

CITY OF
San Diego

**Water Financial Plan, Cost of Service,
and Rate Study**

DRAFT Report / December 4, 2024

DRAFT



December 4, 2024

Ms. Lisa Celaya
Executive Assistant Director
City of San Diego
9192 Topaz Way
San Diego, CA 92123

Subject: Water Financial Plan, Cost of Service, and Rate Study Report

Dear Ms. Celaya,

Raftelis is pleased to provide this Water Financial Plan, Cost of Service, and Rate Study Report (Report) for the City of San Diego (City).

The major objectives of the study include the following:

- Develop a financial plan forecast which maintains the financial health of the water utility. This forecast was developed to ensure that revenue from rates and other sources meet annual operating expenses, payments on existing and proposed debt service, provide funding for the capital improvement program, and satisfies debt service coverage and reserve targets.
- Develop a comprehensive cost of service analysis which determines the cost to provide water service to each customer class.
- Develop cost of service based rates which meet the City's policy objectives and comply with legal and statutory requirements.
- Update the rate model developed previously and in use by the City.

The Report summarizes the key findings and recommendations related to the development of the financial plan for the water utility, the cost-of-service analysis and the development of the water rates.

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

Sincerely,

A handwritten signature in black ink that reads 'Todd Cristiano'.

Todd Cristiano
Vice President

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Executive Summary

Introduction

The City of San Diego (City) retained Raftelis to conduct a comprehensive financial planning, cost of service, and rate design study for its water utility. The City's overall objectives for this study included:

- Develop a multi-year financial plan for FY 2026 through FY 2029 (Study Period)¹, for the Water Fund to ensure that revenues from rates, fees, and charges are sufficient to cover annual operating expenses, the capital improvement program net of bond and loan proceeds and meet the City's reserve and debt service coverage requirements.
- Undertake a comprehensive cost of service analysis for the water utility to determine the costs of serving the various customer classes for the Study Period.
- Design rates for the Study Period which reflect the cost of serving each customer class.
- Update the previously developed comprehensive rate model used for the City's future financial planning and rate analysis.
- Comply with Proposition 218, Proposition 26, California Government Code Section 66013, the California Urban Water Conservation Council (CUWCC) Best Management Practices, and other regulatory requirements.
- Provide appropriate education and public outreach to the City Council, the general public, and other stakeholders to ensure successful implementation of current and future rate cases.

Study Findings and Conclusions

FINANCIAL PLAN

Projected water sales revenues at existing rates will be inadequate to meet the water utility's revenue requirements throughout the Study Period. Table 1 presents the recommended rate revenue adjustments necessary to meet the forecasted revenue requirements. These adjustments are required to pay for future water utility operating expenses, fund the capital improvement program, provide adequate reserves, and satisfy debt service coverage requirements throughout the Study Period. In addition, rate revenue should be sufficient to fund the cost of water purchased from the San Diego County Water Authority (SDCWA), the City's wholesale water provider. The increases necessary to cover CWA costs are shown below as "Pass-Through" increases.

¹ The City's financial operations are reported on a fiscal year basis July 1 through June 30 and noted in this report as FY, which is the twelve months ending June 30.

Table 1: Projected Rate Revenue and CWA Water Pass-Through Adjustments

Description	FY 2026	FY 2027	FY 2028	FY 2029
City Required Increase	2.5%	9.9%	5.5%	5.9%
Projected Water Purchases Pass-Through Increase	11.2%	4.6%	6.0%	5.1%
Total Annual Increase	13.7%	14.5%	11.5%	11.0%
Compounded Increase	13.7%	30.2%	45.2%	61.1%

COST-OF-SERVICE ANALYSIS

The total revenue requirements to be derived from charges for water service are synonymous with the definition of the costs of service. The development of equitable charges for utility service requires the allocation of the costs of service to various customer classes in a manner reflecting the respective service requirements of each class. Water utility service requirements recognized in the allocation of costs of service include volume of water used and maximum demands of water usage expressed in terms of maximum day and maximum hour demands.

The cost-of-service analysis presented in this study distributes the Test Year² revenue requirement to customer classes based on the principle of cost causation. This fundamental concept asserts that costs should be assigned to each customer class according to their demands placed on the system and the utility infrastructure and associated cost required to meet those requirements. This principle ensures that rates are proportional and aligned with the utility's operational and financial circumstances.

The cost of service by customer class is shown in Table 2 for the Test Year FY 2026. This table compares revenue under cost of service-based rates to the projected revenues by customer class under the City's proposed pass-through rate increase in May 2025. As indicated, the cost-of-service analysis reflects a shifting of costs among the customer classes resulting from the changes in cost components and customer class usage characteristics from the prior cost of service study. Overall, the customer classes will experience a 13.7% average increase (as indicated in Table 1), the unique class impacts are higher or lower than the average depending on the service requirements of the class.

Table 2: Cost of Service Summary

Customer Class	FY 2026 Revenue at May 2025 Rates		FY 2026 Cost of Service		Percent Change
	Revenue	Percent	Revenue	Percent	
Single Family	\$273,055,880	39.2%	\$314,194,804	39.6%	15.1%
Multi-Family	\$162,467,756	23.3%	\$188,741,708	23.8%	16.2%
Commercial	\$160,952,947	23.1%	\$179,716,932	22.7%	11.7%
Irrigation	\$91,325,544	13.1%	\$99,635,718	12.6%	9.1%
Temp Construction	\$4,113,350	0.6%	\$4,765,794	0.6%	15.9%
Private Fire Protection	\$5,445,042	0.8%	\$5,843,955	0.7%	7.3%
Total	\$697,360,519	100%	\$792,898,910	100%	13.7%

² Test Year refers to the year selected in the financial plan to develop cost of service and design rates. The Test Year for this report is FY 2026, as it is the first year of the study period and the first year for which the City has not yet adopted rates.

RATE DESIGN

The major objective of the utility cost of service analysis and rate design is to develop rates and charges that will meet, as nearly as practical, the cost of providing service for each class. A rate structure for each individual customer would place a financial and administrative burden on the utility's resources. Instead, grouping customers into classes with similar demand characteristics is a more manageable and practical method. This reduces potential variability in annual changes to individual rate structures and avoids the unnecessary complexity which would lead to diminishing returns of accuracy. The cost-of-service analysis serves as the basis of determining the cost of serving each class based on their particular service requirements.³

The City has the following customer classes which have been used in this study:

- Single family residential
- Multi-family residential
- Commercial/industrial/outside City
- Irrigation
- Temporary construction meters
- Private fire protection.

Most of the City's customers are billed bimonthly with a small number billed monthly. The City's current rate structure consists of a meter base fee which varies by water meter size and a volume rate which varies by class. The single-family residential volume rate is a 3-tiered structure. The other classes have a uniform rate which varies by class. Tables 3 through 5 present a comparison of current rates to the cost-of-service rates for the study period. The meter base fees shown are monthly. The bimonthly meter base fee is twice the monthly amount. The tier breakpoints for bimonthly single-family volume rates are double the monthly tier break points. For example, tier 1 for a customer billed monthly is 0 to 5 hundred cubic feet (HCF). The tier 1 breakpoint for a bimonthly single-family customer is 0 to 10 HCF or 2x the monthly threshold.

³ Customer class service parameters include average, maximum day and maximum hour demands, number of customers, and number of equivalent ¾" meters.

Table 3: Comparison of Current and Proposed Meter Base Fees
FY 2025 – FY 2029
\$ per month

Meter Size	FY 2025 [1]	FY 2025 [2]	FY 2025 [3]	FY 2026	FY 2027	FY 2028	FY 2029
Effective:	Jul. 2024	Jan. 2025	May 2025	Jan. 2026	Jan. 2027	Jan. 2028	Jan. 2029
5/8", 3/4"	\$25.15	\$27.33	\$28.84	\$33.11	\$37.92	\$42.29	\$46.95
1"	\$40.66	\$44.19	\$46.63	\$53.04	\$60.74	\$67.73	\$75.19
1.5"	\$79.43	\$86.32	\$91.07	\$102.87	\$117.79	\$131.34	\$145.79
2"	\$125.97	\$136.89	\$144.42	\$162.66	\$186.25	\$207.67	\$230.52
3"	\$288.83	\$313.87	\$331.14	\$371.92	\$425.85	\$474.83	\$527.07
4"	\$482.71	\$524.56	\$553.42	\$621.04	\$711.10	\$792.88	\$880.10
6"	\$1,118.64	\$1,215.63	\$1,282.49	\$1,438.15	\$1,646.69	\$1,836.06	\$2,038.03
8"	\$1,715.80	\$1,864.57	\$1,967.13	\$2,205.43	\$2,525.22	\$2,815.63	\$3,125.35
10"	\$3,259.10	\$3,541.69	\$3,736.49	\$4,188.42	\$4,795.75	\$5,347.27	\$5,935.47
12"	\$4,112.18	\$4,468.74	\$4,714.53	\$5,284.54	\$6,050.80	\$6,746.65	\$7,488.79
16"	\$6,051.01	\$6,575.68	\$6,937.35	\$7,775.73	\$8,903.22	\$9,927.10	\$11,019.09

[1] Rates adopted September 19, 2023 and effective July 1, 2024.

[2] Rates adopted September 19, 2023 and effective January 1, 2025.

[3] Rates not yet adopted, but proposed to take effect May 1, 2025.

Table 4: Comparison of Current and Proposed Volume Rates
FY 2025 – FY 2029
\$ per HCF

Customer Class	FY 2025 [1]	FY 2025 [2]	FY 2025 [3]	FY 2026	FY 2027	FY 2028	FY 2029
Effective:	Jul. 2024	Jan. 2025	May 2025	Jan. 2026	Jan. 2027	Jan. 2028	Jan. 2029
Single Family							
0 to 10 hcf	\$6.40	\$6.95	\$7.34	\$8.38	\$9.60	\$10.71	\$11.89
11 to 22 hcf	\$7.87	\$7.87	\$8.31	\$9.52	\$10.91	\$12.17	\$13.51
Above 22 hcf	\$9.91	\$9.91	\$10.46	\$12.25	\$14.03	\$15.65	\$17.38
Multi-Family	\$7.52	\$8.17	\$8.62	\$10.05	\$11.51	\$12.84	\$14.26
Commercial	\$7.33	\$7.97	\$8.41	\$9.36	\$10.72	\$11.96	\$13.28
Irrigation	\$8.62	\$9.37	\$9.89	\$10.72	\$12.28	\$13.70	\$15.21
Temp Construction	\$8.26	\$8.98	\$9.48	\$11.10	\$12.71	\$14.18	\$15.74

[1] Rates adopted September 19, 2023 and effective July 1, 2024.

[2] Rates adopted September 19, 2023 and effective January 1, 2025.

[3] Rates not yet adopted, but proposed to take effect May 1, 2025.

Table 5: Comparison of Current and Proposed Private Fire Service Fees
FY 2025 – FY 2029
\$ per month

Fireline Size	FY 2025 [1]	FY 2025 [2]	FY 2025 [3]	FY 2026	FY 2027	FY 2028	FY 2029
Effective:	Jul. 2024	Jan. 2025	May 2025	Jan. 2026	Jan. 2027	Jan. 2028	Jan. 2029
1"	\$2.32	\$2.52	\$2.66	\$3.75	\$4.30	\$4.80	\$5.33
1.5"	\$3.15	\$3.42	\$3.61	\$4.76	\$5.46	\$6.09	\$6.76
2"	\$4.59	\$4.99	\$5.27	\$6.50	\$7.45	\$8.31	\$9.23
3"	\$9.75	\$10.60	\$11.19	\$12.75	\$14.60	\$16.28	\$18.08
4"	\$18.64	\$20.26	\$21.38	\$23.54	\$26.96	\$30.07	\$33.38
6"	\$50.56	\$54.94	\$57.97	\$62.24	\$71.27	\$79.47	\$88.22
8"	\$105.63	\$114.79	\$121.11	\$128.99	\$147.70	\$164.69	\$182.81
10"	\$188.45	\$204.79	\$216.06	\$229.40	\$262.67	\$292.88	\$325.10
12"	\$303.25	\$329.54	\$347.67	\$368.57	\$422.02	\$470.56	\$522.33
16"	\$644.10	\$699.95	\$738.45	\$781.79	\$895.15	\$998.10	\$1,107.90
20"	\$1,156.81	\$1,257.11	\$1,326.26	\$1,403.36	\$1,606.85	\$1,791.64	\$1,988.73

[1] Rates adopted September 19, 2023 and effective July 1, 2024.

[2] Rates adopted September 19, 2023 and effective January 1, 2025.

[3] Rates not yet adopted, but proposed to take effect May 1, 2025.

Introduction

Study Background

The City's water system serves the City and the cities of Del Mar, Coronado and Imperial Beach, providing water to retail, wholesale, and recycled water customers. The water system's service area covers 404 square miles, including 325 square miles of the City, and a population of approximately 1.4 million people as of January 1, 2024.

The City, through its Public Utilities Department (PUD), operates the water system as a self-supporting enterprise, with revenues and expenditures accounted for separately from other enterprise and General Fund activities. The City and PUD are tasked to protect the long-term interests of water customers with respect to rate pricing, service quality and reliability of essential services, including system reliability during instances of highest possible demand. To achieve this objective, the PUD must consider the need for the water system to remain financially viable and provide reliable, safe, and secure water services to its consumers at all times. Promoting economic efficiency and long-term investment in facilities are factors that the PUD must consider in system planning and ratemaking.

Report Organization

This report contains the following sections:

- **Executive Summary.** Summarizes the study results for the water financial plan, cost of service analysis and rate design.
- **Introduction and Background.** Provides an overview and purpose of the study as well as key components of the study process.
- **Financial Plan.** Details the development of the financial plan, discussion of operating expenses, capital expenditures, debt service, reserve requirements, debt service coverage, and additional bonds test requirements.
- **Cost of Service Analysis.** Details the process for functionalizing, allocating, and distributing the revenue requirement to customer classes.
- **Rate Design.** Details the process for allocating the revenue requirement allocated to each class to the meter base fee and volumetric rate to calculate the rates for each customer class, including the calculation of the tiered volumetric rates for the single-family residential customer class.

The City's financial operations are reported on a fiscal year basis. The fiscal years are the twelve-month periods ending June 30 of each year. In this report the fiscal years are shown as FY XXXX.

Rate Setting Process

The rate setting process involves three steps: first, a revenue requirement is established that represents the total level of revenue required to provide water service, that is, to recover the utility's necessary operating and capital expenditures; second, this revenue requirement is attributed to customer classes based on the design and operation of the water system and the service demands placed on that system by customer classes; finally, rates are designed which recover customer class cost of service by allocating the proportional cost of the services attributable to the customers in each class.

REVENUE REQUIREMENTS

The revenue requirements analysis determines the overall level of revenue required to provide water service, including ensuring that sufficient revenues will be available to support the utility's required operating and capital costs. The revenue requirements of the water utility are derived from the financial plan discussed in the following section. The revenue requirement from a single year, or Test Year, is then used as the basis for the cost-of-service analysis and rate design.

COST OF SERVICE ANALYSIS

The second step of the rate setting process, the cost-of-service analysis, attributes the total revenue requirement to customer classes based on each class's use of the water system. Each customer class places a different level of demand on the system – demands that the City's water system is designed and operated to meet. Customer class demands are cost drivers; the cost-of-service analysis establishes the nexus between how the system is designed and operated and how different types of customers are using the system. The cost of service analysis involves three primary steps: *cost functionalization*, which relates the revenue requirement to the major operating functions of the water system; *cost allocation*, which relates these functional costs to demand components which represent the types of demand that drive these functional costs; and *cost distribution*, which attributes the allocated costs by demand component to each customer class in proportion to that class's share of demand.

The cost-of-service analysis involved analyzing the characteristics of each customer class such as demand factors or different delivery costs, service characteristics, and demand patterns. This analysis included a review of such matters as system operations and water usage data—e.g., capacity (maximum day and maximum hour demands)⁴, commodity (average day demand), number of customers, equivalent meter size, and public fire protection services⁵. The impact that these matters have on system operations determined how the costs were allocated among the various customer classes. For example, the single family residential class uses a greater percentage of the City's customer support services than the percentage of water consumed by the single family residential class. By calculating the cost of service for each customer class in this step, we ensure that the rates calculated in the next step proportionately allocate the system's costs to the customer classes.

RATE DESIGN

As noted above, the financial plan determines the test year revenue requirement, and the cost-of-service analysis allocates the revenue requirement to customer classes. In the rate design step, we allocate each customer class cost of service to the monthly meter base fee and volumetric charge for each customer class. Next, we decide whether to use a uniform or tiered rate structure for each customer class. Finally, we calculate the uniform rate or tiered rates for each customer class. For each customer class, the amount collected through the meter base fee and the volumetric rate(s) must equal the revenue requirement for the customer class.

Reliance on City Provided Data

During this project, the City (and/or its representatives) provided Raftelis with a variety of technical information, including cost and revenue data. Raftelis reviewed the data provided for reasonableness but did not independently assess or test for the accuracy of such data – historic or projected. Raftelis has relied on this data in the formulation

⁴ The term "capacity" refers to the system's ability to supply water to all delivery points at the time when demanded. A system's facilities are built and operated at the size necessary to meet water demand at the time of the highest demand on the system -- a peak demand event. The costs to size the system to meet peak demand include operating and capital costs for facilities to meet peak demand, including treatment, storage, distribution and transmission costs. Both the operating costs and the capital assets-related costs for the system facilities sized to meet peak demand are allocated to each customer class based upon the class's projected peak demand.

⁵ This refers to the need to increase the size of transmission and distribution lines to provide public fire protection requirements.

of our findings and subsequent recommendations, as well as in the preparation of this report. Raftelis also relied on cost allocation data provided by the City needed to complete the cost of service analysis.

There are often differences between actual and projected data. Some of the assumptions used for projections in this report will not be realized, and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the data or results projected in this report and actual results achieved, and those differences may be material. As a result, Raftelis takes no responsibility for the accuracy of data or projections provided by or prepared on behalf of the City, nor do we have any responsibility for updating this report for events occurring after the date of this report.

In conducting the cost-of-service analysis, Raftelis reviewed the books, records, agreements, capital improvement programs, customer sales, and financial projections for the City's water system. The documents, information and data were provided to the consultant by the City. Raftelis also conferred with City staff, including finance, planning, and engineering staff.

In the study, Raftelis made rate calculations using the best estimates of the City's expected costs, planned capital improvements, and future customer demands. Making such calculations in advance is normal for public water providers because providers need to recover revenue matched to public budgets adopted in advance of their fiscal periods. For this reason, and others, achieving mathematical exactitude in rate calculations is impossible. Instead, there are methods and techniques available to water providers that yield reasonable proportionality between the costs incurred to provide water service and the demand for that service. These methods and techniques are broadly referred to as "cost-of-service principles".

Financial Plan

Introduction

The City accounts for the operation of its water utility system through an enterprise fund known as the Water Utility Fund (Water Fund) that is managed by the Public Utilities Department. The Water Fund is a self-supporting enterprise fund. This means that the cost of annual water operations and maintenance (O&M) expenses, capital projects, debt service, and reserve requirements is met through cash inflows from water rates, capacity fees, miscellaneous revenues, and the proceeds from external debt financing. Some of the expenses incurred by the City of San Diego to provide recycled water service are also included in water utility expenses.

The water system operates in an area subject to strict regulatory oversight by Federal and State agencies such as the U.S. Environmental Protection Agency (USEPA), California Division of Drinking Water (DDW), California Department of Public Health (DPH), and the San Diego County Air Pollution Control District. The water system must comply with a multitude of laws including, but not limited to, the Safe Drinking Water Act. Complying with these regulations and resulting mandates contributes to a large share of the cost burden on the system.

May 2025 Pass-through Increase

Near the end of FY 2024, the City became aware that the SDCWA intended to significantly increase rates for wholesale purchased water in FY 2025. Although the City had accounted for a rate increase from SDCWA when developing FY 2025 retail water rates in 2023, the increase imposed by SDCWA was larger than expected. The City's cost to purchase water from January 1 through June 30 of 2025 will now be approximately \$7.9 million higher than under the previously expected wholesale rates; therefore, the City intends to implement an additional pass through rate increase of 5.5% in May 2025. Table 6 provides a summary of the current rates as of October 2024, the rates to be effective January 1, 2025, and the proposed rates for May 1, 2025.

Table 6: Proposed May 2025 Rate Increase

Description	Current	Approved	Proposed
	July 2024	Jan. 2025	May. 2025
Fixed Charge (per month)			
5/8", 3/4"	\$25.15	\$27.33	\$28.84
1"	\$40.66	\$44.19	\$46.63
1.5"	\$79.43	\$86.32	\$91.07
2"	\$125.97	\$136.89	\$144.42
3"	\$288.83	\$313.87	\$331.14
4"	\$482.71	\$524.56	\$553.42
6"	\$1,118.64	\$1,215.63	\$1,282.49
8"	\$1,715.80	\$1,864.57	\$1,967.13
10"	\$3,259.10	\$3,541.69	\$3,736.49
12"	\$4,112.18	\$4,468.74	\$4,714.53
16"	\$6,051.01	\$6,575.68	\$6,937.35
Fire Service Fees (per Month)			
1"	\$2.32	\$2.52	\$2.66
1.5"	\$3.15	\$3.42	\$3.61
2"	\$4.59	\$4.99	\$5.27
3"	\$9.75	\$10.60	\$11.19
4"	\$18.64	\$20.26	\$21.38
6"	\$50.56	\$54.94	\$57.97
8"	\$105.63	\$114.79	\$121.11
10"	\$188.45	\$204.79	\$216.06
12"	\$303.25	\$329.54	\$347.67
16"	\$644.10	\$699.95	\$738.45
20"	\$1,156.81	\$1,257.11	\$1,326.26
Volume Rates (per hcf)			
Single Family			
0 to 10 hcf	\$6.40	\$6.95	\$7.34
11 to 22 hcf	\$7.87	\$7.87	\$8.31
Above 22 hcf	\$9.91	\$9.91	\$10.46
Multi-Family	\$7.52	\$8.17	\$8.62
Commercial	\$7.33	\$7.97	\$8.41
Irrigation	\$8.62	\$9.37	\$9.89
Temp Construction	\$8.26	\$8.98	\$9.48

Financial Plan and Revenue Requirement

For the first step in the study, we analyzed the water system's past revenues and projected expenses to determine the total revenue requirement for the water system in the test year. The total revenue requirement is the total receipts that the City must recover from its rates to pay for the costs of providing water service to its customers, including all operating, capital, debt and reserve expenditures during the test year. In preparing the financial plan and calculating the total revenue requirement, Raftelis reviewed the books, records, agreements, capital improvement programs, debt and reserve policies, customer sales, and financial projections for the City's water system.

For the purposes of this study, water utility financial information has been subdivided into two primary sub-funds; operating and capital. Separate financial forecasts have been made for the operating and capital sub-funds for the study period to determine the adequacy of revenues under existing rates to meet revenue requirements.

Operating Fund

The operating fund tracks financial activities associated with annual operating revenues and revenue requirements.

BEGINNING FUND BALANCE

The total beginning fund balance for FY 2026 is projected to be \$298.1 million which consists of \$118.9 million of operating reserves and \$180.4 million of unrestricted reserves discussed later in this report.

REVENUES

Revenue of the water utility is derived primarily from water sales, which represent approximately 89% of total revenue. Annual revenue adjustments are set to meet both the City's needs and the pass-through of water purchase cost increases from the SDCWA over which the City has no control; water purchase costs are passed directly to the customer. The proposed rates are intended to recover these expenses; however, if water purchase costs are greater than expected, the City may need to implement additional rate increases to recover pass-through costs which exceed these projections.

Other water sales include potable water sales to California American Water (CalAmerican) which Cal American resells to its customers and the sale of wholesale recycled water to three different wholesale accounts. Other operating revenue includes miscellaneous service charges, new water charges, property leases and rentals, and averages \$16.6 million annually. Table 7 summarizes the annual sources of revenue for the Study Period.

Table 7: Revenue Summary (\$ millions)

Description	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Rate Revenue					
Revenue from Existing Rates	\$652.6	\$697.4	\$700.4	\$702.1	\$703.9
Revenue from Proposed Rate Adjustments	\$0.0	\$47.8	\$153.7	\$264.5	\$374.0
Subtotal	\$652.6	\$745.1	\$854.1	\$966.7	\$1,077.9
Non-Rate Operating Revenues					
Recycled Water/Pure Water Credits	\$0.0	\$0.2	\$7.6	\$11.4	\$11.4
Other Water Sales	\$42.3	\$44.4	\$48.8	\$52.9	\$57.2
Other Operating Revenues	\$16.3	\$16.7	\$16.7	\$16.7	\$16.7
Subtotal	\$58.6	\$61.4	\$73.2	\$81.0	\$85.3
Non-Operating Revenues	\$3.4	\$19.7	\$20.3	\$10.9	\$11.4
Interest Earning on Operating Fund	\$8.0	\$7.8	\$6.5	\$5.4	\$6.2
Total Revenues	\$722.6	\$834.1	\$954.1	\$1,064.0	\$1,180.9

REVENUE REQUIREMENTS

Revenue requirements of the water utility include O&M, debt service, transfers to the capital improvement fund, and funding reserves.

Operation and Maintenance Expenses

O&M consists of the cost of personnel and materials to treat and distribute clean potable water that meets all state and federal requirements 100% of the time. Since these costs are an annual obligation of the water utility, they must be met from annual water sales revenue. Personnel costs consist of salaries and wages and fringe benefits and total \$136.6 million in FY 2026. The COS does not project for the potential impacts of any future Memorandum of Understandings (MOU) with Recognized Employee Organizations (REOs), except for the 3.05% assumed by the San Diego City Employees' Retirement System actuaries. Personnel costs average 36.5% of total non-water purchase O&M expenses over the study period.

Remaining O&M expenses include supplies, contracts, IT, energy and utilities, transfers out to other funds (which includes transfers to the Water Enterprise Asset Management Water Inventory and to record the cash impacts of asset transfers from other funds), capital expenses for equipment outlay, miscellaneous debt expenses such as bond-arbitrage rebate expenses and capital lease payments, and purchased water costs. Debt service obligations, including bond, commercial paper, State Revolving Fund loans (SRF Loans) and Water Infrastructure Finance Innovation Act (WIFIA) loan payments are not considered an O&M expense and are discussed in the following Debt Service section. Table 9 summarizes the O&M expenses for the study period.

Water Sales and Purchases

Table 8 presents historical and forecasted water sales and purchases. As seen in the City's sales, it is common for water use to fluctuate from year to year. Weather has a significant effect on sales; in rainy years, like FY 2023 and FY 2024, sales were lower. Although the City has experienced higher than expected water sales in the first portion of FY 2025, City staff believes that this level of water sales is unlikely in the future. Forecasted water sales assume a return to approximately the average water use since FY 2019. Single Family, multi-family, commercial, and irrigation accounts are projected to grow a modest .25% per year reflecting increasing number of customers, however, there are no expected changes in the water use per account.

The City purchases most of the water it sells from SDCWA . Purchased water supply costs are the largest component of O&M expenses, averaging 46.1% of total operating expenses over the Study Period. In FY 2022, the City purchased approximately 167,000 acre-feet of untreated water from SDCWA. Since then, the City has decreased purchases in favor of local sources due to rapidly increasing costs to purchase untreated water from SDCWA; the City experienced a 14% rate increase in FY 2025 and expects increases of 16.4% in FY 2026 and 7% per year through at least FY 2029. The Pure Water project is expected to begin supplying water to the City at the end of FY 2026, further reducing demand for untreated water from the SDCWA to approximately 108,000 acre-feet in FY 2029.

Table 8: Water Sales and Purchases

Description	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Water Sales (hcf)											
Single Family	22,999,683	23,220,504	25,482,192	23,787,706	21,229,780	21,208,603	22,955,136	23,012,524	23,070,055	23,127,730	23,185,549
Multi-Family	15,273,748	15,472,165	17,019,438	16,236,868	16,026,512	16,626,268	15,668,578	15,707,749	15,747,018	15,786,386	15,825,852
Commercial	17,666,956	17,135,546	16,367,057	16,923,277	16,798,809	16,565,679	16,330,962	16,371,790	16,412,719	16,453,751	16,494,885
Irrigation	7,912,350	7,781,880	9,326,098	8,466,687	6,694,339	7,049,597	8,170,353	8,190,779	8,211,256	8,231,784	8,252,363
Temp. Construction	317,883	332,775	279,015	332,448	529,638	133,464	320,812	320,812	320,812	320,812	320,812
Cal. American	4,273,265	4,124,415	4,372,729	4,640,574	4,203,483	3,553,082	4,640,574	4,355,373	4,355,373	4,355,373	4,355,373
Subtotal	68,443,885	68,067,285	72,846,529	70,387,560	65,482,561	65,136,693	68,086,415	67,959,027	68,117,233	68,275,836	68,434,834
Water Loss Estimate	6,440,015	6,404,580	6,854,269	6,622,900	6,161,379	6,128,835	6,406,380	6,394,394	6,409,280	6,424,203	6,439,164
Total Water Requirement (hcf)	74,883,900	74,471,865	79,700,798	77,010,460	71,643,940	71,265,528	74,492,796	74,353,422	74,526,514	74,700,040	74,873,998
Total Water Requirement (AF)	171,910	170,964	182,968	176,792	164,472	163,603	171,012	170,692	171,089	171,488	171,887
Water Purchases (AF)											
Purchased from SDCWA	153,086	153,071	146,968	166,792	136,686	128,603	116,012	114,992	105,689	107,888	108,287
Other Local Sources	18,824	17,893	36,000	10,000	27,786	35,000	55,000	55,700	65,400	63,600	63,600
Total	171,910	170,964	182,968	176,792	164,472	163,603	171,012	170,692	171,089	171,488	171,887

Table 9: Operation and Maintenance Expense Summary (\$ millions)

Description	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	% of Total	% of Total Non-Water Purchases
Purchased Water Supply Costs							
Fixed Costs	\$98.4	\$117.9	\$130.8	\$139.9	\$149.7	17.8%	
Variable Costs	\$174.2	\$193.6	\$199.0	\$217.4	\$233.4	28.4%	
Subtotal	\$272.6	\$311.5	\$329.8	\$357.3	\$383.1	46.1%	
Personnel Costs							
Salaries	\$81.6	\$87.1	\$91.1	\$95.0	\$97.9	12.6%	23.4%
Fringe	\$48.6	\$49.5	\$50.5	\$51.5	\$52.6	7.0%	13.1%
Subtotal	\$130.2	\$136.6	\$141.6	\$146.5	\$150.5	19.2%	36.5%
All Other O&M							
Supplies	\$30.2	\$36.5	\$44.3	\$48.6	\$49.2	5.8%	10.8%
Contracts	\$110.5	\$136.6	\$142.3	\$141.6	\$129.0	18.4%	34.2%
Information Technology	\$17.8	\$18.3	\$19.2	\$19.5	\$19.8	2.6%	4.9%
Energy and Utilities	\$18.9	\$29.8	\$60.9	\$61.7	\$62.6	6.5%	12.1%
Other Expenses	\$0.6	\$0.6	\$0.6	\$0.6	\$0.6	0.1%	0.1%
Capital Expenses	\$4.6	\$6.7	\$5.8	\$4.8	\$4.7	0.7%	1.4%
Subtotal	\$182.5	\$228.5	\$273.1	\$276.7	\$265.8	34.2%	63.5%
Subtotal - Excluding Purchased Water	\$312.7	\$365.1	\$414.7	\$423.2	\$416.4	53.9%	100.0%
Total Operating Expenses	\$585.3	\$676.6	\$744.4	\$780.5	\$799.5	100.0%	

Debt Service

The water utility currently makes debt service payments for revenue bonds, commercial paper, SRF loans and the WIFIA loan. Existing and proposed debt service in FY 2026 totals \$145.1 million. Payments on proposed debt in FY 2026 are estimated at \$27.3 million. Table 10 summarizes the existing and proposed debt service for the study period.

Table 10: Existing and Pending Debt Service Summary (\$ millions)

Debt Service Summary	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Summary of Debt Service by Type					
Existing Debt					
Revenue Bonds	\$96.3	\$97.8	\$97.2	\$97.2	\$97.2
SRF Loans	\$6.2	\$8.0	\$11.8	\$15.7	\$18.3
WIFIA	\$7.0	\$12.0	\$12.6	\$12.6	\$12.5
CP Refinancing	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Subtotal	\$109.5	\$117.8	\$121.6	\$125.5	\$128.1
Proposed Debt					
Commercial Paper	\$4.8	\$4.8	\$0.0	\$6.9	\$0.0
Refinance CP - Revenue Bond	\$5.1	\$15.2	\$31.3	\$31.3	\$47.9
New Revenue Bonds	\$2.4	\$7.3	\$23.4	\$23.4	\$38.0
Subtotal	\$12.3	\$27.3	\$54.8	\$61.7	\$85.9
Total	\$121.8	\$145.1	\$176.4	\$187.1	\$214.1
Summary of Debt Service by Lien					
Existing Debt					
Senior	\$42.7	\$44.4	\$46.7	\$49.8	\$51.8
Subordinate	\$66.8	\$73.3	\$74.9	\$75.7	\$76.3
Subtotal	\$109.5	\$117.8	\$121.6	\$125.5	\$128.1
Proposed Debt					
Senior	\$5.1	\$15.2	\$31.3	\$31.3	\$31.3
Subordinate	\$7.3	\$12.1	\$23.4	\$30.3	\$54.6
Subtotal	\$12.3	\$27.3	\$54.8	\$61.7	\$85.9
Total	\$121.8	\$145.1	\$176.4	\$187.1	\$214.1

PAYGO Capital Transfers

Transfers of cash to the capital sub-fund are used to partially fund the City's water capital improvement program. The use of cash to fund capital improvements is referred to as pay-as-you-go or "PAYGO" funding. These transfers vary each year based on the number of projects funded and the type of funding used for each project. Net transfers to assist in funding the CIP total \$518.2 million over the study period. The City aims for an 80% / 20% debt to PAYGO capital ratio in order to maximize the use of long-term financing for the CIP.

TARGET RESERVES

The City maintains four different types of reserves for the Water Fund: Emergency Operating, Emergency Capital, Rate Stabilization, and Secondary Purchase reserves. The City's financial policy requires minimum balances based on the following requirements:

- **Emergency operating:** 70 days of O&M excluding contingencies, water purchases, and debt service
- **Emergency capital:** \$5,000,000
- **Rate stabilization:** 5% of prior year operating revenue
- **Secondary purchase:** 6% of annual water purchases budget

The total reserves balance for FY 2026 is projected to be \$225 million.

FINANCIAL PLAN SUMMARY

Projected water sales revenue under existing rates is inadequate to meet revenue requirements and sustain minimum reserves throughout the study period. Table 11 shows the cash flow summary including the annual rate revenue adjustments, reserve levels and debt service coverage.

Table 11: Operating Sub-Fund Financial Plan (\$millions)

Description	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Operating Reserve					
Beginning Balance	\$236.5	\$298.1	\$224.9	\$207.2	\$155.3
Less: Restricted Reserves	\$127.7	\$117.7	\$105.4	\$104.3	\$120.6
Unrestricted Balance	\$108.9	\$180.4	\$119.4	\$102.9	\$34.7
Sources of Funds					
Rate Revenues	\$652.6	\$745.1	\$854.1	\$966.7	\$1,077.9
Recycled Water/Pure Water Credits	\$0.0	\$0.2	\$7.6	\$11.4	\$11.4
Water Sales	\$42.3	\$44.4	\$48.8	\$52.9	\$57.2
Operating Income	\$16.3	\$16.7	\$16.7	\$16.7	\$16.7
Non-Operating Income	\$3.4	\$19.7	\$20.3	\$10.9	\$11.4
All Other Income	\$8.0	\$7.8	\$6.5	\$5.4	\$6.2
Total	\$722.6	\$834.1	\$954.1	\$1,064.0	\$1,180.9
Uses of Funds					
Operation and Maintenance Expense	\$585.3	\$676.6	\$744.4	\$780.5	\$799.5
Existing Debt Service	\$109.5	\$117.8	\$121.6	\$125.5	\$128.1
Proposed Debt Service	\$12.3	\$27.3	\$54.8	\$61.7	\$85.9
Interest Earnings on Debt Reserve	(\$0.0)	(\$0.0)	(\$0.0)	(\$0.0)	(\$0.0)
PAYGO Transfers	(\$46.1)	\$85.7	\$51.0	\$148.3	\$61.9
Total	\$661.1	\$907.3	\$971.8	\$1,115.9	\$1,075.4
<i>Change in Fund Balance</i>	<i>\$61.6</i>	<i>(\$73.2)</i>	<i>(\$17.7)</i>	<i>(\$51.9)</i>	<i>\$105.5</i>
Ending Balance	\$298.1	\$224.9	\$207.2	\$155.3	\$260.8
Restricted Reserves	\$117.7	\$105.4	\$104.3	\$120.6	\$191.1
Unrestricted Ending Balance	\$180.4	\$119.4	\$102.9	\$34.7	\$69.7
Annual Rate Revenue Adjustment		2.5%	9.9%	5.5%	5.9%
Water Purchase Pass-Thru Increases		11.2%	4.6%	6.0%	5.1%
Total Adjustment		13.7%	14.5%	11.5%	11.0%
Debt Service Coverage					
Senior Debt Service Coverage	3.4	3.3	3.0	3.5	4.4
Aggregate Debt Service Coverage	1.3	1.3	1.3	1.5	1.7

Capital Fund

The capital fund tracks financial activities associated with funding the capital improvement program.

USES OF FUNDS

Capital improvement expenditures, summarized in Table 12, include both expansion and repair and replacement projects.

Pure Water projects total \$500 million and represent 22.3% anticipated spending in these years. The Pure Water Program represents a significant capital improvement program of the City's Water System and Wastewater System. The City expects that upon full implementation projected in 2035, the facilities will produce 83 mgd of locally controlled water.

The Pure Water Program is being funded by both the water and wastewater funds. The costs included in this study represent the proportion of costs incurred to benefit the water system only and do not include any wastewater related costs. Per the agreement with the Metro Wastewater Joint Powers Authority and its participating agencies, metropolitan wastewater system pays for costs associated up to secondary treatment of wastewater, which is the level of treatment required for ocean discharge. Costs will be trued up at the end of the project based on the final project costs. The City also splits costs between the wastewater system and the water system for Smart Metering which has a 70% Water, 30% Wastewater split. This allocation is based on how many total reads for all customer classes are required to develop water and wastewater bills, and apportioning costs to the water and wastewater funds based on their respective reads required to generate their billings.

Table 12: Capital Improvement Program Summary (\$ millions)

Description	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	Total
Pure Water	\$313.9	\$130.5	\$38.6	\$12.6	\$4.4	\$500.0
Transmission Pipelines	\$40.5	\$70.9	\$133.9	\$115.2	\$148.7	\$509.3
Pipelines	\$115.1	\$136.3	\$215.1	\$219.6	\$145.6	\$831.7
Storage Facilities	\$12.6	\$22.6	\$31.8	\$26.7	\$42.9	\$136.5
Water Treatment Plant	\$9.8	\$11.3	\$15.1	\$31.8	\$38.8	\$106.8
Pump Stations	\$5.1	\$11.7	\$7.3	\$7.9	\$9.8	\$41.8
SDG&E Relocation Advance	(\$22.5)	\$0.0	\$0.0	\$0.0	\$0.0	(\$22.5)
Groundwater Projects	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Recycled Water	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Miscellaneous Projects	\$2.6	\$19.1	\$42.0	\$45.5	\$30.2	\$139.4
Total	\$477.1	\$402.4	\$483.8	\$459.3	\$420.4	\$2,243.0

SOURCES OF FUNDS

Sources include cash transfers from the operating fund, revenue bond and commercial paper proceeds, grants, State Revolving Fund (SRF) loans, and the Water Infrastructure Finance Innovation Act (WIFIA) loan. Rate and capacity fee funded projects total \$375.9 million for the study period. Various borrowing programs will provide \$1,867 million. Total funding for the study period is projected at \$2,243 million, corresponding to the capital needs shown in Table 12. Table 13 shows the funding sources for the capital improvement program over the study period.

Table 13: Capital Sources of Funds (\$ millions)

Description	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	Total	% of Total
Source of Funds for Pure Water Program CIP							
WIFIA Loan	\$254.9	\$96.6	\$9.3	\$0.0	\$0.0	\$360.8	
Cash	\$59.0	\$33.9	\$29.3	\$12.6	\$4.4	\$139.2	
Grants	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Subtotal	\$313.9	\$130.5	\$38.6	\$12.6	\$4.4	\$500.0	22.3%
Source of Funds for Baseline Program CIP							
Commercial Paper/Revenue Bonds	\$229.1	\$160.0	\$340.0	\$230.0	\$240.0	\$1,199.1	
SRF Loans	\$24.2	\$45.1	\$68.4	\$66.0	\$103.5	\$307.2	
Capacity Fees / Cash	(\$90.1)	\$66.8	\$36.8	\$150.7	\$72.4	\$236.7	
Subtotal	\$163.2	\$271.9	\$445.2	\$446.7	\$415.9	\$1,743.0	77.7%
Total	\$477.1	\$402.4	\$483.8	\$459.3	\$420.4	\$2,243.0	100.0%

Cost of Service Analysis

Introduction

The cost-of-service analysis is designed to evaluate and allocate the costs of providing water service to the various classes of customers. The primary purpose of the analysis is to ensure that the rates charged to customers are proportional and sufficient to cover the utility's costs for providing reliable and sustainable water service to its customers. Raftelis reviewed the City's historical financial, operational and customer data and City projections of future customer consumption. Raftelis also conferred with City staff, including finance, planning and engineering staff to gather data and information used in the cost of service analysis.

A cost-of-service analysis involves the following steps:

1. **Cost Functionalization:** O&M and capital expenses are categorized by their function in the system, which include supply, treatment, distribution, transmission, customer service, etc.
2. **Cost Component Allocation:** Functionalized costs are then allocated to cost causation components based on their burden on the system. The cost causation components include commodity, demand, meter and services, customer service, amongst others. The functionalized revenue requirement (from Step 1) is allocated to the cost causation components and results in the total revenue requirement for each cost causation component.
3. **Development of Units of Service:** The units of service provide a consistent and quantifiable framework for measuring how customers interact with the water utility. The units of service reflect the level of service demands for each of the customer classes. The demand characteristics provide the basis to determine each customer class's share of costs in later steps. These units include annual water use, maximum day and maximum hour water use, number of accounts, and number of water meters⁶.
4. **Unit Cost Determination:** 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. The unit cost for a given cost component is the same for all customer classes, ensuring that each customer class is allocated their proportionate share of costs.
5. **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.

FY 2026 Test Year Revenue Requirement

The FY 2026 test year revenue requirement is presented in Table 14 and totals \$792.9 million and consists of water purchases, operation and maintenance expense, existing and proposed debt service, interest earnings, rate funded capital, changes in cash reserves and includes offsets for wholesale water sales, recycled water credits, other operating revenues, and other non-operating income.

⁶ The water meters used to serve individual customers range in size from 5/8" to 16". The larger the meter the greater the potential demand that can be placed on the water system. In this Study the number of equivalent 3/4" meters is used to equate the number of meters based on the relative capacity of the larger meters compared to a 3/4" meter.

The revenue requirement also includes a mid-year adjustment, to account for a mid-fiscal year implementation of the new rates anticipated to be made effective in January of 2026, partially through the City's fiscal year (July 1 to June 30). The expenses and forecasted customer accounts and water use described in this report correspond to the full fiscal year. Therefore, the test year revenue requirement must include an adjustment that represents the revenue that is foregone by implementing the rate increase on some day other than the first day of the fiscal year. The amount of the mid-year adjustment is determined by calculating the additional amount of revenue that the proposed FY 2026 revenue increase (13.7%) would recover in the months of July through December. This amount is added to the cash revenue requirements to determine the test year revenue requirement.

Table 14: FY 2026 Test Year Revenue Requirement

Description	Operating	Capital	Total
Expenses			
Purchased Water	\$311,487,700		\$311,487,700
O&M	\$365,125,063		\$365,125,063
Existing Debt Service		\$117,753,712	\$117,753,712
Proposed Debt Service		\$27,301,379	\$27,301,379
Rate Funded Capital		\$85,679,269	\$85,679,269
Change in Cash Reserves	(\$60,303,250)	(\$12,925,313)	(\$73,228,563)
Subtotal	\$616,309,513	\$217,809,047	\$834,118,560
Mid-Year Rate Adjustment		\$47,769,196	\$47,769,196
Subtotal Before Revenue Offsets	\$616,309,513	\$265,578,243	\$881,887,756
Revenue Offsets			
MWD Credits	\$238,000		\$238,000
Other Water Sales	\$44,402,076		\$44,402,076
Other Operating Revenues	\$16,745,388	\$0	\$16,745,388
Non-Operating Revenues	\$19,115,564	\$612,401	\$19,727,965
Interest Earnings	\$7,844,543	\$30,874	\$7,875,417
Subtotal	\$88,345,571	\$643,275	\$88,750,846
Total Revenue Requirement	\$527,963,942	\$264,934,968	\$792,898,910

The next step in the analysis is to convert the test year revenue requirement into costs that best reflect the cost associated with demands placed on the system. Those costs are proportionately allocated to customer classes based on their respective customer demand and customer service characteristics to determine class cost of service—the portion of the total revenue requirement to be recovered from each customer class through the meter base fee and volumetric rates. Customer demand characteristics include average day demand, maximum day demand, and maximum hour demand. Customer service characteristics include the number of accounts and the number of equivalent meters. The first step in allocating costs to cost components is to functionalize the revenue requirement by dividing the total revenue requirement into various operating and capital cost categories. Costs assigned to these functional cost categories will then be allocated to the cost components.

Functional Cost Categories

Water systems are comprised of several facilities (unit processes or functions) that are designed and operated to collect, treat, store, and distribute water to customers. The separation of costs into functional cost categories provides a means for distributing costs to customer classes based on their respective demands on the system.

The O&M revenue requirement can be functionalized into cost categories based on the line-item descriptions in the budget. O&M functional cost categories include expenses for day-to-day operations and management during the applicable year. Table 15 shows the FY 2026 O&M revenue requirement allocated to functional categories. The allocation of O&M to functional cost categories was determined by City staff through discussions led by the Deputy Director of Finance. The basic premise supporting the functionalization process for O&M is to assign a cost to the function associated with the costs. Raftelis provided guidance on this approach but ultimately relied on the City's best judgement in assigning the O&M costs to the functional cost categories.

Table 15: Functionalization of O&M Expenses

O&M Function	Total
Raw Water Reservoirs	\$59,077,213
CWA Supply - Volume	\$186,162,600
CWA Supply - Fixed	\$113,307,533
Water Treatment Plants	\$61,650,036
Pumping	\$107,998
Transmission	\$29,258,993
Distribution	\$42,393,623
Pure Water	\$37,698,192
Billing	\$12,220,318
Meters and Services	\$27,573,745
Infrastructure Indirect	\$43,839,034
Fire Hydrants	\$3,020,228
Total	\$616,309,513

Table 16 shows the FY 2026 capital cost revenue requirements allocated to the functional cost categories based on the proportionate value of assets. The value of water system assets provides a reasonable basis for allocating the expenses in the capital cost categories to the cost components. Annual capital improvement program costs vary significantly from year to year as well as project types. Allocating the test year capital costs on a project-by-project basis alone may result in a distribution of cost allocations which fluctuates significantly from year to year. Therefore, Raftelis allocated the capital cost categories based on the value of existing assets, plus project additions from the City's capital improvement program.

The value of system assets is based on the new replacement cost of existing assets, escalated from original cost using the Construction Cost Index published by the Engineering News Record. The inflated value of the projects in the capital plan from FY 2025 to FY 2030 (Table 12) is added to the existing assets to determine the total system value by function. These functional values are used to proportionally allocate the test year capital costs as shown in Table 16.

Table 16: Functionalization of Capital Costs

Capital Function	Total
Groundwater Projects	\$217,148
Pipelines	\$139,269,709
Pump Stations	\$10,666,443
Pure Water	\$13,522,139
Recycled Water	\$1,898,007
Storage Facilities	\$36,725,033
Transmission Pipelines	\$18,580,575
Water Treatment Plant	\$31,758,275
Fire Hydrants	\$2,558,458
Meters	\$881,534
Miscellaneous Projects	\$9,448,992
Smart Metering	\$51,931
Total	\$265,578,243

Cost Components

Once costs have been separated into cost categories by function, they can be further allocated to cost components. Allocating costs to cost components provides a means of assigning the functionalized expenses based on the design and functional parameters that characterize each water system expense. Cost components correspond to the unique demand characteristics of the customer classes to recover costs from the customers who cause the utility to incur them.

Functional O&M cost categories are generally allocated to the cost components that best reflect the design or functional parameter associated with each category of expense. For example, the variable portion of water supply expenses are allocated to the Supply cost component because source of supply facilities are designed to meet average day demands. Pumping is used to meet Base and extra capacity (Max Day and Max Hour) demand. Therefore, the Pumping cost category is allocated to the average day, maximum day extra capacity, and maximum hour extra capacity cost components.

The allocation methodology used in this study is the Base-Extra Capacity Methodology, which is the most common allocation methodology employed for water utilities throughout California and the United States. This methodology incorporates the following standard cost components: Base, Max Day, Max Hour, Meters and Services, Billing, and Fire Protection. The premise of this methodology is that since the water system is designed and operated to not only provide water on average days (noted as Base) but also is used to meet maximum day and maximum hour demand and as such costs should be segmented to these components. The City's water system is designed and operated in a manner that aligns well with this methodology. This study also incorporates additional components to specifically allocate the various charges from the SDCWA to the meter base fee and volume rates; these components are SDCWA Supply-Volume and SDCWA Supply-Fixed. As discussed in more detail in the Rate Design section below, the expenses in the SDCWA Supply-Volume, Base, Max Day, and Max Hour cost components (Volume Cost Components) are recovered through the volumetric rate charged to each customer class. In contrast, the Meters, Billing, Fire Protection, and SDCWA Supply-Fixed components (Customer Cost Components) are recovered through the meter base fee paid by each customer.

VOLUME COST COMPONENTS AND SYSTEM DEMAND FACTORS

The City's Water System is designed and operated to meet not only the average water demands of customers but also their maximum daily and hourly demands. The Base-Extra Capacity method for allocating the functional cost categories to the cost components of Base, Max Day Extra Capacity, and Max Hour Extra Capacity recognizes that the water system is sized and operated in a manner to meet maximum day and maximum hour demands of its customers. Allocation of the revenue requirements to the cost components enables the costs to be distributed to the customer classes in proportion to the levels of service demands of each class. This methodology focuses on average and above-average demands and their impact on the size of the system's infrastructure and operations needed to meet different usage patterns. Average (Base) demand is the annual water usage of customers expressed on a daily basis. Base costs vary directly with the quantity of water consumed under average day load conditions. Above-average (Max Day and Max Hour) water demands are demands on the system when customers use water at levels above their average usage. Max Day and Max Hour costs are costs incurred to meet water demands that exceed average levels of water usage by customers. These Max Day and Max Hour expenses are incurred to enable the water system to meet water usage variations and the highest peak demand that could be imposed on the water system. Max Day and Max Hour expenses are incurred over time and are necessary to allow the water system to meet the customers' demands above average demand.⁷

A customer's water use may be below-average, average or above-average when measured each billing cycle. A customer with above-average demand uses water at an above-average rate during the billing cycle which places above-average demand on the system. Further, each customer class demonstrates recognized patterns of average and peak demand.

This methodology defines the proportion of incremental extra costs (maximum day and hour extra capacity costs) to upsize the system from the size that would be necessary to meet average use by allocating these incremental extra costs to the Max Day and Max Hour cost components. Where appropriate, this separation allows the system to recover the proportionate share of the incremental costs to meet above-average demand from customers who place above-average demand on the system.

The cost components Base, Max Day Extra Capacity, and Max Hour Extra Capacity are terms of art in the water utility industry that refer to how large a water system must be designed, built and operated to meet the water demands of its customers. Max Day and Max Hour do not refer to a specific day or hour in a billing cycle when usage is above average. For example, Max Hour demand is the highest possible hourly demand placed on the system. Max Hour demand on the system usually occurs once per year. However, to meet the Max Hour demands certain components of the water system must be built at a size sufficient to meet expected Max Hour demands.

The City's incremental costs (above Base costs) to design, build and operate upsized facilities to meet above-average demand are a significant portion of the cost of service. To allocate the cost categories to the customer classes, we first allocated portions of each cost category to the Base, Max Day Extra Capacity and Max Hour Capacity cost components depending on the function associated with the cost category. The Base cost component

⁷ The water system does not incur a substantial portion of the incremental costs to build and operate the system at Max Hour size at the precise (and relatively rare) moment that the system is called on to meet highest possible (Max Hour) demand. The incremental costs to upsize the system to meet Max Day and Max Hour demand are not incurred at the precise hour that any one customer uses water at an above-average rate. Instead, the water system's costs to build the system at Max Hour size were incurred over the years that the system was built and expanded—long before any actual instance of highest possible demand or the precise hour of a single customer's above-average demand. Similarly, the costs for the City to operate and maintain the system built to meet peak demand are relatively stable in times of regular and peak demand.

includes costs that would be incurred if the system only needed to be built and operated at Base Size to meet average demand. The Base cost component includes, among other costs, the O&M and Capital costs of the system that are associated with building and operating the portion of the system's facilities used to meet average demand.

The Max Day and Max Hour Extra Capacity components provide a means for allocating functionalized costs incurred to support maximum day and hour demand. These components are calculated using demand factors for the entire system.

Table 17 shows the calculation of these factors from daily water production and purchase data provided by the City. The Max Day demand factors shown in Column C of the second table are calculated by dividing the maximum day flow for each year by the corresponding average day amount. As shown in Table 17, water production data varies by year due principally to changes in weather. In order to normalize the data, a four year average was used in this analysis. These four annual factors are averaged to derive the 1.39 factor used to allocate costs. Raftelis estimated max hour production by multiplying the maximum day use for each year by a factor of 1.5, a calculation described in the City's Water Facility Design Guidelines and commonly used by City engineers to estimate system sizing when planning to meet the maximum possible demand.

The figures 1.39 and 2.08 are ratios of maximum day and maximum hour demands compared to average day demand which provide a means for allocating functionalized costs to the cost components. The Max Day Extra Capacity cost component includes costs - *above Base costs* - that the City incurs to build and operate the system sized at Max Day Size – 1.39 times larger than the system would be to meet average demand. The Max Hour Extra Capacity cost component includes costs - *above Base and Max Day costs* - that the City incurs to build and operate the system at Max Hour size - 2.08 times larger than the system would be to meet average demand.

Table 17: System Demand Factors

Annual Production		
Year	A	B
	Total Demand (MG)	Annual Avg. Day (MG)
FY 2024	53,570	146.77
FY 2023	54,019	148.00
FY 2022	58,767	161.01
FY 2021	58,201	159.45
Average	56,139	153.81

Max Day Production			
Year	A	B	C
	Max Day Occurance	Max Day Flow (MGD)	Ratio of Max Day to Annual Average Day
FY 2024	7/20/2023	201.56	1.37
FY 2023	7/5/2022	208.98	1.41
FY 2022	7/20/2021	210.51	1.31
FY 2021	9/11/2020	232.17	1.46
Average		213.31	1.39

Max Hour Production Estimate			
Year	A	B	C
	Ratio of Max Hour to Annual Max Day	Max Hour Flow (MGD)	Ratio of Max Hour to Annual Average Day
FY 2024	1.50	302.35	2.06
FY 2023	1.50	313.47	2.12
FY 2022	1.50	315.76	1.96
FY 2021	1.50	348.26	2.18
Average	1.50	319.96	2.08

The ratio of Max Day and Base demand is used to allocate costs between the Base and Max Day Extra Capacity cost components for cost categories that meet maximum day demands, including capital and operating costs associated with facilities like treatment plants and transmission mains. The 1.39 ratio indicates that approximately 72.1% of the capacity of facilities designed and operated for Max Day demand is used to meet Base demand. Accordingly, 27.9% is used to meet Max Day demand.

$$\text{Average Day Percentage: } 1.0 \div 1.39 = 72.1\%$$

$$\text{Maximum Day Percentage: } 0.39 \div 1.39 = 27.9\%$$

The Max Hour ratio is used to allocate costs for facilities that operate or are designed to meet Max Hour demand. These facilities include treated storage, pumping, and a portion of distribution mains. This ratio indicates 48.1% of the capacity of facilities designed and operated for Max Hour demand is needed for Base demand, 18.6% is required to meet Max Day demand, and the remaining 33.3% is for Max Hour demand.

$$\text{Average Day Percentage: } 1.0 \div 2.08 = 48.1\%$$

$$\text{Maximum Day Percentage: } (1.39 - 1.0) \div 2.08 = 18.6\%$$

$$\text{Maximum Hour Percentage: } (2.08 - 1.39) \div 2.08 = 33.3\%$$

CUSTOMER COST COMPONENTS

The Meters cost component is used for costs which vary based on the capacity of the customers' water meter, which represents the potential demand that the customer can place on the water system.

All fixed charges associated with water purchases⁸ are allocated to the CWA Supply-Fixed cost component to be recovered from customers based on their meter size. SDCWA assesses these fixed charges to all of its participating wholesale customers which include the City of San Diego. The charges are fixed regardless of the amount of water purchased; therefore, it is reasonable for the City to allocate this charge to its customers in the same way.

The Billing cost component includes costs for billing, customer service, collections, and customer accounting.

The Fire Protection cost component captures direct fire protection costs associated with maintenance, repair and replacement of fire hydrants.

Table 18 and Table 19 show the functional allocation of the O&M and capital cost categories to the cost components.

⁸ SDCWA and MWD charge the City several fixed charges that do not vary with the amount of water the City uses, including the Readiness to Serve Charge, Capacity Reservation Charge, Supply Reliability Charge, Customer Service Charge, Emergency Storage Charge, Infrastructure Access Charge, Transportation Charge, and Payment In Lieu of Taxes Charge.

Table 18: Functionalized O&M Cost Categories Allocated to Cost Components

O&M Expense Functional Cost Allocations									
Functional Component	Total	Volume-Related				Customer-Related			Direct Public Fire
		CWA Supply - Volume	Base	Max Day Extra Capacity	Max Hour Extra Capacity	CWA Supply - Fixed	Meters and Services	Billing	
Raw Water Operations	100.0%	100.0%	100.0%			100.0%			
CWA Supply - Volume	100.0%								
CWA Supply - Fixed	100.0%								
Water Treatment Plants	100.0%		72.1%	27.9%					
Pumping	100.0%		48.1%	18.6%	33.3%				
Transmission	100.0%		72.1%	27.9%					
Distribution	100.0%		48.1%	18.6%	33.3%				
Pure Water	100.0%		100.0%						
Billing	100.0%							100.0%	
Meters and Services	100.0%						100.0%		
Infrastructure Indirect (1)	100.0%		79.4%	14.5%	6.2%				
Fire Hydrants	100.0%								100.0%

O&M Expenses Allocated to Cost Components									
Functional Component	Total	Volume-Related				Customer-Related			Direct Public Fire
		CWA Supply - Volume	Base	Max Day Extra Capacity	Max Hour Extra Capacity	CWA Supply - Fixed	Meters and Services	Billing	
Raw Water Operations	\$59,077,213	-	59,077,213	-	-	-	-	-	-
CWA Supply - Volume	\$186,162,600	186,162,600	-	-	-	-	-	-	-
CWA Supply - Fixed	\$113,307,533	-	-	-	-	113,307,533	-	-	-
Water Treatment Plants	\$61,650,036	-	44,441,165	17,208,871	-	-	-	-	-
Pumping	\$107,998	-	51,901	20,098	35,999	-	-	-	-
Transmission	\$29,258,993	-	21,091,694	8,167,298	-	-	-	-	-
Distribution	\$42,393,623	-	20,373,300	7,889,116	14,131,208	-	-	-	-
Pure Water	\$37,698,192	-	37,698,192	-	-	-	-	-	-
Billing	\$12,220,318	-	-	-	-	-	-	12,220,318	-
Meters and Services	\$27,573,745	-	-	-	-	-	27,573,745	-	-
Infrastructure Indirect	\$43,839,034	-	34,801,668	6,339,216	2,698,151	-	-	-	-
Fire Hydrants	\$3,020,228	-	-	-	-	-	-	-	3,020,228
Total O&M Revenue Requirement	\$616,309,513	\$186,162,600	\$217,535,133	\$39,624,598	\$16,865,358	\$113,307,533	\$27,573,745	\$12,220,318	\$3,020,228
<i>Percent of Total</i>	<i>100.0%</i>	<i>30.2%</i>	<i>35.3%</i>	<i>6.4%</i>	<i>2.7%</i>	<i>18.4%</i>	<i>4.5%</i>	<i>2.0%</i>	<i>0.5%</i>

(1) Related to multiple functions, allocation based on all other base, max day, max hour costs

Table 19: Functionalized Capital Costs Categories Allocated to Cost Components

Capital Cost Percentage Allocations									
Functional Component	Total	Volume-Related				Customer-Related			Direct Public Fire
		CWA Supply - Volume	Base	Max Day Extra Capacity	Max Hour Extra Capacity	CWA Supply - Fixed	Meters and Services	Billing	
Groundwater Projects	100%		100.0%						
Pipelines	100%		48.1%	18.6%	33.3%				
Pump Stations	100%		48.1%	18.6%	33.3%				
Pure Water	100%		100.0%						
Recycled Water	100%		100.0%						
Storage Facilities	100%		48.1%	18.6%	33.3%				
Transmission Pipelines	100%		72.1%	27.9%					
Water Treatment Plant	100%		72.1%	27.9%					
Fire Hydrants	100%								100.0%
Meters	100%						100.0%		
Miscellaneous Projects	100%	0.0%	55.3%	19.0%	24.3%	0.0%	0.3%	0.0%	1.0%
AMI	100%							100.0%	

Capital Costs Allocated to Cost Components									
Functional Component	Total	Volume-Related				Customer-Related			Direct Public Fire
		CWA Supply - Volume	Base	Max Day Extra Capacity	Max Hour Extra Capacity	CWA Supply - Fixed	Meters and Services	Billing	
Groundwater Projects	\$217,148	-	\$217,148	\$0	\$0	\$0	\$0	\$0	\$0
Pipelines	\$139,269,709	-	\$66,929,489	\$25,916,984	\$46,423,236	\$0	\$0	\$0	\$0
Pump Stations	\$10,666,443	-	\$5,126,022	\$1,984,940	\$3,555,481	\$0	\$0	\$0	\$0
Pure Water	\$13,522,139	-	\$13,522,139	\$0	\$0	\$0	\$0	\$0	\$0
Recycled Water	\$1,898,007	-	\$1,898,007	\$0	\$0	\$0	\$0	\$0	\$0
Storage Facilities	\$36,725,033	-	\$17,649,119	\$6,834,236	\$12,241,678	\$0	\$0	\$0	\$0
Transmission Pipelines	\$18,580,575	-	\$13,394,030	\$5,186,546	\$0	\$0	\$0	\$0	\$0
Water Treatment Plant	\$31,758,275	-	\$22,893,332	\$8,864,943	\$0	\$0	\$0	\$0	\$0
Fire Hydrants	\$2,558,458	-	\$0	\$0	\$0	\$0	\$0	\$0	\$2,558,458
Meters	\$881,534	-	\$0	\$0	\$0	\$0	\$881,534	\$0	\$0
Miscellaneous Projects	\$9,448,992	-	\$5,224,917	\$1,799,849	\$2,295,404	\$0	\$32,521	\$1,916	\$94,385
AMI	\$51,931	-	\$0	\$0	\$0	\$0	\$0	\$51,931	\$0
Total Gross Capital Revenue Req.	\$265,578,243	-	\$146,854,202	\$50,587,498	\$64,515,799	\$0	\$914,055	\$53,846	\$2,652,843
<i>Percent of Total</i>	<i>100.0%</i>	<i>0.0%</i>	<i>55.3%</i>	<i>19.0%</i>	<i>24.3%</i>	<i>0.0%</i>	<i>0.3%</i>	<i>0.0%</i>	<i>1.0%</i>

Table 20 summarizes the allocated non-rate revenues. Operating revenues associated with other water sales are allocated fully to the Base component, while all others are based on the percentages in the final row of Table 18. Most capital-related revenues are allocated proportionally to capital expenses using the percentages shown in the final row of Table 19; the exception is Grant Assistance, which is fully allocated to the base component.

Table 20: Summary of Non-Rate Revenue Allocated to Cost Components

Non-Rate Revenue Item	Total	Volume-Related				Customer-Related			Direct Public Fire
		CWA Supply - Volume	Base	Max Day Extra Capacity	Max Hour Extra Capacity	CWA Supply - Fixed	Meters and Services	Billing	
Operations Related Items									
MWD Credit	\$238,000	\$0	\$238,000	\$0	\$0	\$0	\$0	\$0	\$0
Other Water Sales	\$44,402,076	\$0	\$44,402,076	\$0	\$0	\$0	\$0	\$0	\$0
Other Operating Revenue	\$16,745,388	\$4,937,292	\$5,769,335	\$1,050,900	\$447,293	\$3,005,074	\$931,295	\$524,100	\$80,101
Non-Operating Revenues	\$19,115,564	\$5,774,052	\$6,747,108	\$1,229,003	\$523,099	\$3,514,366	\$855,232	\$379,028	\$93,676
Interest Earnings	\$7,844,543	\$2,369,525	\$2,768,842	\$504,352	\$214,667	\$1,442,207	\$350,966	\$155,543	\$38,442
Subtotal	\$88,345,571	\$13,080,868	\$59,925,361	\$2,784,255	\$1,185,058	\$7,961,647	\$2,137,492	\$1,058,671	\$212,219
Capital Related Items									
Non-Operating Revenues	\$612,401	\$0	\$338,633	\$116,650	\$148,768	\$0	\$2,108	\$124	\$6,117
Interest Earnings	\$30,874	\$0	\$17,072	\$5,881	\$7,500	\$0	\$106	\$6	\$308
Subtotal	\$643,275	\$0	\$355,705	\$122,531	\$156,268	\$0	\$2,214	\$130	\$6,426

Table 21 summarizes the allocated revenue requirement from the analysis of operating costs, capital costs, and non-rate revenues discussed in the sections above. The total revenue requirement will be distributed to customer classes based on their proportionate share of total customer service characteristics.

Table 21: Allocated Revenue Requirement

Cost of Service by Component	Total	CWA Supply - Volume	Base	Max Day Extra	Max Hour Extra Capacity	CWA Supply - Fixed	Meters and Services	Billing	Direct Public Fire
Operating Cost	\$616,309,513	\$186,162,600	\$217,535,133	\$39,624,598	\$16,865,358	\$113,307,533	\$27,573,745	\$12,220,318	\$3,020,228
Capital Cost	\$265,578,243	\$0	\$146,854,202	\$50,587,498	\$64,515,799	\$0	\$914,055	\$53,846	\$2,652,843
Subtotal	\$881,887,756	\$186,162,600	\$364,389,335	\$90,212,096	\$81,381,157	\$113,307,533	\$28,487,799	\$12,274,164	\$5,673,072
Operating Revenue Offsets	\$88,345,571	\$13,080,868	\$59,925,361	\$2,784,255	\$1,185,058	\$7,961,647	\$2,137,492	\$1,058,671	\$212,219
Capital Revenue Offsets	\$643,275	\$0	\$355,705	\$122,531	\$156,268	\$0	\$2,214	\$130	\$6,426
Subtotal	\$88,988,846	\$13,080,868	\$60,281,066	\$2,906,786	\$1,341,326	\$7,961,647	\$2,139,706	\$1,058,802	\$218,644
Total	\$792,898,910	\$173,081,732	\$304,108,269	\$87,305,310	\$80,039,830	\$105,345,886	\$26,348,093	\$11,215,362	\$5,454,427

Units of Service

The next step of the cost-of-service analysis is to determine the units of service that will be used to assign costs to each customer class. Each customer class has unique system use characteristics that are quantified and used to assign costs, ensuring that each class pays their share of costs in proportion to the impacts their water use characteristics place on the water system.

CUSTOMER CLASSES

As discussed above, the purpose of cost-of-service analysis is to relate the costs incurred by the water utility to provide service to customers in proportion to the demands they place on the water system. That said, determining the cost to serve each individual customer is not practical because it would involve isolating the individual components of the water system that are used only to serve that customer. This would also ignore the diversity and economies of scale which come from having many customers with varying demand profiles. Water utilities have networked systems, built to serve the varying demands of many customers, rather than each customer individually. Accordingly, it is appropriate to group customers into classes based on similar demand characteristics and develop rates around the average embedded cost to serve the class, which is comprised of customers with comparable demands.

In addition, it is also common to establish cost of service within a class. The most common approach to doing so involves the use of tiered rates which vary based on the amount of water consumed. Tiered rates effectively create sub-classes within a class which recognize the difference in demand characteristics of customers within a class based on the volumes they use. In this case, cost of service is established for the class is first based on the class demand characteristics, then allocated within the class to each tier. In this way, the class as a whole pays its proportionate share of costs, with the sub-classes picking up their proportionate share of total class cost of service. The City has historically employed both approaches within its water rate structure. Multi-family residential (MFR), commercial, irrigation, and temporary construction all have rates designed around their class cost of service. Single family residential (SFR) customers have tiered rates, which reflect cost of service by tier, within the SFR class.

The City's current rate structure consists of a meter base fee which varies by meter size and a volume commodity rate for each unit of water usage (measured in number of hundred cubic feet (HCF) of water consumed during the billing cycle). The multi-family residential⁹, commercial, irrigation, and temporary construction customer classes have a uniform commodity rate. The SFR class has a 3-tier increasing block structure which applies a higher unit rate to volumes which enter each successive tier. SFR customers are generally billed bi-monthly, with a small number billed monthly. All other classes are generally billed monthly, with a small number billed bi-monthly. The tiers' widths and the meter base fee are reflective of each respective billing period (e.g., a bi-monthly bill has twice the meter base fee of a monthly bill).

CUSTOMER UNITS OF SERVICE

Customer units include the number of accounts and number of ¾" equivalent meters for each customer class and are used to develop the City's monthly or bi-monthly base charges. Table 22 shows a forecast of the number of accounts by customer class for FY 2026.

⁹ Individual residences in a multi-family residential complex do not have separate water accounts with the City that are billed at the Multi-Family commodity rate. Rather, the complex as a whole is a single account billed at the multi-family residential rate whether it has 400 units or 10 units.

Table 22: FY 2026 Accounts

Meter Size	Single Family	Multi-Family	Commercial	Irrigation	Construction
5/8", 3/4"	205,763	16,025	5,873	973	-
1"	20,698	4,720	2,482	1,391	-
1.5"	804	5,425	3,485	1,755	-
2"	105	4,356	4,624	3,788	520
3"	-	301	256	63	43
4"	-	302	272	42	-
6"	-	89	137	15	-
8"	-	40	69	5	-
10"	-	5	39	1	-
12"	-	-	1	-	-
16"	-	-	-	-	-
Total	227,370	31,263	17,238	8,033	563

Table 23 shows the equivalent meter ratio calculation. The capacity of a customer's water meter is representative of the potential demand that a customer can have on the City's water system. As indicated, larger meters have access to more capacity than smaller meters, whether they use it or not. Equivalent meter ratios allow for the allocation of the fixed cost of providing this capacity to customers based on their potential demand. Equivalent meter units in this study are based on AWWA-rated hydraulic capacities¹⁰ and are calculated to represent the potential demand on the water system relative to a base meter size. Equivalent meter ratios are calculated by dividing the capacity of each meter size by the capacity of a 3/4" meter, the base meter size in this study. For example, the capacity of a 1" meter is divided by the capacity of a 3/4" meter (50/30) to derive the 1" equivalent meter ratio of 1.67.

Table 23: Equivalent Meter Ratio

Meter Size	Max Capacity (gpm)	Meter Ratio
5/8", 3/4"	30	1.00
1"	50	1.67
1.5"	100	3.33
2"	160	5.33
3"	370	12.33
4"	620	20.67
6"	1,440	48.00
8"	2,210	73.67
10"	4,200	140.00
12"	5,300	176.67
16"	7,800	260.00

¹⁰ Raftelis reviewed a sample of meters in service for the type (turbine, compound, disk, etc) that could be readily identified. For some meter sizes, the City uses several different types of meters that have different safe operating capacities. In these cases, the Max Capacity in Table 23 is the average capacity of each type weighted by the number of meters in the sample.

The capacity equivalent ratio developed in Table 23 is multiplied by the number of accounts to determine the number of equivalent meter units. For example, 20,698 1" SFR accounts are multiplied by the capacity equivalent factor of approximately 1.67 to derive 34,497 ¾" capacity equivalent meters.

Table 24: FY 2026 Equivalent Meters

Meter Size	Single Family	Multi-Family	Commercial	Irrigation	Construction
5/8", 3/4"	205,763	16,025	5,873	973	-
1"	34,497	7,867	4,137	2,318	-
1.5"	2,680	18,083	11,617	5,850	-
2"	560	23,232	24,661	20,203	2,773
3"	-	3,712	3,157	777	530
4"	-	6,241	5,621	868	-
6"	-	4,272	6,576	720	-
8"	-	2,947	5,083	368	-
10"	-	700	5,460	140	-
12"	-	-	177	-	-
16"	-	-	-	-	-
Total	243,500	83,079	72,362	32,217	3,304

FIRE PROTECTION

Water systems provide two types of fire protection: public fire protection for firefighting through the fire hydrants and private fire protection (i.e. fire lines for private structures with sprinkler systems for fire suppression). The benefits of private fire protection accrue to those customers with private fire connections. These costs are recovered by the City's private fire line charge. Public fire protection is designed to protect human life and property, and accrues to property owners within the City's service area. Put differently, public fire protection is a property related service, similar to domestic water service. Accordingly, as described below, the City recovers the cost of providing public fire protection in its meter base fees.

Raftelis performed a fire demand analysis to determine fire protection maximum day and hour units, which are used to determine the total cost to provide fire protection service (public and private) and analyzed the number of public fire hydrants and private fire connections in order to allocate the total fire cost between the two. The City provided Raftelis with a count of fire hydrants and private fire line connections.

Based on a review of data provided by the San Diego Fire-Rescue Department, this study assumes that the water system could need to support fighting ten simultaneous fires at a sample of development types. The Max Day and Max Hour capacity requirements represent a peak demand, similar to the Max Day demand costs for other classes determined above.

Table 25 shows the units of service associated with fire protection based on assumptions regarding the duration and water use rate associated with the typical fire events based on the City's fire occurrence data. As shown in Table 25, the calculation is based on the firefighting flow rates by type of property, the estimated potential number of concurrent fires and the estimated average duration of each type of firefighting event.

Table 25: Fire Protection Requirement

Development Type	Fire Demand (gpm)	Incidents	GPM for All Events	Duration per Event (minutes)	Max Day (gpd)	Max Hour (gpd)
Single Family	1,500	5	7,500	60	450,000	10,800,000
Condos/Apartments	3,000	2	6,000	90	540,000	8,640,000
Commercial	4,000	2	8,000	90	720,000	11,520,000
Industrial	6,000	1	6,000	300	1,800,000	8,640,000
Total		10	27,500		3,510,000	39,600,000
<i>hcf requirement:</i>					4,692	52,937

PUBLIC AND PRIVATE FIRE CONNECTIONS

Table 26 shows the calculation of equivalent fire demand associated with public fire 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 divided by 6" and raised to the 2.63 power to determine the fire meter ratio.¹¹ The ratio is multiplied by the number of connections at each size to calculate equivalent fire demand. Private fire connections are calculated as equivalent to a 6" connection, the standard for public fire hydrants.

Table 26: Private Fire Equivalent Connections

Connection Size	Count	Fire Meter Ratio	Equivalent 6"
3/4"		0.00	0.00
1"		0.01	0.00
1.5"	3	0.03	0.08
2"	87	0.06	4.84
3"	20	0.16	3.23
4"	1,681	0.34	578.69
6"	2,394	1.00	2,394.00
8"	1,802	2.13	3,840.11
10"	195	3.83	747.30
12"	33	6.19	204.28
16"	7	13.19	92.34
20"	2	23.72	47.45
Total	6,224		7,912

Table 27 develops a percentage to allocate total fire demand between public and private fire connections. The private fire equivalents developed above are compared to the City's 26,413 public fire hydrants to estimate that 23.1% of fire protection capacity should be allocated to private fire customers.

¹¹ Hazen-Williams equation and AWWA Manual M1

Table 27: Allocation Between Public and Private Fire

Fire Connections	Equivalent Connections	% of Equivalent Connections	Max Day Fire Flow	Max Hour Fire Flow
Private Fire Equivalent Connections	7,912	23.1%	1,082	12,203
Public Fire Equivalent Connections	26,413	76.9%	3,611	40,735
Total Fire Connections	34,325	100.0%	4,692	52,937

WATER USAGE AND DEMAND

The volume related cost components are allocated based on volumetric units expressed in the number of HCF (about 748 gallons), as well as Max Day Extra Capacity and Max Hour Extra Capacity customer characteristics:

- Base: a unit represents a single HCF of water billed.
- Max Day Extra Capacity: a unit represents the additional capacity (HCF per day) needed above the average amount to meet the demand on the hypothetical maximum use day. This is represented in HCF per day.
- Max Hour Extra Capacity: a unit represents the additional capacity above the maximum day amount needed to meet the hypothetical highest hourly demand experienced by the system. This is represented in HCF per day.

The City provided Raftelis with a complete data set of every bill issued to its retail customers from FY 2021 through FY 2024. This data provided the basis for determining maximum day and maximum hour extra capacity units of service using demand factors.

CUSTOMER CLASS DEMAND FACTORS

The units of service for the Max Day and Max Hour extra capacity functional cost categories are calculated using unique customer class demand factors. Through the class units of service process and using these demand factors, we distribute the incremental costs to build and operate the system to handle peak demand (the Max Day and Max Hour Extra Capacity functional cost components) to the customer classes based on each class's historic peaking behavior.

Class demand factors are developed to reflect the estimated demand placed on the system by each class and are expressed as a ratio of the average daily demand for each class. If the estimated daily demand for a class on the hypothetical maximum day of demand is estimated at 60,000 HCF per day, and the average annual daily demand for the class is 40,000 HCF per day, the demand factor (or Max Day demand factor) is 1.5. If the estimated daily demand from the class is 100,000 HCF per day on a day of a Max Hour event, then the Max Hour demand factor is 2.5.

Table 28 provides an example of the demand factor calculation for the SFR class in FY 2021. Because the City bills SFR customers primarily on a bi-monthly basis, the data must first be normalized to remove the effects of cycle billing. If a larger number of customers is billed in a particular cycle, the monthly demand factor analysis can be skewed to apply additional weight to those months. To do this, Raftelis sorted the individual billing data according to the City's billing cycles: even, odd, and monthly. The total amount of water billed (Line 4) and number of bills issued in each month (Line 8) was determined from this data, as shown below. This information is used to calculate the average water use per read for each month (Line 9). To derive the normalized monthly use, these averages were applied to the number of average monthly reads (Line 10). The normalized monthly use is shown on Line 11.

Table 28: Demand Factor Calculation Example

Line	Calculation Note	Description	July	August	September	October	November	December	January	February	March	April	May	June	Total
Sum of Use															
1	From Data	Even	645,019	1,930,500	645,775	2,023,508	467,826	1,771,362	507,931	1,445,002	495,307	1,370,546	497,743	1,744,581	13,545,100
2	From Data	Odd	1,541,019	683,063	1,601,660	742,688	1,343,392	709,326	1,066,805	463,251	1,096,229	596,890	1,127,095	674,293	11,645,711
3	From Data	Month	5,173	5,327	5,295	5,140	4,905	4,485	4,252	3,434	4,274	4,815	5,019	5,782	57,901
4		Total	2,191,211	2,618,890	2,252,730	2,771,336	1,816,123	2,485,173	1,578,988	1,911,687	1,595,810	1,972,251	1,629,857	2,424,656	25,248,712
Count of Reads															
5	From Data	Even	38,576	85,685	36,646	87,090	29,263	94,286	34,889	88,522	37,909	85,230	31,413	89,374	738,883
6	From Data	Odd	75,540	27,312	74,357	31,318	70,024	37,731	63,493	26,818	74,295	32,694	67,244	31,324	612,150
7	From Data	Month	489	489	489	489	491	488	489	486	489	489	488	486	5,862
8		Total	114,605	113,486	111,492	118,897	99,778	132,505	98,871	115,826	112,693	118,413	99,145	121,184	1,356,895
9	= 4/8	Average Use per Read	19.12	23.08	20.21	23.31	18.20	18.76	15.97	16.50	14.16	16.66	16.44	20.01	
10	= avg of 9	Average Monthly Reads	113,075												
11	= 9 * 10	Normalized Monthly Use	2,161,950	2,609,396	2,284,707	2,635,623	2,058,143	2,120,749	1,805,822	1,866,275	1,601,213	1,883,336	1,858,847	2,262,402	25,148,463
Demand Factor Calculation															
12	Max of 11	Maximum Monthly Normalized Use			2,635,623										
13	Avg of 11	Average Monthly Normalized Use			2,095,705										
14	= 12 / 13	Ratio of Max to Average			1.26										
15	From Data	System Factor			1.22										
16	= 14 * 15	SFR FY 2021 Demand Factor			1.54										

The demand factor is calculated by dividing the water use in the maximum month by the water use in the average month. This ratio is then scaled up by a factor that relates the average daily use in the maximum month for the entire system to the system's maximum daily use. This process was repeated for each customer class and for FY 2022, FY 2023, and FY 2024. The yearly demand factors for each class were averaged to determine the test year max day demand factor used in this study, as shown in Table 29. The use of a multi-year average normalizes the demand factors, which can fluctuate from year to year based on weather conditions and other factors.

Table 29: Class Max Day Demand Factors

Customer	FY 2021	FY 2022	FY 2023	FY 2024	Average
SFR	1.54	1.40	1.48	1.59	1.50
MFR	1.64	1.72	1.73	1.73	1.71
Commercial	1.58	1.32	1.39	1.54	1.46
Irrigation	2.01	1.88	2.14	1.77	1.95
Construction	1.97	1.61	3.00	1.76	2.09

The final class maximum day demand factor is multiplied by 1.5 to estimate the maximum hour demand factor in accordance with the City's Water Facility Design Guidelines discussed above.

Using customer class demand factors, the units of service for each of the functional cost components were calculated as shown in Table 30. The Max Day Factor and Max Hour Factor are multiplied by the number of HCF for average day to obtain the Max Hour and Max Day Total Capacity units of service. Max Day extra capacity units are the result of subtracting average day use from Max Day total use; Max Hour extra capacity units are the result of subtracting Max Day total capacity units from Max Hour total capacity units.

Table 30: Extra Capacity Unit Calculation

Customer Class	Base		Maximum Day			Maximum Hour		
	Annual Use (HCF)	Average Day Use (HCF)	Demand Factor	Total Capacity (HCF/Day)	Extra Capacity (HCF/Day)	Demand Factor	Total Capacity (HCF/Day)	Extra Capacity (HCF/Day)
Single Family Residential	23,012,524	63,048	1.50	94,684	31,636	2.25	142,026	47,342
Multi-Family Residential	15,707,749	43,035	1.71	73,416	30,381	2.56	110,123	36,708
Comm / Industrial / Outside City	16,371,790	44,854	1.46	65,334	20,479	2.18	98,001	32,667
Irrigation	8,190,779	22,440	1.95	43,742	21,302	2.92	65,613	21,871
Temp Construction	320,812	879	2.09	1,833	954	3.13	2,750	917
Public Fire Protection				3,611	3,611		40,735	37,124
Private Fire Protection				1,082	1,082		12,203	11,121
Total Units of Service	63,603,654			283,701	109,444		471,450	187,750

UNITS OF SERVICE SUMMARY

Table 31 summarizes the customer class units of service shown in the tables above.

Table 31: Units of Service Summary

Customer Class	Volume			Customer		
	Annual Use (HCF)	Max Day Extra Capacity (HCF/Day)	Max Hour Extra Capacity (HCF/Day)	Equivalent Meters x12	Monthly Bills	Equivalent Hydrants
Single Family Residential	23,012,524	31,636	47,342	2,921,996	2,728,440	
Multi-Family Residential	15,707,749	30,381	36,708	996,952	375,156	
Comm / Industrial / Outside City	16,371,790	20,479	32,667	868,344	206,856	
Irrigation	8,190,779	21,302	21,871	386,608	96,396	
Temp Construction	320,812	954	917	39,644	6,756	
Public Fire Protection		3,611	37,124			26,413
Private Fire Protection		1,082	11,121		74,688	7,912
Total Units of Service	63,603,654	109,444	187,750	5,213,544	3,488,292	34,325

Unit Costs

The next step is to calculate the unit cost for each functional cost component¹². The unit cost is the quotient of the allocated revenue requirement by cost component from Table 21 divided by the units of service for each from Table 31.

Table 32: Unit Costs

Cost Component	Cost	Units of Service		Unit Cost
CWA Supply - Volume	\$173,081,732	63,603,654	HCF	\$2.72
Base	\$304,108,269	63,603,654	HCF	\$4.78
Max Day Extra Capacity	\$87,305,310	109,444	HCF/day	\$797.72
Max Hour Extra Capacity	\$80,039,830	187,750	HCF/hr	\$426.31
CWA Supply - Fixed	\$105,345,886	5,213,544	Eq. Meters x 12	\$20.21
Meters and Services	\$26,348,093	5,213,544	Eq. Meters x 12	\$5.05
Billing	\$11,215,362	3,488,292	No. of Bills	\$3.22
Direct Public Fire	\$5,454,427	N/A		
	\$792,898,910			

Distribution of Costs to Customer Classes

The customer class units of service in Table 31 are multiplied by the unit costs in Table 30 to determine the distribution of the cost of service to the customer classes.

¹² For presentation purposes in this report, unit costs in Table 32 are rounded to the nearest penny. Manually performing the calculations displayed in Table 33 using the data shown in Table 32 will not result in precisely the result shown.

Table 33: Distribution of Total Revenue Requirement to Customer Classes

Customer Class	CWA Supply - Volume	Base	Max Day Extra Capacity	Max Hour Extra Capacity	CWA Supply - Fixed	Meters and Services	Billing	Direct Public Fire	Preliminary Total
Single Family	\$62,622,935	\$110,029,824	\$25,236,346	\$20,182,398	\$59,042,421	\$14,767,119	\$8,772,328		\$300,653,371
Multi-Family	\$42,744,783	\$75,103,489	\$24,235,131	\$15,648,960	\$20,144,606	\$5,038,374	\$1,206,181		\$184,121,524
Commercial	\$44,551,808	\$78,278,470	\$16,336,804	\$13,926,258	\$17,545,928	\$4,388,418	\$665,072		\$175,692,757
Irrigation	\$22,289,195	\$39,162,587	\$16,992,731	\$9,323,910	\$7,811,877	\$1,953,831	\$309,927		\$97,844,057
Temp Construction	\$873,011	\$1,533,899	\$761,266	\$390,767	\$801,054	\$200,352	\$21,722		\$4,582,071
Public Fire Protection	\$0	\$0	\$2,880,227	\$15,826,521				\$5,454,427	\$24,161,175
Private Fire Protection	\$0	\$0	\$862,805	\$4,741,017			\$240,133		\$5,843,955
Total Allocated Rev. Req.	\$173,081,732	\$304,108,269	\$87,305,310	\$80,039,830	\$105,345,886	\$26,348,093	\$11,215,362	\$5,454,427	\$792,898,910

Reallocation of Public Fire Protection Costs

The customer class revenue requirement also includes reallocated public fire protection costs. Public Fire is reallocated among the customer classes to reflect the shared benefit of this service. Table 34 shows this distributed cost, which is allocated to the customer classes in proportion to their equivalent meters and recovered in the meter base fee. This charge is appropriate to recover from the City's customers on this basis because fire protection services are provided to each property. Public fire hydrants and their associated capacity in the water system are used to provide a direct benefit to individual properties in the event of a fire requiring their use. It is a reasonable assumption that locations with a large water meter are larger than others and would require more firefighting effort to control a fire event.

Table 34: Public Fire Reallocation

Customer Class	Preliminary Total	Equivalent Meters	Equivalent Meter Distribution	Reallocation of Public Fire	Total
Single Family	\$300,653,371	2,921,996	56.0%	\$13,541,433	\$314,194,804
Multi-Family	\$184,121,524	996,952	19.1%	\$4,620,184	\$188,741,708
Commercial	\$175,692,757	868,344	16.7%	\$4,024,175	\$179,716,932
Irrigation	\$97,844,057	386,608	7.4%	\$1,791,661	\$99,635,718
Temp Construction	\$4,582,071	39,644	0.8%	\$183,723	\$4,765,794
Public Fire Protection	\$24,161,175			(\$24,161,175)	\$0
Private Fire Protection	\$5,843,955			\$0	\$5,843,955
Total Allocated Rev. Req.	\$792,898,910	5,213,544	100.0%	-	\$792,898,910

Comparison of FY 2026 Cost of Service to Revenue Status Quo

Table 35 compares the final allocated revenue requirement by class to the amount of revenue that would be recovered from each class under the status quo scenario. If all rates were simply increased by an equal percentage amount in an across-the-board (ATB) fashion (13.7%, from Table 1), the Commercial, Irrigation, and Private Fire Protection customer classes would pay more than their allocated share of costs. The cost of service by customer class compared to the projected revenues under the status quo scenario is shown in Table 35. As indicated, the results of the cost-of-service analysis results in a shifting of costs among the customer classes reflecting the changes in cost components and customer class usage characteristics from the prior cost of service study supporting the City's existing rates.

Table 35: Customer Class Cost of Service vs. Revenue under Current Rates

Customer Class	FY 2026 Revenue at May 2025 Rates		FY 2026 Cost of Service		Percent Change
	Revenue	Percent	Revenue	Percent	
Single Family	\$273,055,880	39.2%	\$314,194,804	39.6%	15.1%
Multi-Family	\$162,467,756	23.3%	\$188,741,708	23.8%	16.2%
Commercial	\$160,952,947	23.1%	\$179,716,932	22.7%	11.7%
Irrigation	\$91,325,544	13.1%	\$99,635,718	12.6%	9.1%
Temp Construction	\$4,113,350	0.6%	\$4,765,794	0.6%	15.9%
Private Fire Protection	\$5,445,042	0.8%	\$5,843,955	0.7%	7.3%
Total	\$697,360,519	100%	\$792,898,910	100%	13.7%

Rate Design

Introduction

The revenue requirements and cost of service analysis described in the preceding sections of this report provide a basis for the design of a water rate structure. Setting rates involves the development of rate schedules for each customer class. The rate schedules must establish rates that are sufficient to recover the annual revenue requirement determined for each customer class. The proposed rates are calculated directly from the results of the cost-of-service analysis.

In this section of the study, we first allocated the portions of each customer class's revenue requirement to be recovered through the fixed meter base fee and the commodity charge calculated using variable rates. Next, for each customer class and for each tier of the single-family residential customer class, we calculated the variable commodity rate to be used to calculate the commodity charge for the billing cycle. Finally, we analyzed the impact of the proposed changes in the meter base fee and commodity rates on the customer classes.

Meter Base Fee

The meter base fee is the same for all customer classes and is based on meter size. The meter base fee recovers portions of fixed cost elements such as meter maintenance and services, meter reading, customer billing and collections, customer service, and maintenance. Additionally, a portion of the fixed charges levied by SDCWA are recovered in the City meter base fee. This structure is one way the City charges customers who require more capacity. For example, customers with a 4" meter expect to be able to use more water (at a higher flow capacity) than customers with a 3/4" meter. Consequently, the City's water system must maintain assets sized accordingly and capable of providing customers the level of service expected from their meter connection when the tap turns on. Table 36 shows the calculation of each component of the meter base fee, derived by dividing the cost components from Table 33 and the units of service from Table 31.

Table 36: Meter Base Fee Components

Rate Component	Total Cost	Units	Rate
CWA Supply - Fixed	\$105,345,886	5,213,544 Eq. Meters x12	\$20.21
Meters and Services	\$26,348,093	5,213,544 Eq. Meters x12	\$5.05
Billing	\$11,215,362	3,488,292 Bills	\$3.22
Fire Protection	\$24,161,175	5,213,544 Eq. Meters x12	\$4.63
Private Fire Capacity	\$5,603,822	94,948 Fire Eq. Meters	\$59.02

Table 37 shows the buildup of the meter base fee for each meter size. The Billing rate component is the same for all customers. The SDCWA Supply-Fixed, Meters and Services, and Public Fire Protection rate components scale with the size of the meter according to the meter capacity ratios developed in Table 23. Each component for each meter size is then added to develop the final monthly fee.

Table 37: Meter Base Fee - \$ per month

Meter Size	Meter Ratio	Rate Components				Total
		CWA Supply - Fixed	Meters and Services	Billing	Public Fire Protection	
5/8", 3/4"	1.00	\$20.21	\$5.05	\$3.22	\$4.63	\$33.11
1"	1.67	\$33.68	\$8.42	\$3.22	\$7.72	\$53.04
1.5"	3.33	\$67.35	\$16.85	\$3.22	\$15.45	\$102.87
2"	5.33	\$107.77	\$26.95	\$3.22	\$24.72	\$162.66
3"	12.33	\$249.21	\$62.33	\$3.22	\$57.16	\$371.92
4"	20.67	\$417.59	\$104.44	\$3.22	\$95.78	\$621.04
6"	48.00	\$969.90	\$242.58	\$3.22	\$222.45	\$1,438.15
8"	73.67	\$1,488.52	\$372.29	\$3.22	\$341.39	\$2,205.43
10"	140.00	\$2,828.87	\$707.53	\$3.22	\$648.80	\$4,188.42
12"	176.67	\$3,569.76	\$892.83	\$3.22	\$818.73	\$5,284.54
16"	260.00	\$5,253.61	\$1,313.98	\$3.22	\$1,204.92	\$7,775.73

Commodity Rate

The City's commodity charge for all customers is based on rate charged per hundred cubic feet. It is calculated to recover costs associated with the SDCWA Supply-Volume, Base, Max Day, and Max Hour cost components. These costs include fixed and variable costs that are incurred by the City's water systems while meeting customer average rate of use and peak demand use. The commodity rate is developed by customer class. The following sections explain the development of the rate associated with each of the four volume related cost components. Each of these components are added together to develop the proposed uniform commodity rate per HCF by customer class.

SDCWA SUPPLY - VOLUME RATE COMPONENT

Table 38 shows the calculation of the rate to recover costs from the SDCWA Supply-Volume cost component. The costs for each customer class were previously shown in Table 33. The Units are the total amount of water, measured in HCF, forecasted to be sold in FY 2026. The rate is calculated by dividing the cost for each class by the units. This rate recovers a portion of the costs of the City to purchase water from SDCWA and is charged equally to all classes, since SDCWA's charge for water is consistent regardless of the amount purchased by the City.

Table 38: Supply Rate Component Calculation

Customer Class	Cost	Units	Rate
Single Family	\$62,622,935	23,012,524	\$2.72
Multi-Family	\$42,744,783	15,707,749	\$2.72
Commercial	\$44,551,808	16,371,790	\$2.72
Irrigation	\$22,289,195	8,190,779	\$2.72
Temp Construction	\$873,011	320,812	\$2.72

BASE RATE COMPONENT

Table 39 shows the calculation of the rate to recover costs from the Base cost component. The Billable Units are the total amount of water, measured in HCF, forecasted to be sold in FY 2026. The rate is calculated by dividing the cost for each class by the billable units. This represents the portion of the rate charged to recover the cost to deliver water at an average rate of demand and is applied equally to the rate being developed for all classes.

Table 39: Base Rate Component Calculation

Customer Class	Cost	Units	Rate
Single Family	\$110,029,824	23,012,524	\$4.78
Multi-Family	\$75,103,489	15,707,749	\$4.78
Commercial	\$78,278,470	16,371,790	\$4.78
Irrigation	\$39,162,587	8,190,779	\$4.78
Temp Construction	\$1,533,899	320,812	\$4.78

DEMAND RATE COMPONENT

Table 40 shows the calculation of the rate to recover costs from the Max Day Extra Capacity and Max Hour Extra Capacity cost components, which are added together in this table. The Units are the total amount of water, measured in HCF, forecasted to be sold in FY 2026. The rate is calculated by dividing the cost for each class by the units.

This rate includes the City's incremental costs (above Base costs) to build the system larger than the system would need to be built to meet average demand (the Max Day Extra Capacity and Max Hour Extra Capacity cost components). Since these costs were allocated to the customer classes in proportion to their demand in Table 33, the rates are different for each class. Customer classes with a higher demand factor pay a higher rate for demand costs.

Table 40: Demand Rate Component Calculation

Customer Class	Cost	Units	Rate
Single Family	\$45,418,744	23,012,524	\$1.97
Multi-Family	\$39,884,090	15,707,749	\$2.54
Commercial	\$30,263,062	16,371,790	\$1.85
Irrigation	\$26,316,641	8,190,779	\$3.21
Temp Construction	\$1,152,033	320,812	\$3.59

Rate Structures

The City's current rate structure consists of a monthly meter base fee which varies by meter size and a volume rate which varies by customer class.

The City's current SFR volume rate structure consists of three tiers each with a different volume rate. Our examination of the City's detailed customer billing records confirms that the current rate structure is appropriate for the City. Development of tiered rates involves first establishing cost of service for the SFR class, then allocating that cost between the tiers, such that the rates will recover cost of service both by class and within the class. A detailed explanation of this process is provided in the next section of this report.

The multi-family residential, commercial, irrigation, and temporary construction customer classes have a uniform commodity rate. A tiered rate structure is appropriate for SFR customers because it recognizes the diversity of demands within the class especially with regard to differences in indoor and outdoor water usage. A tiered structure recognizes these differences, charging higher rates for usage which contribute to the need for a larger, more expensive water system to support max day and max hour demand.

That said, relative to the SFR class, the non-SFR classes are far more heterogeneous. For example, the average usage for a 400-unit apartment complex will be higher than the average usage for a 10 unit complex; the average HCF usage for a university will be many times higher than average usage amount for a daycare; and the average usage for a dry cleaner will be higher than the average HCF usage for the convenient store next door. In other words, customers in these classes other than the single family residential class vary considerably in size which makes it impractical and inequitable to use a fixed increasing-block tiered rate structure for these customer classes. A fixed-tiered structure applied to a customer class with a greater diversity of demand between the customers reduces the efficacy of recovering the incremental max day and max hour costs proportionately as compared to a more homogeneous customer class such as single family residential.

To apply a tier structure to the non-SFR classes would result in certain customers being charged for maximum day and hour extra capacity costs, even if their demand is relatively consistent. For example, a department store may average 10,000 HCF of usage per billing cycle. In a tiered rate structure like the one used for the single family residential class, the department store will be required to pay for 9,982 HCF, or over 99% of its water, at the tier 3 rate. However, forcing a department store to pay the highest tiered rate for 99% of its water does not achieve the City's purpose of passing the incremental cost of above-average usage to customers with above-average usage in a billing cycle because the City would be charging higher tiered rates for usage that, for the department store, is not above-average and therefore did not contribute to the City's incremental costs to create capacity in the system to meet above-average demand.

A tiered rate structure for the Multi-family, Commercial, Temporary Construction, and Irrigation customer classes, would not proportionately recover the cost to provide service for each customer due to the diversity of demand within the classes. As discussed above, the purpose of allocating the expenses associated with extra capacity to separate cost components (Max Day and Max Hour as opposed to Base) is to allow the system to recover a proportional share of the City's incremental costs to meet above-average demand from customers only when they place above-average demand on the system. Tiered rates accomplish this by recovering average day, maximum day, and maximum hour costs in tiers 1, 2, and 3 respectively.

The use of a uniform rate for the non-single family residential customer classes does not mean that customers in the non-single family residential customer classes do not pay their portion of the City's costs to create capacity in the system to meet above-average demand. In the Cost-of-Service section above, unique customer class demand factors were used to allocate more of the costs to upsize the system (the Max Day and Max Hour cost components) to the customer classes who demonstrate the most max day and max hour demand. Through this process, the classes with higher max day and max hour demand (irrigation and temporary construction) are allocated proportionally higher amounts from the max day and max hour costs than the classes that demonstrate less max day and max hour demand (commercial). This explains why the uniform rates for the irrigation and temporary construction customer classes are higher than the rate for the commercial customer class.

TIERED RATE STRUCTURE FOR THE SINGLE FAMILY RESIDENTIAL CUSTOMER CLASS

After the City chose to use a tiered rate structure for the single-family residential customer class, the next step was to set the consumption levels for the three tiers. The City previously adopted a three-tier structure following Raftelis' recommendation in the 2022 Rate Study. This study maintains the same tier structure, though Raftelis did confirm that the tier breakpoints for the single family residential customer class are still appropriate by performing a detailed analysis of customer usage patterns from 2021 through 2024.

The breakpoint between Tier 1 and Tier 2 is set at 10 HCF per bimonthly period, which accounts for about 50% of all water billed to the SFR class. This amount was determined using a recommendation from the California Department of Water Resources (DWR)¹³ that "water suppliers achieve an indoor water use efficiency standard of ... 47 gallons [per person] per day by 2025." According to the latest available Census data, the average household size in the City of San Diego is 2.59 persons¹⁴. This suggests that a reasonable estimate for indoor water use is 5 HCF per month, or 10 HCF per bi-monthly period.¹⁵

The Tier 2/Tier 3 break point is 22 HCF, which is average use for bills issued during the summer months, representing an average amount of outdoor usage. Tier 3 includes all water use above 22 HCF per bimonthly period. The tier breakpoints for SFR customers billed monthly are half of these values.

CALCULATION OF THREE TIER SFR COMMODITY RATES

As described above, the purpose of a tiered rate structure is to recover max day and max hour costs from customers who place these demands on the water system. The required calculations are conceptually the same as the process for allocating these costs between the customer classes as described in the cost-of-service section and uniform rate calculation for other customer classes above. First, units of service (billed water use and demand factors) must be determined for each tier of water use. Second, maximum day and hour costs must be allocated to each tier. Finally, a rate must be developed based on the allocated cost and the billable units.

The demand factors presented here were derived using the same methodology described in the Units of Service section above, and the extra capacity units for Max Day and Max hour using the same process as shown in Table 30. The Max Day Allocation and Max Hour Allocation are the resulting percentage distribution of the Max Day Extra Capacity Units and the Max Hour Extra Capacity Units¹⁶.

¹³ <https://water.ca.gov/News/News-Releases/2021/Nov-21/State-Agencies-Recommend-Indoor-Residential-Water-Use-Standard>

¹⁴ 2022 ACS Data Table S1101 for the San Diego census defined place.

¹⁵ 47 gallons per person per day * 2.59 persons per household * 30 days per month = 3,652 gallons per month or 4.88 HCF

¹⁶ For example, 1,322 HCF/Day out of 17,769 HCF/Day is 7.4%.

Table 41: SFR Tier Cost Allocations

Description	Base		Maximum Day			Maximum Hour			Allocations	
	Annual Use (HCF)	Average Day Use (HCF)	Demand Factor	Total Capacity (HCF/Day)	Extra Capacity (HCF/Day)	Demand Factor	Total Capacity (HCF/Day)	Extra Capacity (HCF/Day)	Maximum Day	Maximum Hour
Tier 1	11,712,112	32,088	1.04	33,410	1,322	1.56	50,114	16,705	7.4%	41.3%
Tier 2	6,741,009	18,469	1.29	23,825	5,356	1.94	35,737	11,912	30.1%	29.5%
Tier 3	4,559,403	12,492	1.89	23,583	11,091	2.83	35,374	11,791	62.4%	29.2%
Total	23,012,524				17,769			40,409		

Table 42 shows the calculation of the demand rate component of each tier. The total SFR max day extra capacity component cost, \$25.2 million, is reallocated to each tier using the Max Day Allocation calculated in Table 41; the same step is repeated for Max Hour costs. It is important to note that the total demand costs allocated to the three proposed tiers within the SFR class are the same as the total SFR peaking costs previously calculated in Table 33. Regardless of the tier breakpoint definitions or unique tier demand factors, the tiered rates are calculated to recover exactly 100% of the entire class cost.

Table 42: Demand Rate Calculation

Description	Max Day Share	Max Day Cost	Max Hour Share	Max Hour Cost	Total Cost	Units	Rate
Tier 1	7.4%	\$1,877,059	41.3%	\$8,343,332	\$10,220,391	11,712,112	\$0.87
Tier 2	30.1%	\$7,607,095	29.5%	\$5,949,733	\$13,556,828	6,741,009	\$2.01
Tier 3	62.4%	\$15,752,192	29.2%	\$5,889,333	\$21,641,525	4,559,403	\$4.75
Total	100.0%	\$25,236,346	100.0%	\$20,182,398	\$45,418,744	23,012,524	\$1.97

Table 43 summarizes the SFR tiered rates and uniform rates for other classes. The total commodity rate for each tier is the sum of each of the rate components.

Table 43: Tiered Commodity Rates - \$ per HCF

Customer Classes	Bimonthly Tier Widths (HCF) [1]	Rate Components			COS Total
		Supply	Base	Max Day & Max Hour	
Single Family					
Tier 1	0 to 10	\$2.72	\$4.78	\$0.87	\$8.38
Tier 2	11 to 22	\$2.72	\$4.78	\$2.01	\$9.52
Tier 3	Above 22	\$2.72	\$4.78	\$4.75	\$12.25
Multi-Family		\$2.72	\$4.78	\$2.54	\$10.05
Commercial		\$2.72	\$4.78	\$1.85	\$9.36
Irrigation		\$2.72	\$4.78	\$3.21	\$10.72
Temp Construction		\$2.72	\$4.78	\$3.59	\$11.10

[1] Monthly bills' tier thresholds are 50% of bimonthly thresholds.

Alternative Uniform Rate Options

Raftelis believes a tiered rate structure is best suited to meet the City's needs and will proportionally recover the City's total costs of water service to the single-family residential customers. However, Raftelis also developed two uniform rate options as possible alternatives to the tiered structure.

If the City elected to eliminate the tiered rate structure for single family customers, the process described in Table 41 and Table 42 would be removed. Instead, the demand component of the single-family rate would be that shown in Table 40 and the full rate would be \$9.48 per HCF, derived in the same manner as the rates for other classes.

The second option is to eliminate customer class rates entirely. In this case, all customer class Demand costs and billed units in Table 40 would be added together and used to calculate a single overall Demand rate of \$2.25, resulting in a total volumetric rate of \$9.76 per HCF for all customers.

Private Fire Protection Rates

Private fire protection rates recover the cost of the system capacity available to deliver water during a fire event from those customers with private fire suppression systems installed at their property. This enables recognition of the portion of water system infrastructure available to provide stand-by, ready to serve service. The rate components were derived in Table 36. The customer cost component is the same for each meter size and is the same charge applied to all other retail meters. The fire capacity component is scaled according to the equivalent fire demand ratios shown in Table 24.

Table 44: Monthly Private Fire Service Fees - \$ per monthly bill

Connection Size	Meter Ratio	Rate Components		Total
		Private Fire Capacity	Billing	
1"	0.01	\$0.53	\$3.22	\$3.75
1.5"	0.03	\$1.54	\$3.22	\$4.76
2"	0.06	\$3.28	\$3.22	\$6.50
3"	0.16	\$9.53	\$3.22	\$12.75
4"	0.34	\$20.32	\$3.22	\$23.54
6"	1.00	\$59.02	\$3.22	\$62.24
8"	2.13	\$125.77	\$3.22	\$128.99
10"	3.83	\$226.18	\$3.22	\$229.40
12"	6.19	\$365.35	\$3.22	\$368.57
16"	13.19	\$778.57	\$3.22	\$781.79
20"	23.72	\$1,400.14	\$3.22	\$1,403.36

Rate Forecast

Table 45, Table 46, and Table 47 provide a forecast of rates throughout the study period. The rates shown in the first column are those which are proposed to take effect in May 2025. The FY 2026 rates are those developed above. In FY 2027, each rate is increased by 14.5%, which is the required percentage revenue increases identified in Table 1. The same across the board rate increase methodology is applied in FY 2028 and FY 2029.

Table 45: Comparison of Current and Proposed Meter Base Fees - \$ per month

Meter Size	FY 2025 [1]	FY 2025 [2]	FY 2025 [3]	FY 2026	FY 2027	FY 2028	FY 2029
Effective:	Jul. 2024	Jan. 2025	May 2025	Jan. 2026	Jan. 2027	Jan. 2028	Jan. 2029
5/8", 3/4"	\$25.15	\$27.33	\$28.84	\$33.11	\$37.92	\$42.29	\$46.95
1"	\$40.66	\$44.19	\$46.63	\$53.04	\$60.74	\$67.73	\$75.19
1.5"	\$79.43	\$86.32	\$91.07	\$102.87	\$117.79	\$131.34	\$145.79
2"	\$125.97	\$136.89	\$144.42	\$162.66	\$186.25	\$207.67	\$230.52
3"	\$288.83	\$313.87	\$331.14	\$371.92	\$425.85	\$474.83	\$527.07
4"	\$482.71	\$524.56	\$553.42	\$621.04	\$711.10	\$792.88	\$880.10
6"	\$1,118.64	\$1,215.63	\$1,282.49	\$1,438.15	\$1,646.69	\$1,836.06	\$2,038.03
8"	\$1,715.80	\$1,864.57	\$1,967.13	\$2,205.43	\$2,525.22	\$2,815.63	\$3,125.35
10"	\$3,259.10	\$3,541.69	\$3,736.49	\$4,188.42	\$4,795.75	\$5,347.27	\$5,935.47
12"	\$4,112.18	\$4,468.74	\$4,714.53	\$5,284.54	\$6,050.80	\$6,746.65	\$7,488.79
16"	\$6,051.01	\$6,575.68	\$6,937.35	\$7,775.73	\$8,903.22	\$9,927.10	\$11,019.09

[1] Rates adopted September 19, 2023 and effective July 1, 2024.

[2] Rates adopted September 19, 2023 and effective January 1, 2025.

[3] Rates not yet adopted, but proposed to take effect May 1, 2025.

Table 46: Comparison of Current and Proposed Commodity Rates - \$ per HCF

Customer Class	FY 2025 [1]	FY 2025 [2]	FY 2025 [3]	FY 2026	FY 2027	FY 2028	FY 2029
Effective:	Jul. 2024	Jan. 2025	May 2025	Jan. 2026	Jan. 2027	Jan. 2028	Jan. 2029
Single Family							
0 to 10 hcf	\$6.40	\$6.95	\$7.34	\$8.38	\$9.60	\$10.71	\$11.89
11 to 22 hcf	\$7.87	\$7.87	\$8.31	\$9.52	\$10.91	\$12.17	\$13.51
Above 22 hcf	\$9.91	\$9.91	\$10.46	\$12.25	\$14.03	\$15.65	\$17.38
Multi-Family	\$7.52	\$8.17	\$8.62	\$10.05	\$11.51	\$12.84	\$14.26
Commercial	\$7.33	\$7.97	\$8.41	\$9.36	\$10.72	\$11.96	\$13.28
Irrigation	\$8.62	\$9.37	\$9.89	\$10.72	\$12.28	\$13.70	\$15.21
Temp Construction	\$8.26	\$8.98	\$9.48	\$11.10	\$12.71	\$14.18	\$15.74

[1] Rates adopted September 19, 2023 and effective July 1, 2024.

[2] Rates adopted September 19, 2023 and effective January 1, 2025.

[3] Rates not yet adopted, but proposed to take effect May 1, 2025.

Table 47: Comparison of Current and Proposed Private Fire Service Fees - \$ per month

Fireline Size	FY 2025 [1]	FY 2025 [2]	FY 2025 [3]	FY 2026	FY 2027	FY 2028	FY 2029
Effective:	Jul. 2024	Jan. 2025	May 2025	Jan. 2026	Jan. 2027	Jan. 2028	Jan. 2029
1"	\$2.32	\$2.52	\$2.66	\$3.75	\$4.30	\$4.80	\$5.33
1.5"	\$3.15	\$3.42	\$3.61	\$4.76	\$5.46	\$6.09	\$6.76
2"	\$4.59	\$4.99	\$5.27	\$6.50	\$7.45	\$8.31	\$9.23
3"	\$9.75	\$10.60	\$11.19	\$12.75	\$14.60	\$16.28	\$18.08
4"	\$18.64	\$20.26	\$21.38	\$23.54	\$26.96	\$30.07	\$33.38
6"	\$50.56	\$54.94	\$57.97	\$62.24	\$71.27	\$79.47	\$88.22
8"	\$105.63	\$114.79	\$121.11	\$128.99	\$147.70	\$164.69	\$182.81
10"	\$188.45	\$204.79	\$216.06	\$229.40	\$262.67	\$292.88	\$325.10
12"	\$303.25	\$329.54	\$347.67	\$368.57	\$422.02	\$470.56	\$522.33
16"	\$644.10	\$699.95	\$738.45	\$781.79	\$895.15	\$998.10	\$1,107.90
20"	\$1,156.81	\$1,257.11	\$1,326.26	\$1,403.36	\$1,606.85	\$1,791.64	\$1,988.73

[1] Rates adopted September 19, 2023 and effective July 1, 2024.

[2] Rates adopted September 19, 2023 and effective January 1, 2025.

[3] Rates not yet adopted, but proposed to take effect May 1, 2025.