	8.39	394.41
13	6"	111.31	26	2,894.1	$2,000	13.99	363.64
14	8"	237.21	5	1,186.0	$3,000	20.98	104.90
15	10"	426.58	2	853.2	$4,000	27.97	55.94
16	**Subtotal**		**97**	**6,851.7**			**970.0**

[4] Hazen-Williams equation and AWWA Manual M1

Table 6-11 shows the number of equivalent fire demand units associated with public and private fire protection (from **Table 6-10,** Column C). The proportional share of equivalent fire demand (Column B) provides the basis for which Fire Protection costs are allocated between public and private in subsequent steps of the COS analysis.

Table 6-11: Public vs. Private Fire Protection Allocation

Line	Description	A	B
		Eq. Fire Demand	% of Fire Demand
1	**Public Fire Protection**	86,266.0	92.6%
2	**Private Fire Protection**	6,851.7	7.4%
3	**Total**	**93,117.6**	**100.0%**

6.9. Peaking Units of Service

Peaking units of service are developed to calculate unit peaking costs (Max Day and Max Hour) for each customer class and provide a basis to reallocate peaking costs to Fire Protection in subsequent steps of the COS analysis. Public hydrants and private fire lines contribute to system capacity-related costs (i.e., peaking costs) and therefore are reallocated a portion of Max Day and Max Hour costs.

Table 6-12 shows calculations used to attribute peaking costs to specific customer classes based on actual water use patterns. Raftelis estimated Max Day (Column C) and Max Hour (Column H) factors based on actual FY 2020 water use and system-wide peaking factors from **Table 6-2**. Projected FY 2023 water use in Column A (from **Table 4-5**) is divided by 365 days to determine average daily water use (Column B). Average daily use in Column B is then multiplied by the Max Day factor (Column C) to determine Max Day demand (Column D). Max Day requirements (Column E) are determined by subtracting average daily water use (Column B) from Max Day demand (Column D). Max Hour requirements (Column H) are similarly calculated. Max Hour demand (Column G) equals average daily water use (Column B) multiplied by Max Hour demand (Column F). Max Hour requirements (Column H) equal Max Hour demand (Column G) less Max Day requirements (Column E).

Table 6-12: Peaking Units by Customer Class

Line	Description	A	B	C	D	E	F	G	H
		Annual Water Use	Average Daily Use	Max Day Factor	Max Day Demand	Max Day Requirement	Max Hour Factor	Max Hour Demand	Max Hour Requirement
	Customer Class								
1	Single Family Residential	1,399,409	3,834	1.53	5,848	2,014	2.35	9,005	3,158
2	Multi Family	155,985	427	1.32	566	138	2.04	871	305
3	Commercial	393,429	1,078	1.41	1,522	444	2.17	2,343	822
4	City / County	45,507	125	1.46	182	58	2.25	281	98
5	Schools	58,431	160	2.05	329	169	3.16	507	178

Table 6-13 shows a methodology[5] used to calculate peaking units of service associated with Fire Protection based on assumptions regarding the duration and water use rate associated with typical fires:

Max Day Requirements (HCF/day) = Duration of Fire (hrs) × Water Use Rate (gpm) × 60 mins/hr ÷ 748.05 gallons/HCF

[5] Per the AWWA Manual M1.

Max Hour Requirements (HCF/day) = [Water Use Rate (gpm) × 60 mins/hr × 24 hrs/day ÷ 748.05 gallons/HCF] – Max Day Requirements (HCF/day)

Table 6-13: Peaking Units for Fire Protection

Line	Description	A
		Value
1	**Duration of Fire (Hours)**	3
2	**Water Use Rate (gallons/min)**	3,000
3	**Max Day Requirements**	722
4	**Max Hour Requirements**	5,053

Peaking units of service (from **Table 6-12** and **Table 6-13**) are summarized below in **Table 6-14**. The distribution of Fire Protection peaking units in Lines 3 and 4 (from **Table 6-13**) is based on proportional equivalent fire demand (from **Table 6-11**). The proportional shares of Max Day and Max Hour units of service are also shown in Columns B and D of **Table 6-14,** respectively.

Table 6-14: Summary of Total Peaking Units

Line	Description	A	B	C	D
		Max Day Requirement	% of Max Day Req.	Max Hour Requirement	% of Max Hour Req.
	Customer Class				
1	Single Family Residential	2,014	56.8%	3,158	32.8%
2	Multi Family	138	3.9%	305	3.2%
3	Commercial	444	12.5%	822	8.5%
4	City / County	58	1.6%	98	1.0%
5	Schools	169	4.8%	178	1.8%
6	Public Fire	669	18.9%	4,681	48.7%
7	Private Fire	53	1.5%	372	3.9%
8	**Total**	**3,544**	**100.0%**	**9,614**	**100.0%**

6.10. Adjusted Cost of Service Allocation

Table 6-15 shows the adjusted allocation of the rate revenue requirement to the various cost causation components. The adjusted COS allocation (Line 6) incorporates adjustments to the preliminary COS allocations developed in Section 6.7 and ultimately provides the underlying basis for proposed FY 2020-21 rate calculations shown subsequently in Section 7. The results shown in **Table 6-15** are calculated as follows based on intermediate results developed in the preceding subsections:

1. **Preliminary Cost of Service Allocation** (Line 1): The preliminary COS allocations were previously developed in **Section 6.7**. (see **Table 6-9).** The General cost causation component is excluded because all General costs were previously reallocated to other costs causation components.

2. **Reallocation of Public Fire Costs** (Line 2): Public fire protection represents a common benefit. Therefore, all public fire protection costs are reallocated to the Meter Service cost causation component to be recovered from all metered connections. Preliminary Max Day (Column C, Line 1) and Max Hour costs (Column D, Line 1) associated with public fire protection are reallocated from Max Day (Column C, Line 2) and Max Hour (Column D, Line 2) to Meter Service (Column F, Line 2) based on the percentage of peaking units associated with public fire protection (**Table 6-14**, Column B, Line 6). Note that the reallocation results in a shifting of costs between cost causation components but does not change the total rate revenue requirement.

3. **Reallocation of Private Fire Costs** (Line 3): Preliminary peaking costs (Columns C and D, Line 1) associated with private fire protection are reallocated from Max Day (Column C, Line 3) and Max Hour (Column D, Line 3) to a newly added Private Fire Protection cost component (Column G, Line 3) based on the percentage of peaking units associated with private fire protection (**Table 6-14**, Columns B and D, Line 7). Note that the reallocation results in a shifting of costs between cost causation components but does not change the total rate revenue requirement.

4. **Reallocation of Base and Peaking Costs to Meter Service** (Lines 4 and 5): The City collects approximately 30 percent of its rate revenues from Fixed Meter Charges. Without this additional cost reallocation, this updated COS analysis would reduce the proportion of revenues from fixed charges to approximately 11 percent. This would reduce revenue stability and increase the risk of revenue insufficiency resulting from decreases in water sales during periods of reduced demand. To increase the proportion of fixed revenue, Raftelis reallocated 80 percent of remaining Max Day and Max Hour costs after the fire reallocations from Max Day (Column C, Line 5) and Max Hour (Column D, Line 5) to Meter Service (Column F, Line 5). A 12 percent portion of Base costs (Column B, Line 4) is also reallocated to the Meter Service component (Column F, Line 4). Utilities invest in and continuously maintain facilities to provide capacity to meet all levels of water consumption, including base and peak demand. These costs must be recovered regardless of the amount of water used during a given period, so these costs are generally considered fixed water system costs incurred regardless of water use. To balance between affordability and revenue stability, it is a common practice that a portion of these costs is recovered in the bi-monthly service charge, along with customer-related costs and meter-related costs.

5. **Final Cost of Service Allocation** (Line 7): The final COS allocation (Line 7) equals the sum of Lines 1 and 6. This represents the final adjusted allocation of the total revenue requirement (from **Table 6-1**, Column C, Line 9) to the various cost causation components.

Table 6-15: Adjusted Cost of Service Allocation

Line	Description	A Supply	B Base Delivery	C Max Day	D Max Hour	E Customer Service	F Meter Service	G Private Fire - Capacity	H Private Fire - Backflow	I Private Fire - Admin	J Total
1	**Preliminary Cost of Service**	$11,147,700	$2,417,888	$1,090,923	$656,131	$928,971	$359,854	$0	$55,362	$1,862	$16,658,691
	Reallocations										
2	Public Fire			($205,855)	($319,486)		$525,340				$0
3	Private Fire			($16,350)	($25,375)			$41,725			$0
4	Base to Meter		($290,147)				$290,147				$0
5	Peak to Meter			($694,974)	($249,016)		$943,991				$0
6	**Subtotal**	**$0**	**($290,147)**	**($917,179)**	**($593,877)**	**$0**	**$1,759,478**	**$41,725**	**$0**	**$0**	**$0**
7	**Final Cost of Service**	**$11,147,700**	**$2,127,741**	**$173,744**	**$62,254**	**$928,971**	**$2,119,332**	**$41,725**	**$55,362**	**$1,862**	**$16,658,691**

6.11. Unit Cost Development

Units of service are used to convert total adjusted costs allocated to each cost causation component (from **Table 6-15**) into unit costs, which are directly incorporated into the proposed rate calculations for FY 2023 in **Section 7**. Units of service relating to water use and peaking were previously determined (see **Table 4-5** and **Table 6-14**). However, additional units of service must be determined to develop Customer, Meters, and Fire Protection unit costs.

Additional Units of Service

Table 6-16 shows the development of additional units of service needed to calculate unit costs for Customer, Meter Service, and Fire Protection cost causation components. Customer unit costs are calculated on a per-account basis, as these costs do not vary based on connection type or size. Total accounts are approximated by summing total water meters for each customer class, as previously determined in **Table 4-3**.

Table 6-17 shows the meter equivalents calculation, which is used to allocate meter-related costs appropriately and equitably. Larger meters impose greater demand, are more expensive to install, maintain, and replace than smaller meters, and require greater capacity within the water system. Equivalent meter units in this study are based on AWWA-rated hydraulic capacities and are calculated to represent the potential demand on the water system relative to a base meter size.

Capacity ratios are calculated by dividing larger meter capacities by the base meter capacity. The base meter in this study is a 3/4-inch meter. AWWA capacity ratios (Column H) are calculated by dividing the capacity of each meter size (Column G) by the capacity of a 3/4-inch meter (Column G, Line 1). The projected number of meters (**Table 6-16**) is multiplied by the AWWA capacity ratios (Column H) to determine equivalent meter units (Columns A to E).

Table 6-16: Customer Meters by Class

Line	Description	A	B	C	D	E	F
		SFR	MFR	Comm.	City/ County	Schools	Total
	Meter Size						
1	5/8" or 3/4"	7,551	678	191	20	1	8,441
2	1"	3,599	412	132	27	1	4,171
3	1.5"	573	90	67	12	1	743
4	2"	7	18	128	43	3	199
5	3"	-	-	19	3	7	29
6	4"	2	-	3	2	2	9
7	6"	-	-	3	3	3	9
8	8"	-	-	1	-	1	2
9	10"	-	-	1	-	-	1
10	**Subtotal**	**11,732**	**1,198**	**545**	**110**	**19**	**13,604**

Table 6-17: Equivalent Meter Units

Line	Description	A	B	C	D	E	F	G	H
		SFR	MFR	Comm.	City/ County	Schools	Total	AWWA Capacity	Capacity Ratio
	Meter Size								
1	5/8" or 3/4"	7,551	678	191	20	1	8,441	30	1.00
2	1"	5,998	687	220	45	2	6,952	50	1.67
3	1.5"	1,910	300	223	40	3	2,477	100	3.33
4	2"	37	96	683	229	16	1,061	160	5.33
5	3"	-	-	222	35	82	338	350	11.67
6	4"	42	-	63	42	42	189	630	21.00
7	6"	-	-	130	130	130	390	1,300	43.33
8	8"	-	-	80	-	80	160	2,400	80.00
9	10"	-	-	127	-	-	127	3,800	126.67
10	**Subtotal**	**15,539**	**1,761**	**1,938**	**541**	**356**	**20,135**		

Unit Costs

Unit costs comprise the constituent parts from which proposed FY 2023 rates are calculated in **Section 7**. **Table 6-18** shows unit costs for each cost causation component (Column D), which are calculated by dividing the final COS allocation in Column A (from **Table 6-15**, Line 7) by the relevant units of service (Column B). The units of service vary by unit cost and are based on either FY 2023 water use (from **Table 4-5**), peaking units (from **Table 6-14**), or the number of accounts/fire lines/equivalent meter units (from **Table 6-10**, **Table 6-16,** or **Table 6-17**). All customer and meter units in those tables have been annualized to account for the fact that each account will receive six bi-monthly bills per year.

Table 6-18: Development of Unit Costs

Line	Description	A	B	C	D
		COS	Units of Service	Units	Unit Cost
	Cost Component				
1	Supply	$11,147,700	2,063,144	Water Use	$5.40
2	Base Delivery	$2,127,741	2,052,761	Water Use, less Fire	$1.04
3	Max Day	$173,744	2,822	Max Day Req, less Fire	$61.56
4	Max Hour	$62,254	4,561	Max Hour Req, less Fire	$13.65
5	Customer Service	$928,971	81,624	Meters	$11.38
6	Meter Service	$2,119,332	120,808	Eq. Meters	$17.54
7	Private Fire - Capacity	$41,725	41,110	Private Fire Eq. Meters	$1.01
8	Private Fire - Backflow	$55,362	5,820	Private Fire Cost Eq. Meters	$9.51
9	Private Fire - Admin	$1,862	582	Private Fire Meters	$3.20
10	**Total**	**$16,658,691**			

6.12. Customer Class Costs

Unit costs developed in **Table 6-18** are used to distribute costs to each customer class based on their unique units of service from **Table 4-5**, **Table 6-14**, **Table 6-16**, and **Table 6-17**, which are summarized again in Lines 1 to 6. The Unit Costs are multiplied by the service units to derive the cost to each class for each cost component in Columns A to I, Lines 7 to 12. The total cost of service for each class is shown in Column J.

Table 6-19: Customer Class Cost of Service

Line	Description	A	B	C	D	E	F	G	H	I	J
		Supply	Base Delivery	Max Day	Max Hour	Customer Service	Meter Service	Private Fire - Capacity	Private Fire - Backflow	Private Fire - Admin	Total
	Customer Class Units										
1	Single Family Residential	1,399,409	1,399,409	2,014	3,158	70,392	93,232				
2	Multi Family	155,985	155,985	138	305	7,188	10,564				
3	Commercial	393,429	393,429	444	822	3,270	11,630				
4	City / County	45,507	45,507	58	98	660	3,248				
5	Schools	58,431	58,431	169	178	114	2,134				
6	Private Fire	10,383						41,110	5,820	582	
	Customer Class Costs										
7	Single Family Residential	$7,561,369	$1,450,524	$123,967	$43,101	$801,138	$1,635,567	$0	$0	$0	$11,615,666
8	Multi Family	$842,827	$161,683	$8,512	$4,169	$81,807	$185,324	$0	$0	$0	$1,284,322
9	Commercial	$2,125,799	$407,800	$27,324	$11,216	$37,216	$204,025	$0	$0	$0	$2,813,379
10	City / County	$245,886	$47,169	$3,547	$1,344	$7,512	$56,980	$0	$0	$0	$362,438
11	Schools	$315,718	$60,565	$10,394	$2,424	$1,297	$37,437	$0	$0	$0	$427,835
12	Private Fire	$56,102	$0	$0	$0	$0	$0	$41,725	$55,362	$1,862	$155,051
13	**Total**	**$13,210,844**	**$4,180,502**	**$176,566**	**$66,815**	**$1,010,595**	**$2,240,140**	**$82,835**	**$61,182**	**$2,444**	**$16,658,691**

7. Proposed Water Rates

Section 7 details the proposed water rate calculations. Proposed FY 2023 rates are calculated directly from the results of the COS analysis (from **Section 6**). All proposed rates beginning in FY 2024 are calculated by simply increasing the prior year's proposed rate by the annual revenue adjustment (from **Table 5-11**).

7.1. Proposed FY 2023 Fixed Meter Charges

Table 7-1 shows the detailed calculation of proposed FY 2023 Fixed Meter Charges which are based on Customer and Equivalent meter unit rates. Customer costs do not vary by connection type or size. Therefore, the Customer unit rate, previously derived in **Table 6-18**, Column D, Line 5, is applied uniformly to all Fixed Meter Charges (Column A). Because Meters costs vary by meter size based on hydraulic capacity, the unit cost (**Table 6-18**, Column C, Line 6) is multiplied by the AWWA capacity ratio for each meter size (**Table 6-17**, Column G). For example, the AWWA capacity ratio for a 1" meter is 1.67, which is multiplied by $17.54 to derive the meter component cost of $29.54 (Column B, Line 2). The two fixed charge components in Columns A and B are added in Column C, showing the total proposed bi-monthly fixed charge.

Table 7-1: Proposed FY 2023 Fixed Meter Charge Calculation

Line	Description	A	B	C	D	E	F
		Customer Component	Eq. Meter Component	Proposed Charge	Current Charge	$ Change	% Change
	Meter Size						
1	5/8" or 3/4"	$11.38	$17.54	$28.93	$40.46	($11.53)	-28.5%
2	1"	$11.38	$29.24	$40.62	$63.64	($23.02)	-36.2%
3	1.5"	$11.38	$58.48	$69.86	$101.48	($31.62)	-31.2%
4	2"	$11.38	$93.56	$104.95	$147.26	($42.31)	-28.7%
5	3"	$11.38	$204.67	$216.05	$296.30	($80.25)	-27.1%
6	4"	$11.38	$368.40	$379.79	$406.60	($26.81)	-6.6%
7	6"	$11.38	$760.20	$771.58	$787.98	($16.40)	-2.1%
8	8"	$11.38	$1,403.44	$1,414.82	$1,245.64	$169.18	13.6%
9	10"	$11.38	$2,222.11	$2,233.50	$1,779.60	$453.90	25.5%

7.2. Proposed FY 2023 Volume Charges

Volume Charges are designed to recover the portion of the rate revenue requirement allocated to the following cost causation components: Supply, Base Delivery, and Peaking (Max Day and Max Hour).

Proposed FY 2023 Volume Charge Calculation

Table 7-2 shows the proposed FY 2023 Volume Charge calculations. Although the supply and base delivery unit rates are the same for all customers and have been calculated in **Table 6-18**, Column D, Lines 1 and 2, the peaking component of the volume rates varies by customer class in relation to the class peaking factor. Therefore, the volume rate calculation relies on the allocated costs of each component and each class shown in **Table 6-19**, Columns A to D, Lines 7 to 12. The total cost to be recovered in the volume charge for each class is shown in Column E. The billable units, simply the annual water volume to be sold, are shown in Column F (from **Table 4-5).** The proposed rate in Column G is the result of dividing Column E by column F and rounding to the next penny.

Table 7-2: Proposed FY 2023 Volume Charge Calculation

Line	Description	A	B	C	D	E	F	G
		Supply	Base	Max Day	Max Hour	Total Cost	Billable Units	Proposed Rate
	Customer Class							
1	Single Family Residential	$7,561,369	$1,450,524	$123,967	$43,101	$9,178,961	1,399,409	$6.56
2	Multi Family	$842,827	$161,683	$8,512	$4,169	$1,017,191	155,985	$6.53
3	Commercial	$2,125,799	$407,800	$27,324	$11,216	$2,572,138	393,429	$6.54
4	City / County	$245,886	$47,169	$3,547	$1,344	$297,946	45,507	$6.55
5	Schools	$315,718	$60,565	$10,394	$2,424	$389,101	58,431	$6.66
6	Private Fire	$56,102	$0	$0	$0	$56,102	10,383	$5.41

7.3. Proposed FY 2023 Private Fire Line Charges

Fixed charges for private fire lines are calculated in the same manner as the fixed charges in Table 7-1. All Customers pay the same unit rate for administration, as calculated in **Table 6-18**, Column D, Line 9 and shown again in Table 7-3, column C. The capacity component (Table 6-18, Column D, Line 7) is scaled to larger meter sizes using the equivalent demand factors from Table 6-10, Column A, while the backflow component is scaled using the meter cost ratio in Column D of that table. These components for each meter size are added in Table 7-3, Column D, and compared to the existing private fire line charges in Column E.

Table 7-3: Proposed FY 2023 Private Fire Line Charge Calculation

Line	Description	A	B	C	D	E	F	G
		Capacity	Backflow	Admin	Proposed Charge	Current Charge	$ Change	% Change
	Meter Size							
1	5/8" or 3/4"	$1.01	$9.51	$3.20	$13.73			
2	1"	$1.01	$13.24	$3.20	$17.46			
3	1.5"	$2.95	$20.82	$3.20	$26.97			
4	2"	$6.28	$28.27	$3.20	$37.76	$43.52	($5.76)	-13.2%
5	3"	$18.25	$49.89	$3.20	$71.34	$61.82	$9.52	15.4%
6	4"	$38.89	$79.82	$3.20	$121.92	$82.42	$39.50	47.9%
7	6"	$112.98	$133.04	$3.20	$249.22	$139.62	$109.60	78.5%
8	8"	$240.76	$199.56	$3.20	$443.52	$208.28	$235.24	112.9%
9	10"	$432.96	$266.08	$3.20	$702.25	$288.36	$413.89	143.5%

7.4. Proposed Five-Year Rate Schedule

Table 7-4 shows the proposed five-year schedule of water rates through FY 2027. Proposed FY 2023 Fixed Meter Charges (see **Table 7-1**) and Volume Charges (**Table 7-2**) were calculated in the preceding subsections. All proposed rates beginning in FY 2024 are calculated by increasing the prior year's proposed rate by the proposed annual revenue adjustment (from **Table 5-11**). Current FY 2022 water rates (from **Table 4-1**) are also shown.

Table 7-4: Proposed Five-Year Water Rate Schedule

Description	Tiers	FY 2022 Current	FY 2023 Nov 1, 2022	FY 2024 Nov 1, 2023	FY 2025 Nov 1, 2024	FY 2026 Nov 1, 2025	FY 2027 Nov 1, 2026
Bi-Monthly Fixed Charges							
5/8" or 3/4"		$40.46	$28.93	$31.54	$34.23	$35.60	$37.03
1"		$63.64	$40.62	$44.28	$48.05	$49.98	$51.98
1.5"		$101.48	$69.86	$76.15	$82.63	$85.94	$89.38
2"		$147.26	$104.95	$114.40	$124.13	$129.10	$134.27
3"		$296.30	$216.05	$235.50	$255.52	$265.75	$276.38
4"		$406.60	$379.79	$413.98	$449.17	$467.14	$485.83
6"		$787.98	$771.58	$841.03	$912.52	$949.03	$987.00
8"		$1,245.64	$1,414.82	$1,542.16	$1,673.25	$1,740.18	$1,809.79
10"		$1,779.60	$2,233.50	$2,434.52	$2,641.46	$2,747.12	$2,857.01
Volume Rates							
1" and Smaller, All Classes							
Tier 1	1-14	$4.28					
Tier 2	15-48	$5.86					
Tier 3	>48	$9.38					
1 1/2" and Larger, All Classes	Uniform	$5.51					
SFR			$6.56	$7.16	$7.77	$8.09	$8.42
MFR			$6.53	$7.12	$7.73	$8.04	$8.37
Commercial			$6.54	$7.13	$7.74	$8.05	$8.38
City / LA County			$6.55	$7.14	$7.75	$8.06	$8.39
Schools			$6.66	$7.26	$7.88	$8.20	$8.53
Private Fire			$5.41	$5.90	$6.41	$6.67	$6.94
Bi-Monthly Private Fire Line Charges							
5/8" or 3/4"			$13.19	$14.38	$15.61	$16.24	$16.89
1"			$17.46	$19.04	$20.66	$21.49	$22.35
1.5"			$26.97	$29.40	$31.90	$33.18	$34.51
2"		$43.52	$37.76	$41.16	$44.66	$46.45	$48.31
3"		$61.82	$71.34	$77.77	$84.39	$87.77	$91.29
4"		$82.42	$121.92	$132.90	$144.20	$149.97	$155.97
6"		$139.62	$249.22	$271.65	$294.75	$306.54	$318.81
8"		$208.28	$443.52	$483.44	$524.54	$545.53	$567.36
10"		$288.36	$702.25	$765.46	$830.53	$863.76	$898.32

7.5. Bi-Monthly Bill Impacts

Table 7-5 shows sample bi-monthly bills for each customer class using the most common meter size for the class and a range of water use volumes to provide a representative sample of impacts across many customers.

Table 7-5: Customer Bill Impacts

Line	Description	A	B	C	D	E	F
		Meter Size	Water Use	Current Bill	Proposed Bill	$ Change	% Change
1	**Single Family Residential**	5/8" or 3/4"	10	$83.26	$94.53	$11.27	13.5%
2		5/8" or 3/4"	15	$106.24	$127.33	$21.09	19.9%
3		5/8" or 3/4"	20	$135.54	$160.13	$24.59	18.1%
4		5/8" or 3/4"	40	$252.74	$291.33	$38.59	15.3%
5		5/8" or 3/4"	75	$552.88	$520.93	($31.95)	-5.8%
6	**Multi Family**	2"	10	$202.36	$170.25	($32.11)	-15.9%
7		2"	15	$229.91	$202.90	($27.01)	-11.7%
8		2"	22	$268.48	$248.61	($19.87)	-7.4%
9		2"	40	$367.66	$366.15	($1.51)	-0.4%
10		2"	50	$422.76	$431.45	$8.69	2.1%
11	**Commercial**	1"	40	$284.04	$302.22	$18.18	6.4%
12		1"	80	$504.44	$563.82	$59.38	11.8%
13		1"	120	$724.84	$825.42	$100.58	13.9%
14		1"	150	$890.14	$1,021.62	$131.48	14.8%
15		1"	170	$1,000.34	$1,152.42	$152.08	15.2%
16	**City / County**	2"	15	$229.91	$203.20	($26.71)	-11.6%
17		2"	30	$312.56	$301.45	($11.11)	-3.6%
18		2"	69	$527.45	$556.90	$29.45	5.6%
19		2"	120	$808.46	$890.95	$82.49	10.2%
20		2"	150	$973.76	$1,087.45	$113.69	11.7%
21	**Schools**	3"	100	$847.30	$1,045.79	$198.49	23.4%
22		3"	250	$1,673.80	$2,044.79	$370.99	22.2%
23		3"	512	$3,117.42	$3,789.71	$672.29	21.6%
24		3"	630	$3,767.60	$4,575.59	$807.99	21.4%
25		3"	700	$4,153.30	$5,041.79	$888.49	21.4%

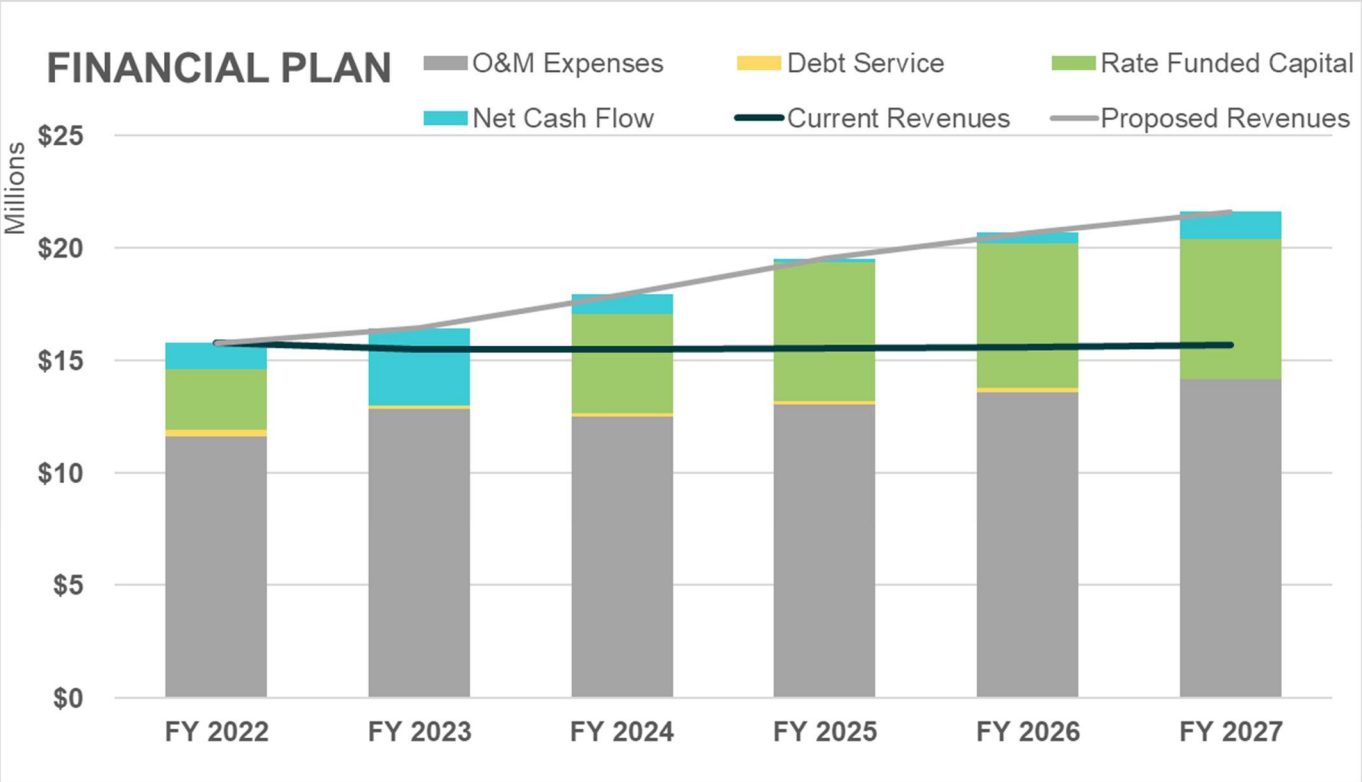
8.Conclusions

The City of Manhattan Beach has not raised water rates since 2014. Although the City has managed costs effectively since then, inflation has increased by 21%; given the City's capital needs over the next five years, rate increases will now be required in order to continue to provide safe, reliable water service.

Raftelis conducted a status quo cash flow analysis to evaluate whether existing water rates can adequately fund the City's various expenses over the five-year study period. With the assistance of City staff, annual revenues, O&M expenses, debt service payments, and capital expenditures were projected through FY 2027. Raftelis projects that with no rate increases over the five-year study period, the City will fully deplete its reserves by the end of FY 2025. This demonstrates a clear need for revenue adjustments (i.e. water rate revenue increases relative to the status quo). The proposed revenue adjustments were selected to provide financial sufficiency for the City while minimizing impacts to City customers.

The need for the proposed increases is most clearly demonstrated in **Figure 8-1**. Current revenues, as represented by the dark blue line, are insufficient to cover expenses as soon as FY 2023. Revenue under the proposed increases, represented by the gray line, fully fund operations each year of the study period.

Figure 8-1



Additionally, this Raftelis developed a new rate structure that the project team believes accurately reflects the principles required by Proposition 218 and nationally recognized industry standards. The water utility is fully funded by ratepayers; there are no general fund transfers or meaningful outside subsidies. Therefore, it is important to develop rates that fully recover the costs of providing water service from those customers who cause the City to incur them.