Western Municipal Water District

Murrieta Service Area Water Cost of Service Study Report

Final Report Version 1 / Rates Adopted June 2, 2021

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ABBREVIATIONS

Terms	Descriptions
AF	Acre foot / Acre feet
AWWA	American Water Works Association
COS	Cost of Service
CIP	Capital Improvement Plan
EMU	Equivalent Meter Unit
EMWD	Eastern Municipal Water District
FSC	Fixed System Charges
FY	Fiscal Year ending (July 1 – June 30)
GPCD	Gallons per capita per day
GPM	Gallons per minute
HCF	Hundred cubic feet = 100 cubic feet = 748 gallons
MFR	Multi-family Residential
MGD	Million gallons per day
O&M	Operations and maintenance
PAYGO	Literally “pay as you go” to refer to capital funded through rate revenues
SFR	Single Family Residential

1. EXECUTIVE SUMMARY

1.1 BACKGROUND OF THE STUDY

Western Municipal Water District (District) conducted a Water Cost of Service Study (Study) to review and update the water rates for the Murrieta Service Area. This Study provides the analysis used to determine the proposed water rates for the District's Murrieta Service Area for the four-year Study period, Fiscal Year (FY[1]) 2022 through FY 2025.

1.1.1 Objectives of the Study

The major objectives of the Study include the following:

- Perform cost-of-service (COS) analyses for the Murrieta Service Area for FY 2022 through FY 2025[2]
- Examine the fixed and variable split for recovering the District's revenue requirements
- Document the nexus between the costs incurred by the District and the proposed rates

1.1.2 Proposed Rates

The District's operating costs will be recovered through a monthly fixed charge and two separate variable charges. If adopted by the District's Board of Directors, the proposed rates would be effective and applied to all water usage and service charges billed on or after July 1 of each FY.

1.1.2.1 Monthly Fixed System Charges

Table 1-1 shows the proposed FY 2022 through FY 2025 monthly Fixed System Charge (FSC) by meter size.

Table 1-1: Current and Proposed Rates for Monthly Fixed System Charge ($/Meter Size)

Meter Size	Current	Proposed FY 2022	Proposed FY 2023	Proposed FY 2024	Proposed FY 2025
5/8"	$32.00	$34.63	$35.94	$37.30	$38.71
3/4"	$44.39	$46.41	$48.20	$50.05	$51.97
1"	$68.56	$70.17	$72.91	$75.75	$78.70
1.5"	$129.28	$130.07	$135.20	$140.53	$146.08
2"	$154.50	$155.05	$161.17	$167.54	$174.16
3"	$384.49	$370.32	$385.07	$400.40	$416.33
4"	$744.16	$720.57	$749.39	$779.35	$810.49
6"	$1,641.58	$1,603.18	$1,667.43	$1,734.22	$1,803.64
8"	$2,182.15	$2,137.56	$2,223.24	$2,312.29	$2,404.85
10"	$2,907.64	$2,854.62	$2,969.01	$3,087.92	$3,211.51

[1] In this Study, fiscal years begin on July 1 and end on June 30 and are abbreviated by using the year of the June 30 date. For example, the fiscal year beginning July 1, 2021 and ending June 30, 2022 is abbreviated FY 2022.

[2] The cost-of -service tables for the second through fourth years (FY 2023 – FY 2025) are available upon request from the District.

1.1.2.2 Monthly Fixed System Charge for Private Fire

Fixed system charges have been proposed for the Murrieta Service Area, as shown in Table 1-2[3].

Table 1-2: Proposed Monthly Fixed System Charge for Private Fire ($/Meter Size)

Meter Size	CURRENT 5/8" By-Pass	CURRENT 3/4" By-Pass	Proposed FY 2022	Proposed FY 2023	Proposed FY 2024	Proposed FY 2025
3"	$32.00	$44.39	$25.11	$25.96	$26.85	$27.76
4"	$32.00	$44.39	$40.47	$41.85	$43.28	$44.77
6"	$32.00	$44.39	$95.58	$98.85	$102.26	$105.79
8"	$32.00	$44.39	$190.63	$197.18	$203.99	$211.04
10"	$32.00	$44.39	$333.61	$345.08	$357.00	$369.35
12"	$32.00	$44.39	$531.77	$550.06	$569.06	$588.77

1.1.2.3 Variable Charges

The District utilizes a water budget rate structure for its customers that is overviewed in Appendix A of this Study. Table 1-3 and Table 1-4 show the tier widths and use in each tier. The current and proposed variable rates per one hundred cubic feet (hcf) of water are shown in Table 1-5[4].

Table 1-3: Tier Width Definitions

Tier	Tier Definition	SFR	MFR	COM	IRR
Tier 1	Essential Use	100% IWB	100% IWB	58% TWB	N/A
Tier 2	Efficient Use	100% OWB	100% OWB	42% TWB	100% OWB
Tier 3	Inefficient Use	54% OWB	54% OWB	54% TWB	54% OWB
Tier 4	Unsustainable Use	Above Tier 3	Above Tier 3	Above Tier 3	Above Tier 3

Table 1-4: Projected Use in Each Tier (HCF)

Tier	Tier Definition	FY 2022	FY 2023	FY 2024	FY 2025
Tier 1	Essential Use	430,560	434,866	439,214	443,606
Tier 2	Efficient Use	567,440	573,114	578,846	584,634
Tier 3	Inefficient Use	49,947	50,447	50,951	51,461
Tier 4	Unsustainable Use	45,563	46,018	46,478	46,943
Total		**1,093,510**	**1,104,445**	**1,115,490**	**1,126,644**

[3] The District previously charged private fire based the by-pass meter size.
[4] One hundred cubic feet (hcf) equals 748 gallons.

Table 1-5: Current and Proposed Rates for the Commodity Charge ($/HCF)

Tier	Current	Proposed FY 2022	Proposed FY 2023	Proposed FY 2024	Proposed FY 2025
Tier 1 - Essential Use	$2.006	$2.176	$2.258	$2.342	$2.428
Tier 2 - Efficient Use	$4.286	$4.014	$4.221	$4.420	$4.625
Tier 3 - Inefficient Use	$5.118	$5.141	$5.362	$5.565	$5.773
Tier 4 - Wasteful/Unsustainable Use	$5.558	$5.621	$5.842	$6.045	$6.253
Tier 5 - Unsustainable Use	$6.438	N/A	N/A	N/A	N/A

Table 1-6 shows the current and proposed Pumping Charge rates per hcf of water for those customers in the Grizzly Ridge community. In addition to the Commodity Charge, this Pumping Charge recovers the energy cost of pumping water to the higher elevation of the Grizzly Ridge community. The District is renaming its Power Zones. In this case, Power Zone 8 is being renamed Power Zone 108.

Table 1-6: Current and Proposed Rates for the Pumping Charge ($/HCF)

Zone	Current (Zone 8)	Proposed FY 2022	Proposed FY 2023	Proposed FY 2024	Proposed FY 2025
Power Zone 108	$0.234	$0.212	$0.223	$0.234	$0.246

The calculations and forecasts in this Study are based on the reasonable projection of existing service costs, water demands, and system operations with information available at the time of this Study. Significant changes in the District's operations, changes occurring in California law, or further regulatory actions by the Governor or the State Water Resources Control Board concerning water use may require the District to modify or update the cost of service analysis in the future.

2. INTRODUCTION

2.1 STUDY BACKGROUND

The District, formed in 1954, provides water supply, wastewater disposal, and water resource management to the public in a safe, reliable, environmentally sensitive, and financially responsible manner. The District supplies water on both a wholesale and a retail basis to a region stretching 527-square miles in western Riverside County. This regional area includes the cities of Corona, Norco, Riverside, and Murrieta and the water agencies serving Box Springs, Eagle Valley, Lake Elsinore, Temescal Valley, and Temecula.

As a Metropolitan Water District of Southern California (MWD) member agency, the District receives most of its water from the Sacramento-San Joaquin Bay-Delta and the Colorado River. Most of the Delta water the District receives originates as snowpack in the Sierra Nevadas and travels 444 miles southerly to its final destination in Southern California homes and businesses. Colorado River water travels westward through a 200-plus mile journey via an aqueduct constructed by MWD in the 1930s. The Murrieta Service Area's water sources are local groundwater and an Eastern Municipal Water District interconnection.

2.2 OBJECTIVES OF THE STUDY

The major objectives of the Study include the following:

- Perform cost-of-service (COS) analyses for the Murrieta Service Area for FY 2022 through FY 2025.
- Examine the fixed and variable split for recovering the District's revenue requirements to enhance revenue assurance.
- Document the nexus between the costs incurred by the District and the proposed rates.

2.3 PROCESS

This Study was prepared using principles established by the American Water Works Association (AWWA). The AWWA *"Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices M1* Manual (the "M1 Manual") establishes commonly accepted professional standards for cost-of-service studies. The M1 Manual principles of rate structure design are described below.

According to the M1 Manual, the first step in rate-making is to determine the adequate and appropriate level of funding for a given utility. This is referred to as determining the "revenue requirement." This analysis considers the short-term and long-term service objectives of the utility over a given planning horizon, including capital facilities, system operations and maintenance, and financial reserve policies to determine the adequacy of a utility's existing rates to recover its costs. Several factors may affect these projections, including the number of customers served, water-use trends, nonrecurring sales, weather, conservation, water use restrictions, inflation, interest rates, wholesale contracts, capital finance needs, changes in tax laws, and other changes in operating and economic conditions, among others.

After determining a utility's revenue requirement, the next step is determining the cost of service. Utilizing a public agency's approved budget, financial reports, operating data, water source costs and available volume, and capital improvement plans, a rate study generally categorizes (functionalizes) system costs (e.g.,

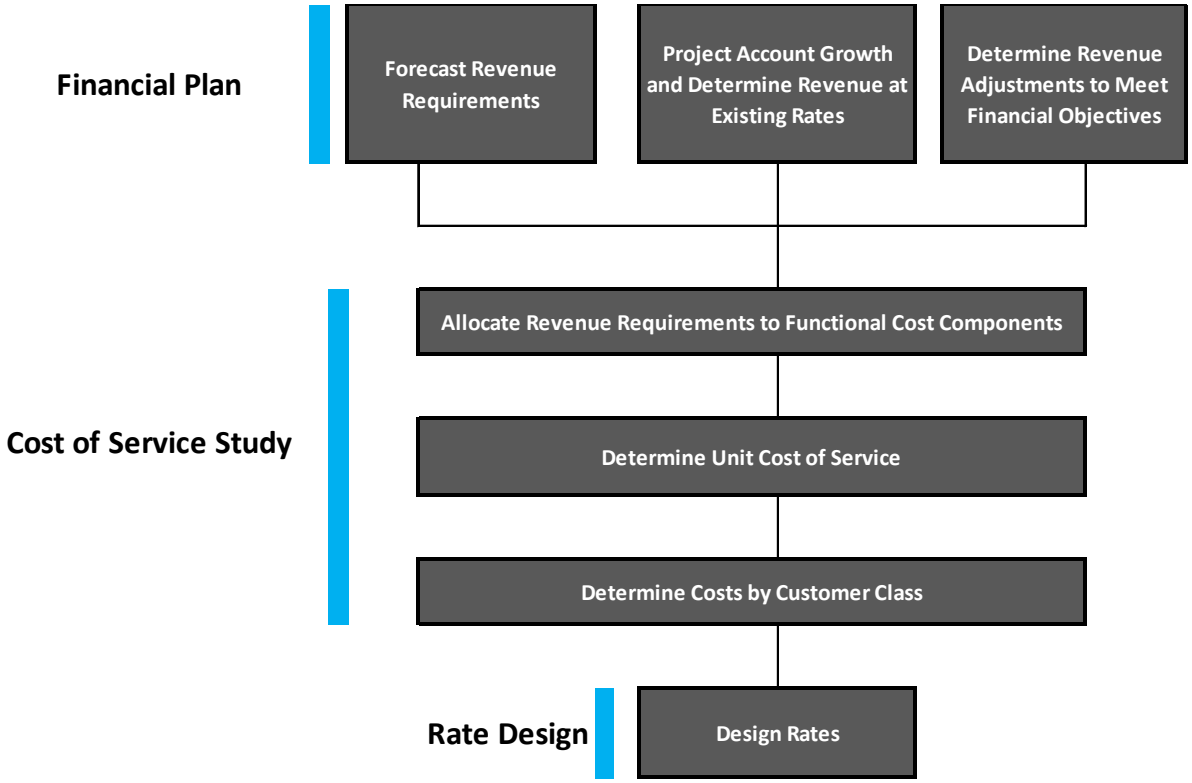
treatment, storage, pumping, etc.), including operating & maintenance (O&M) and asset costs, among major operating functions to determine the cost of service.

After the asset values and O&M costs are appropriately categorized by function, the functionalized costs are allocated to cost causation components and distributed to the various customer classes (e.g., single-family residential, multi-family residential, commercial, etc.[5]). The allocation to customers' classes is determined by examining each customer class characteristic and contribution to the cost causation components, such as supply costs, base costs, peaking costs, and efficiency costs (or conservation costs).

Rate design is the final element of the rate-making process and uses the revenue requirement and cost of service analysis to determine rates for each customer class that reflects the proportionate cost of providing service among the customer classes and on a parcel basis to the customers within each customer class. Rates utilize "rate components" that add up to the total variable and fixed charge rates for the various customer classes. In the case of tiered rates, the rate components allocate the cost of service within each customer class, effectively treating each tier as a sub-class and determining the cost to serve each tier.

Figure 1 provides a graphic representation of the rate study process described above.

Figure 1: Rate Study Approach



[5] For the Murrieta Service Area, SFR, MFR, Commercial, and Irrigation customers have budget based rates. Schools were classified as Commercial customers for the purposes of this Study.

2.4 LEGAL REQUIREMENTS

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

Proposition 218 was enacted in 1996. In part, it added Article XIII D, section 6 (for ease of reference, referred to throughout this Study as Proposition 218), requiring that rates for property-related charges be reasonable and proportional to the cost of providing service. The principal requirements of Proposition 218 as they relate to water service charges imposed by a local agency are as follows:

1. Revenues derived from the charge shall not exceed the costs required to provide the property-related service.
2. Revenues derived from the charge shall not be used for any purpose other than that for which the charge was imposed.
3. The amount of the charge imposed upon any parcel shall not exceed the proportional cost of service attributable to the parcel.
4. No charge may be imposed for a service unless that service is actually used or immediately available to the owner of property.
5. No charge may be imposed for general governmental services including, but not limited to, police, fire, ambulance, or library services, where the service is available to the public at large in substantially the same manner as it is to property owners.
6. A public agency must hold a public hearing to consider the adoption of the proposed new or increase in an existing charge; written notice of the public hearing and the proposed charge shall be mailed to the record owner of each parcel at least 45 days prior to the public hearing; if the public agency receives written protests against the proposed charge from a majority of the property owners the new charge or increase charge may not be imposed.

As stated in AWWA's *M1 Manual*, "water charges should be recovered from classes of customers in proportion to the cost of serving those customers." This cost of service analysis follows industry-standard rate-setting methodologies set forth by the AWWA *M1 Manual* to ensure the study meets Proposition 218 requirements and develops rates that do not exceed the proportionate cost of providing water services.

2.4.2 California Constitution - Article X, Section 2

Article X, Section 2 of the California Constitution states the following:

> "It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare."

Article X, section 2 of the State Constitution institutes the need to preserve the State's water supplies and to discourage the wasteful or unreasonable use of water by encouraging conservation. As such, public agencies are constitutionally mandated to maximize the beneficial use of water, prevent waste, and encourage conservation.

In connection with meeting the objectives of Article X, section 2, Water Code Sections 370 and 375 et seq. authorize a water purveyor to utilize its water rate design to incentivize the efficient use of water. Although incentives to conserve water may be provided by implementing a higher rate as consumption increases, Proposition 218 requires that the higher rate correspond to the actual cost of serving the parcel at that level of water consumption.

Government Code Section 370 et seq. (Allocation-Based Conservation Water Pricing)

In 2000, the California Legislature adopted a body of law entitled "Allocation-Based Conservation Water Pricing" (Water Code Section 370 et seq.) authorizing public agencies to adopt a form of tiered water rate structure that is designed to harmonize the provisions of Article X, section 2 with those of Proposition 218.

Water Code Section 370 provides in part as follows:

> "The Legislature hereby finds and declares all of the following:
> (a) The use of allocation-based conservation water pricing by public entities that sell and distribute water is one effective means by which waste or unreasonable use of water can be prevented and water can be saved in the interest of the people and for the public welfare, within the contemplation of Section 2 of Article X of the California Constitution.
> (b) It is in the best interest of the people of California to encourage public entities to voluntarily use allocation-based conservation water pricing, tailored to local needs and conditions, as a means of increasing efficient uses of water, and further discouraging wasteful or unreasonable use of water under both normal and dry-year hydrologic conditions."

Water Code Section 372 provides as follows:

> "(a) A public entity may employ allocation-based conservation water pricing that meets all of the following criteria.
> (1) Billing is based on metered water use.
> (2) A basic use allocation is established for each customer account that provides a reasonable amount of water for the customer's needs and property characteristics. Factors used to determine the basic use allocation may include, but are not limited to the number of occupants, the type or classification of use, the size of lot or irrigated area, and the local climate data for the billing period. Nothing in this chapter prohibits a customer of the public entity from challenging whether the basic use allocation established for that customer's account is reasonable under the circumstances. Nothing in this chapter is intended to permit public entities to limit the use of property through the establishment of a basic use allocation."
> (3) A basic charge is imposed for all water used within the customer's basic use allocation, except that at the option of the public entity, a lower rate may be applied to any portion of the basic use allocation that the public entity has determined to represent superior or more than reasonable conservation efforts.
> (4) A conservation charge shall be imposed on all increments of water use in excess of the basic use allocation. The increments may be fixed or may be determined on a percentage or any other basis, without limitation on the number of increments, or any requirement that the increments or conservation charges be sized, or ascend uniformly, or in a specified relationship. The volumetric prices for the lowest through the highest priced increments shall be established in an ascending

relationship that is economically structured to encourage conservation and reduce the inefficient use of water, consistent with Section 2 of Article X of the California Constitution.
(b)(1) Except as specified in subdivision (a), the design of an allocation-based conservation pricing rate structure shall be determined in the discretion of the public entity.
(2) The public entity may impose meter charges or other fixed charges to recover fixed costs of water service in addition to the allocation-based conservation pricing rate structure.
(c) A public entity may use one or more allocation-based conservation water pricing structures for any class of municipal or other service that the public entity provides."

The District sets a water budget for each customer that defines how much water is considered efficient for indoor and outdoor water usage, if applicable, based upon several factors particular to each customer. Customers with usage above this efficient usage budget pay a higher rate for their "inefficient" or "wasteful" usage. As demonstrated in this Study, the rate at each level of consumption corresponds to the actual cost of serving the parcel. This Study conforms to the principles set forth in the enabling statutes for Allocation-Based Conservation Water rates (also referred to as Water Budget Rate Structures).

Tiered Rates – "Inclining" tiered water rate structures (synonymous with "tiered" rates), when properly designed and differentiated by customer class, allow a water utility to send consistent price signals to customers. Tiered rates meet the requirements of Proposition 218 as long as the tiered rates reflect the proportionate cost of providing service to users in each tier.

2.4.3 Cost-Based Rate Setting Methodology

As stated in the AWWA M1 Manual, "the costs of water rates and charges should be recovered from classes of customers in proportion to the cost of serving those customers." To develop utility rates that comply with Proposition 218 and industry standards while meeting other emerging goals and objectives of the District, four major steps are discussed below and previously addressed in Section 2.3.

1. **Calculate Revenue Requirement**
   The rate-making process starts by determining the revenue requirement, that is, revenues required to sufficiently fund the utility's O&M, debt service, capital expenses, and reserves.

2. **Cost of Service Analysis (COS)**
   The annual cost of providing water service is distributed among customer classes commensurate with their service requirements. A COS analysis involves the following:
   - Functionalize costs. Examples of functions are supply, treatment, transmission, distribution, storage, meter servicing, and customer billing and collection.
   - Allocate functionalized costs to cost causation components. Cost causation components include, but are not limited to, base[6], maximum day, maximum hour[7], conservation, public fire protection, meter service, and customer service and billing costs.

[6] Base costs are those associated with meeting average day demands and unrelated to meeting peaking demands.
[7] Collectively maximum day and maximum hour costs are known as peaking costs or capacity costs.

- Distribute the cost causation components. Distribute cost components, using unit costs, to customer classes in proportion to their demands on the water system. This is described in the M1 Manual published by AWWA.

A COS analysis considers both the average quantity of water consumed (base costs) and the peak rate at which it is consumed (peaking or capacity costs as identified by maximum day and maximum hour demands).[8] Peaking costs are costs that are incurred during peak times of consumption. There are additional costs associated with designing, constructing, and operating & maintaining facilities large enough to meet peak demands. These peak demand costs need to be allocated to those whose higher water usage requires a utility to make additional capital investments, acquire or purchase higher cost sources of water supply, or develop water conservation and efficiency programs to meet their higher demand. In other words, not all customer classes or customers within a customer class share the same responsibility for peaking related costs.

3. **Rate Design and Calculations**

   Rates do more than simply recover costs. Within the legal framework and industry standards, properly designed rates should support and optimize a blend of various utility objectives, such as deterring water waste, supporting affordability for essential needs, and ensuring revenue stability, among other objectives. Rates may also act as a public information tool in communicating these objectives to customers.

4. **Rate Adoption**

   Rate adoption is the last step of the rate-making process to comply with Proposition 218. This report's rate study results demonstrate that the proposed water service charges reflect the proportional cost of providing water, and serve as a public education tool about the proposed changes, the rationale and justifications behind the changes, and their anticipated financial impacts.

[8] System capacity is the system's ability to supply water to all delivery points at the time when demanded. Coincident peaking factors are calculated for each customer class at the time of greatest system demand. The time of greatest demand is known as peak demand. Both the operating costs and capital asset related costs incurred to accommodate the peak flows are generally allocated to each customer class based upon the class's relative demands during the peak month, day, and hour event.

3. KEY ASSUMPTIONS

The Study period is for Fiscal Years (FY) 2022 through FY 2025. Assumptions and inputs incorporated into the Study include, but are not limited to, the selection of the baseline year, available water supply and related cost increases, and the revenue requirements for the Study period. Please note that due to numerical rounding for report display, the numbers and percentages presented within this Study may not precisely reflect the actual totals.

3.1 BASELINE YEAR

Like many agencies in California, the District is dealing with challenges related to water supply availability during periods of drought. These conditions have led to a reduction in water usage due to conservation and restrictions, as well as increased costs associated with conservation programs, monitoring, and customer outreach. It is crucial for rate setting to select a baseline year that reflects the District's customers' typical consumption patterns and the respective cost allocations within the budget that represent the average expenditures or the expected expenditures moving forward. The revenue requirement is based on the FY 2022 adopted budget and the FY 2023-2025 projected budgets.

Water demand is influenced by a variety of different factors, including, but not limited to, the broader economy, changes in weather and climate, population changes, and water conserving devices. Actual water historical usage was obtained as well as historical Evapotranspiration (ETo). An analysis was conducted using Microsoft Excel and R Statistical Program to analyze the relationship between climate extremes in the data set and time series analysis using R's timeseries package and forecast package. This historical information was used to forecast demand for FY 2022. ETo was looked at to see if high or low values occurred because of extreme weather. Tiers 1 and 2 estimates for FY 2022 were determined from maximum monthly averages. For Tiers 3-4, the District took a more conservative approach and took the average demand over the 2017-2020. A 1% increase in demand was applied to each tier in the remaining years of the Study period.

3.2 AVAILABLE WATER SUPPLY

The District meets customers' demands through local groundwater and importing water from Eastern Municipal Water District (EMWD). Table 3-1 lists the water supplies and summarizes the expected acre-feet (AF) available from each source. EMWD is listed as "Unlimited" in that there is not a maximum established; however, 1,190 AF is the projected demand. The Study assumes there will be no changes to the water availability from each source during the Study period. Unit supply costs are also provided in Table 3-1 which are projected based on historical expense growth for the Well supply, and projected based primarily on MWD's rate forecast for the EMWD supply.

Table 3-1: Available Water Supplies

Water Supply Source	Quantity Available Each Fiscal Year (AF)	Unit Cost ($/AF)			
		FY 2022	FY 2023	FY 2024	FY 2025
Wells	1,452	$286.93	$298.20	$309.91	$322.10
EMWD	Unlimited	$1,373.23	$1,442.14	$1,502.97	$1,565.35

4. POTABLE COST OF SERVICE & RATES

This Study conforms to the principles set forth in the enabling statutes, and the rates abide by the cost-of-service provisions of Proposition 218.

4.1 PROPORTIONALITY

When calculating rates, a critical component of ensuring compliance with Proposition 218 is demonstrating proportionality. For costs that are recovered through the District's proposed Fixed System Charge, the Study spreads the costs either over all accounts or by meter size, depending on the type of cost. As such, customer classes and usage are not considered for calculating each customer's Fixed System Charge. Conversely, costs that were determined as variable are allocated among customer classes based on their demand on the system and water supplies. As stated in the M1 Manual, the AWWA Rates and Charges Subcommittee agree with Proposition 218 that "the costs of water rates and charges should be recovered from classes of customers in proportion to the cost of serving those customers." The District's revenue requirements are, by definition, the cost of providing service. This cost is then used as the basis to develop unit costs for the water components and to allocate costs to the various customer classes in proportion to the water services rendered.

Individual customer demands vary depending on the nature of the use at the location where service is provided. For example, water service demand for a family residing in a typical single-family home is different than the water service demand for an irrigation customer. The concept of proportionality requires that cost allocations consider both the average quantity of water consumed (Base) and the peak rate at which it is consumed (Peaking). The use of peaking is consistent with the cost of providing service because a water system is designed to meet peak demands, and the additional costs associated with designing, constructing, and maintaining facilities required to meet these peak demands need to be allocated to those customers whose usage requires the District to make capital investments in facilities to meet peak demand.

In allocating the costs of service, the industry standard, as promulgated by AWWA's M1 Manual, is to group customers with similar system needs and demands into customer classes. Rates are then developed for each customer class, with each individual customer paying the customer class's proportionate allocated cost-of-service.

Generally speaking, customers place the following demands on the water system and water supplies:

- The system capacity[9] (for treatment, storage, and distribution) that must be constructed, operated, and maintained to provide reliable service to all customers at all times;
- The level of water efficiency as a collective group; and
- The number of customers requiring customer services such as bill processing, customer service support, and other administrative services.

A customer class consists of a group of customers with common characteristics who share responsibility for certain costs incurred by the utility. Joint costs are proportionately shared among all customers in the system based on their service requirements; some specific costs are borne by specific classes based on the characteristics of that group alone.

4.2 COST OF SERVICE PROCESS

A cost-of-service analysis distributes a utility's revenue requirements (costs) to each customer class. Figure 2 provides a general overview of a cost-of-service analysis. Each step shown below will be described in greater detail in the subsections below.

Figure 2: Cost of Service Process

4.3 STEP 1 – DETERMINE REVENUE REQUIREMENTS

Table 4-1 summarizes Revenue Requirements for the Study period. The first year, Fiscal Year 2021-22 ("FY 2022"), was based on the Board-adopted operating budget with subsequent fiscal year amounts escalated by 4.5% per year (which has been the historical expense growth experience of the District). Exceptions to this last sentence are described as follows:

- Purchased Water costs (line 12) were adjusted for all four years to reflect the calculated purchased water cost based on the projected water usage and projected cost per AF as opposed to the original budgeted cost.
- Source of Supply costs (line 13) and Treatment costs (line 14) were adjusted for FY 2022 after the District conducted a more in-depth analysis of historical costs than was utilized during the development of the operating budget. Costs for the remaining fiscal years of the Study period were escalated by 3.0%

[9] System capacity is the system's ability to supply water to all delivery points at the time when demanded. The time of greatest demand is known as peak demand.

or 4.5% depending on the growth assumptions of the underlying costs. The percentage growth assumptions were based on historical growth of the underlying costs.

- Purchased Power (line 15) was adjusted to reflect the actual costs for Fiscal Year 2019-20 plus 3% to arrive at the projected amount for Fiscal Year 2020-21, and then escalated by an additional 3% to arrive at the amount for the first rate setting year, FY 2022. Subsequent years were increased by 6% - 1% for projected customer growth and 5% for projected increases in the rates from energy providers.
- Water Use Efficiency costs (line 16) were adjusted to reflect the anticipated costs of the conservation measures for the first year of the Study period as opposed to the adopted budget, and then first year costs were escalated by 1% for each remaining year to reflect projected growth in customer water demand.
- Other Revenue Adjustments (lines 21-27) are based on the adopted budget for FY 2022 and then held constant for the remaining three years of the Study period.

The District determines the annual revenues it must generate to meet O&M expenses, any debt service needs, reserve funding to achieve target levels, and capital investment needs. This is called the revenue requirement.

Table 4-1: Revenue Requirements

Line No.	Description	FY 2022	FY 2023	FY 2024	FY 2025
1	**O&M Expenditures**				
2	Water Pumping	$230,049	$240,401	$251,219	$262,524
3	Transmission & Distribution	$1,524,880	$1,593,500	$1,665,208	$1,740,142
4	Customer Accounts	$212,549	$222,114	$232,109	$242,554
5	Replacement Reserve	$1,038,457	$1,085,007	$1,133,885	$1,185,206
6	G&A Allocation	$802,988	$839,122	$876,882	$916,342
7	Other Operating Expenses	$159,956	$167,154	$174,676	$182,536
8	Prop Tax Collection	$10	$10	$10	$10
9	**Total O&M Expenditures**	**$3,968,889**	**$4,147,308**	**$4,333,989**	**$4,529,314**
10					
11	**Other Expenditures**				
12	Purchased Water	$1,634,799	$1,754,943	$1,869,080	$1,988,851
13	Source of Supply	$273,723	$283,642	$293,936	$304,619
14	Treatment	$142,903	$149,333	$156,053	$163,076
15	Purchased Power	$30,632	$32,526	$34,556	$36,623
16	Water Use Efficiency	$54,343	$54,887	$55,436	$55,990
17	**Total Other Expenditures**	**$2,136,400**	**$2,275,331**	**$2,409,061**	**$2,549,159**
18					
19	**Total Expenses**	**$6,105,289**	**$6,422,639**	**$6,743,050**	**$7,078,473**
20					
21	**Other Revenue Adjustments**				
22	Property Tax	($5,000)	($5,000)	($5,000)	($5,000)
23	**Operating Revenues**				
24	Interest Income	($5,700)	($5,700)	($5,700)	($5,700)
25	Delinquent Penalties	($50,000)	($50,000)	($50,000)	($50,000)
26	Water Availability Charge Revenue	($131,000)	($131,000)	($131,000)	($131,000)
27	Other	($7,500)	($7,500)	($7,500)	($7,500)
28	**Total Other Revenue Adjustments**	**($199,200)**	**($199,200)**	**($199,200)**	**($199,200)**
29					
30	**Net Revenue Requirement**	**$5,906,089**	**$6,223,439**	**$6,543,850**	**$6,879,273**

4.4 STEP 2 – FUNCTIONALIZE COSTS

After determining a utility's revenue requirements, the next step in a cost-of-service analysis is to outline the cost to deliver each unit of water to serve each customer. This process takes each item in the District's budget (e.g., O&M costs and system assets) and organizes the items collectively based on what function is served. The District's revenue requirements were functionalized by the District as described below:

1. **Purchased Water** – Direct costs of purchasing water from EMWD
2. **Source of Supply** – Operating costs associated with producing water from local wells
3. **Water Pumping** – Costs associated with pumping water from other sources or from treatment facilities to the transmission and distribution systems
4. **Treatment** – Costs associated with treating water to potable water standards
5. **Transmission** – Costs or assets associated with transporting water from the point of treatment through major trunk locations within the distribution system

6. **Transmission and Distribution** – Costs associated with transporting water from the point of treatment through major trunk locations and eventually to smaller local service distribution mains to specific locations within a service area
7. **Customer Accounts** – Costs associated with administering customer accounts such as processing complaints, responding to customer inquiries, performing meter reading, and billing
8. **Meters & Services** – Costs or assets associated with providing customer water meters and associated testing and replacements (maintenance)
9. **Storage** – Costs or assets associated with water reservoirs or storage
10. **Replacement Reserve** – Costs associated with replacing infrastructure
11. **General/G&A** – Costs that are general and administrative in nature or other costs that do not serve a specific function
12. **Purchased Power** – Energy costs associated with pumping treated water to higher elevations
13. **Water Use Efficiency** – Costs associated with programs and services offered to District customers that promote water use efficiency
14. **Property Tax Collection** – Costs associated with collecting property taxes

Table 4-2 shows the functionalized fixed asset listing at replacement cost less depreciation (RCLD)[10] used for each year of the Study period. The RCLD asset valuation method takes into consideration the cost to replace assets at today's costs yet realizes the assets being depreciated still have remaining value. Using the RCLD method results in a dollar amount reflecting the current market value of the asset. The functionalized assets will be used to allocate capital costs within the O&M Budget (specifically replacement costs). Table 4-3 summarizes the functionalized costs for each year of the Study period.

Table 4-2: Assets by Function

Asset Function	Total RCLD	% of Assets
General	$830,331	6.39%
Water Pumping	$936,679	7.20%
Transmission Telemetry	$13,484	0.10%
Transmission & Distribution	$6,088,241	46.82%
Meters & Services	$773,386	5.95%
Source of Supply	$2,331,951	17.93%
Storage	$2,028,832	15.60%
Total Assets	**$13,002,904**	**100.00%**

[10] A detailed listing of assets is on file with the District. Using the Asset Type and Sub Type descriptions, each asset was placed into one of the functions described above.

Table 4-3: O&M by Function

Line No.	Functions	FY 2022	FY 2023	FY 2024	FY 2025
1	Water Pumping	$230,049	$240,401	$251,219	$262,524
2	Transmission & Distribution	$1,524,880	$1,593,500	$1,665,208	$1,740,142
3	Customer Accounts	$212,549	$222,114	$232,109	$242,554
4	Replacement Reserve	$1,038,457	$1,085,007	$1,133,885	$1,185,206
5	G&A Allocation	$802,988	$839,122	$876,882	$916,342
6	Other Operating Expenses	$159,956	$167,154	$174,676	$182,536
7	Prop Tax Collection	$10	$10	$10	$10
8	Purchased Water	$1,634,799	$1,754,943	$1,869,080	$1,988,851
9	Source of Supply	$273,723	$283,642	$293,936	$304,619
10	Treatment	$142,903	$149,333	$156,053	$163,076
11	Purchased Power	$30,632	$32,526	$34,556	$36,623
12	Water Use Efficiency	$54,343	$54,887	$55,436	$55,990
13	**Total Expenses**	**$6,105,289**	**$6,422,639**	**$6,743,050**	**$7,078,473**

4.5 STEP 3 – ALLOCATION OF FUNCTIONAL COSTS TO COST CAUSATION COMPONENTS

The functionalization of costs and assets allows us to better allocate the costs based on how the costs are incurred. This is commonly referred to as **cost causation,** and this analysis determines the amount of costs recovered from the various rate components (cost causation components). The District's costs of service are assigned to the following cost causation components:

1. ***Water Supply Costs*** represents direct water supply costs to produce local water before distributing to customers and the direct costs of purchasing water from EMWD
2. ***Base/Delivery Costs*** are the base costs incurred to provide water under average daily demand conditions
3. ***Extra Capacity Costs*** or peaking costs represent those costs incurred to meet customer peak demands for water in excess of average day usage and are further functionalized as maximum day costs and maximum hour costs.
4. ***Efficiency Costs*** include costs of managing the District's water supply through water conservation efforts and efficiency programs.
5. ***Elevation Costs*** include energy costs incurred to pump treated water to higher elevations.
6. ***Billing and Customer Service Costs*** include customer-related costs such as meter reading, billing, collecting, customer accounting, and customer call center. These costs are incurred at the same level regardless of the type of land use, customer class, or the total amount of water delivered.
7. ***Meters and Service Costs*** include maintenance and capital costs associated with servicing meters. These costs are assigned based on meter cost ratios.
8. ***General Costs*** are either general or administrative in nature. These costs will be distributed to Delivery, Extra Capacity, Billing and Customer Service, and Meters and Service.
9. ***Fire Protection Costs*** are separated into public fire protection costs (associated with fire hydrants) and private fire protection costs (associated with fire suppression systems in a commercial building).

4.5.1 Extra Capacity Costs Allocation

Extra capacity or peaking costs are further divided/functionalized into maximum day (Max Day) and maximum hour (Max Hour) demand. The Max Day demand is the maximum amount of water used in a single day in a year. The Max Hour demand is the maximum usage in an hour on the maximum usage day. Different facilities, such as distribution and storage facilities, and the O&M costs associated with those facilities are designed to meet the peaking (i.e., Max Day and Max Hour) demands of customers. Therefore, extra capacity[11] costs include the O&M and capital costs associated with meeting peak customer demand. This method is consistent with the AWWA M1 Manual and is widely used in the water industry.

After functionalizing costs, the next step is to allocate the functionalized costs to cost causation components. To do so, we must identify system-wide peaking factors. The system-wide peaking factors are used to derive the cost component allocation bases (i.e., percentages). Functionalized costs are then allocated to the cost causation components using these allocation bases. To understand the interpretation of the percentages, we must first establish the base use as the average daily demand of all customers during the year.

The base demand is assigned a value of 1.0, which signifies no peaking demands. Table 4-4 shows the Max Day and Max Hour values based on the District's Master Plan engineering document for the Murrieta Service Area. The Max Day peaking factor of 2.70 means that when the maximum amount of water is delivered, the system delivers 2.70 times the amount of water it does during an average day. Similarly, the Max Hour peaking factor of 4.05 means that during the hour when the maximum amount of water is delivered on a Max Day, the system delivers 4.05 times the amount of water it does on an average day.

Table 4-4: System-Wide Peaking Characteristics

System Peaking Factors	System-wide Ratio
Base	1.00
Max Day Demand	2.70
Max Hour Demand	4.05

Max Day Demand

Next, the relative proportion of costs assigned to Base, Max Day, and Max Hour are used to allocate costs to the cost causation components. Cost causation components designed to meet Max Day peaks, such as reservoirs and transmission facilities, are allocated to both Base and Max Day factors.

The Max Day factor of the District's system is 2.70, which means that Max Day demand is expected to be 270% of the average day capacity. Applying the formula to the system peaking factors found in Table 4-4 yields the following:

$$\text{Base} = \frac{\text{Base}}{\text{Max Day}} = \frac{1}{2.70} \approx 37\%$$

$$\text{Max Day} = \frac{\text{Max Day} - \text{Base}}{\text{Max Day}} = \frac{2.70 - 1}{2.70} \approx 63\%$$

[11] The terms extra capacity, peaking, and capacity costs are used interchangeably.

Max Hour Demand

Facilities designed for Max Hour peaks, such as distribution system facilities, are allocated similarly. The Max Hour factor is 4.05, so Max Hour facilities are designed to provide 405% of the average day capacity. The allocation of Max Hour facilities is shown below:

$$Base = \frac{Base}{Max\ Hour} = \frac{1}{4.05} \approx 25\%$$

$$Max\ Day = \frac{Max\ Day - Base}{Max\ Hour} = \frac{2.70 - 1}{4.05} \approx 42\%$$

$$Max\ Hour = \frac{Max\ Hour - Max\ Day}{Max\ Hour} = \frac{4.05 - 2.70}{4.05} \approx 33\%$$

The base results of the allocation are presented in Table 4-5 below. These percentages are used as the foundation for allocating operating and capital improvement expenses to cost components, explained in detail in the following sub-sections.

Table 4-5: Allocation Factors

System Peaking Factors	Base	Max Day	Max Hour
Base	100%	0%	0%
Max Day Demand	37%	63%	0%
Max Hour Demand	25%	42%	33%
Average Demand	31%	52%	17%

4.5.2 Allocation of Operating Expenses

Once the system peaking factors have been determined, the next step is to allocate the functionalized costs to cost causation components. Table 4-6 provides a matrix of the District's functions in the left-most column, which are allocated to the cost causation components on the right. The following cost-of-service analysis documents the FY 2022 analysis. The results of the FY 2023 - FY 2025 analyses are summarized within this Study, while detailed tables for individual years are available upon request from the District.

Table 4-6: Allocation to Cost Causation Components

Functions		Water Supply	Delivery	Max Day	Max Hour	Efficiency	Elevation	Billing & CS	Meters & Service	General	Total
Water Pumping	Max Hour	0%	25%	42%	33%	0%	0%	0%	0%	0%	100%
Transmission & Distribution	Max Hour	0%	25%	42%	33%	0%	0%	0%	0%	0%	100%
Transmission Telemetry	Max Day	0%	37%	63%	0%	0%	0%	0%	0%	0%	100%
Customer Accounts	Billing & CS	0%	0%	0%	0%	0%	0%	100%	0%	0%	100%
Replacement Reserve	Capital Assets	0%	37%	33%	18%	0%	0%	0%	6%	6%	100%
G&A Allocation	General	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%
Other Operating Expenses	General	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%
Prop Tax Collection	General	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%
Purchased Water	Supply	100%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Source of Supply (O&M)	Supply	100%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Source of Supply (Capital)	Delivery	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%
Treatment	Supply	100%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Purchased Power	Elevation	0%	0%	0%	0%	0%	100%	0%	0%	0%	100%
Water Use Efficiency	Efficiency	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%
Storage	Max Day	0%	37%	63%	0%	0%	0%	0%	0%	0%	100%
Meters & Service	Meters & Service	0%	0%	0%	0%	0%	0%	0%	100%	0%	100%

Table 4-7 summarizes the percentage allocations for each capital asset function, and Table 4-8 summarizes the dollar allocations of capital assets to cost causation components. The RCLD asset value of each functionalized asset (derived from Table 4-2) is spread to the cost causation components based on the percentages shown in Table 4-6 and again in Table 4-7. Using Storage as an example, Storage facilities are designed to accommodate Base Delivery demand and Max Day demand, therefore the Max Day percentages from Table 4-5 were used to allocate the RCLD asset value to cost causation components. To determine the dollar amount allocated to each component, the RCLD asset value is multiplied by the percentages shown. Using Transmission Telemetry as an example, the amount allocated to the delivery component is $13,484 × ~37% = $4,994 and the amount allocated to Max Day is $13,484 × ~63% = $8,490. The Asset Allocation percentages at the bottom of the Table are calculated by dividing the allocated asset costs for a given cost causation component by the total RCLD asset value of $13,002,904. Please note there may be differences due to rounding.

Table 4-7: Capital Allocation (%)

Function	Total RCLD	Delivery	Max Day	Max Hour	Meters & Service	General
General	$830,331	0%	0%	0%	0%	100%
Water Pumping	$936,679	25%	42%	33%	0%	0%
Transmission Telemetry	$13,484	37%	63%	0%	0%	0%
Transmission & Distribution	$6,088,241	25%	42%	33%	0%	0%
Meters & Services	$773,386	0%	0%	0%	100%	0%
Source of Supply	$2,331,951	100%	0%	0%	0%	0%
Storage	$2,028,832	37%	63%	0%	0%	0%
Total Assets	**$13,002,904**	**$4,822,913**	**$4,234,634**	**$2,341,640**	**$773,386**	**$830,331**
Asset Allocation %	***100.0%***	***37.1%***	***32.6%***	***18.0%***	***5.9%***	***6.4%***

Table 4-8: Capital Allocation ($)

Function	Total RCLD	Delivery	Max Day	Max Hour	Meters & Service	General
General	$830,331	$0	$0	$0	$0	$830,331
Water Pumping	$936,679	$231,279	$393,174	$312,226	$0	$0
Transmission Telemetry	$13,484	$4,994	$8,490	$0	$0	$0
Transmission & Distribution	$6,088,241	$1,503,269	$2,555,558	$2,029,414	$0	$0
Meters & Services	$773,386	$0	$0	$0	$773,386	$0
Source of Supply	$2,331,951	$2,331,951	$0	$0	$0	$0
Storage	$2,028,832	$751,419	$1,277,413	$0	$0	$0
Total Assets	**$13,002,904**	**$4,822,913**	**$4,234,634**	**$2,341,640**	**$773,386**	**$830,331**
Asset Allocation %	***100.0%***	***37.1%***	***32.6%***	***18.0%***	***5.9%***	***6.4%***

Next, the O&M functionalized costs from Table 4-3 are allocated to cost components using the percentages from Table 4-6. Functionalizing O&M follows the principles of rate-setting theory. The end goal is to allocate O&M expenses to cost causation components. Table 4-10 summarizes the FY 2022 O&M allocation to cost components and determines the O&M Allocation (%) in the last row. Note, the Replacement Reserve was allocated based on the Asset Allocation (%) in the last row in Table 4-8.

Table 4-9: FY 2022 O&M Allocation (%)

Function	Water Supply	Delivery	Max Day	Max Hour	Efficiency	Elevation	Billing & CS	Meters & Service	General
Water Pumping		24.7%	42.0%	33.3%					
Transmission & Distribution		24.7%	42.0%	33.3%					
Customer Accounts							100.0%		
Replacement Reserve		37.1%	32.6%	18.0%				5.9%	6.4%
G&A Allocation									100.0%
Other Operating Expenses									100.0%
Prop Tax Collection									100.0%
Purchased Water	100.0%								
Source of Supply	100.0%								
Treatment	100.0%								
Purchased Power						100.0%			
Water Use Efficiency					100.0%				

Table 4-10: FY 2022 O&M Allocation ($)

Function	FY 2022 Budget	Water Supply	Delivery	Max Day	Max Hour	Efficiency	Elevation	Billing & CS	Meters & Service	General
Water Pumping	$230,049		$56,802	$96,564	$76,683					
Transmission & Distribution	$1,524,880		$376,514	$640,073	$508,293					
Customer Accounts	$212,549							$212,549		
Replacement Reserve	$1,038,457		$385,175	$338,193	$187,011				$61,765	$66,313
G&A Allocation	$802,988									$802,988
Other Operating Expenses	$159,956									$159,956
Prop Tax Collection	$10									$10
Purchased Water	$1,634,799	$1,634,799								
Source of Supply	$273,723	$273,723								
Treatment	$142,903	$142,903								
Purchased Power	$30,632						$30,632			
Water Use Efficiency	$54,343					$54,343				
Total	**$6,105,289**	**$2,051,425**	**$818,490**	**$1,074,829**	**$771,988**	**$54,343**	**$30,632**	**$212,549**	**$61,765**	**$1,029,267**
O&M Allocation %	***100.0%***	***33.6%***	***13.4%***	***17.6%***	***12.6%***	***0.9%***	***0.5%***	***3.5%***	***1.0%***	***16.9%***

The District has available unrestricted revenues, as shown in Table 4-11. These revenues can be used to lower the total revenue requirements, or they can be used specifically at the discretion of the District. Other revenues will be used to lower the revenue requirement for the General cost component, as shown in Table 4-12.

Table 4-11: Other Available Revenues

Revenue Source	FY 2022 Revenue ($)
Property Tax	$5,000
Interest Income	$5,700
Delinquent Penalties	$50,000
Water Availability Charge Revenue	$131,000
New Service Set Up & Meter Repair	$7,500
Total	**$199,200**

Table 4-12: Adjusted General Costs

Description	$
General Costs	$1,029,267
Revenue Offsets	($199,200)
Adjusted General Costs	**$830,067**

Next, the remaining costs allocated to the General Cost component of $830,067 are reallocated based on the proportionate share of Delivery, Max Day, Max Hour, Billing & Customer Service, and Meters & Service revenue requirements (Table 4-13). This was done because the percentage of total costs is a proxy of how much unassigned cost should be allocated since it reasonably reflects the amount of general service needed for that cost component. As an example, the following equation shows the calculation of the Allocation of General Costs (%) for the Delivery Component:

$$Delivery\ General\ Cost\ Allocation = \frac{Delivery\ Subtotal\ Revenue\ Requirement}{(Delivery + Max\ Day + Max\ Hour + Billing\ \&\ CS + Meters\ \&\ Services\ Revenue\ Requirements)}$$

$$= \frac{\$818{,}490}{(\$818{,}490 + \$1{,}074{,}829 + \$771{,}988 + \$212{,}549 + \$61{,}765)} \approx 27.8\%$$

Therefore, approximately 27.8% (or $231,119) of the $830,067 of General Costs is allocated to the Delivery Costs cost causation component. The reallocation of General Costs is shown in Table 4-13.

Table 4-13: General Cost Reallocation

Line No.	Cost Causation Components	FY 2022 Requirements A	Applicable Cost B	Allocation % C = B ÷ B10	General Requirement Reallocation D = A9 × C	Net Revenue Requirements E = A + D
1	Water Supply	$2,051,425	N/A		$0	$2,051,425
2	Delivery	$818,490	$818,490	27.8%	$231,119	$1,049,609
3	Max Day	$1,074,829	$1,074,829	36.6%	$303,502	$1,378,331
4	Max Hour	$771,988	$771,988	26.3%	$217,988	$989,976
5	Efficiency	$54,343	N/A		$0	$54,343
6	Elevation	$30,632	N/A		$0	$30,632
7	Billing & CS	$212,549	$212,549	7.2%	$60,018	$272,567
8	Meters & Service	$61,765	$61,765	2.1%	$17,441	$79,206
9	Adjusted General Costs	$830,067	N/A		$0	N/A
10	**Total**	**$5,906,089**	**$2,939,622**	**100.0%**	**$830,067**	**$5,906,089**

In an analogous manner to general costs, fire capacity costs (both public and private) are first calculated and then reallocated to the other cost causation components. Water systems provide two types of fire protection: public fire protection for delivering water to property in sufficient quantities and pressures in the event of a fire, which is generally visible as hydrants on the street, and private fire protection, which provides fire flow to buildings and other structure sprinkler systems for fire suppression within private improvements. These costs include not only the delivery point, whether it be public fire hydrants and private suppression systems, but the entire share of capacity for storage, distribution, and pumping necessary to deliver sufficient water to property in the event of a fire. The potential flow of public hydrants and private fire lines must be analyzed to determine the share of total fire costs responsible for each.

Each fire connection size has a fire flow demand factor similar to a hydraulic capacity factor of a water meter. The diameter of the connection is raised to the 2.63 power to determine the fire flow demand factor[12]. This is shown in Table 4-14, column B. The count of connections of a specific size (column C) is multiplied by the fire flow demand factor (column B) to derive the total equivalent fire demand (column D). This analysis estimates that 76 percent of fire capacity (column E, line 6), and therefore costs, relate to public fire and will be included and recovered by the monthly fixed charges.

[12] Hazen-Williams equation via AWWA M1 Manual

Table 4-14: Fire Flow Demand

Line No.	Description	Connection Size (inches) A	Fire Demand B = A^2.63	# of Connections C	Fire Demand Units D = B x C	% of Total E = D / D16
1	**Public Hydrants**	0.00	0.00	0	0	
2	2-inch	2.00	6.19	0	0	
3	4-inch	4.00	38.32	6	230	
4	6-inch	6.00	111.31	690	76,804	
5	8-inch	8.00	237.21	2	474	
6	**Total Public**			**698**	**77,508**	**76%**
7						
8	**Private Fire**					
9	3-inch	3.00	17.98	0	0	
10	4-inch	4.00	38.32	5	192	
11	6-inch	6.00	111.31	26	2,894	
12	8-inch	8.00	237.21	78	18,502	
13	10-inch	10.00	426.58	6	2,559	
14	12-inch	12.00	689.04	1	689	
15	**Total Private**			**116**	**24,837**	**24%**
16	**Total**				**102,345**	**100%**

The percentage of public versus private fire capacity is used to allocate maximum day and maximum hour capacity costs, as shown in Table 4-15. The maximum day and maximum hour fire capacities are calculated based on a 2,500 gallons per minute (gpm) fire lasting 2 hours which is a typical demand/duration for a multi-family residential building in the District's service area, and is about mid-way between the demand/duration of a residential home and a commercial building. These calculations are as follows:

$$Fire\ Capacity\ Max\ Day\ Demand = \frac{2{,}500\ gpm\ \times 2\ hours\ \times 60\ minutes}{748\ gallons\ per\ hcf} = 401\ hcf$$

$$Fire\ Capacity\ Max\ Hour\ Demand = \frac{(2{,}500\ gpm\ \times 24\ hours\ \times 60\ minutes) - 401 hcf}{748\ gallons\ per\ hcf} = 4{,}412\ hcf$$

Table 4-15 derives the maximum day and maximum hour capacity costs for public and private fire. Column B is derived from Table 4-14. The unit cost of service (Section 5.6) for maximum day and maximum hour costs (line 1) are as shown in Table 4-13 (column A), prior to the reallocation of general costs. Line 1 is divided by extra capacity demand (line 2), discussed in Section 5.6, to arrive at the unit cost of service for maximum day and maximum hour. The unit cost of service (line 3) is multiplied by the respective fire capacity demands from the prior fire capacity equations (line 5) to arrive at the total fire capacity costs (line 6). Each cost in line 6 is multiplied by the respective fire flow demand percentages for public and private fire, as derived in Table 4-14.

Table 4-15: Fire Capacity Costs

Line No.	Fire Capacity Costs	Units A	% Fire Capacity B	Max Day C	Max Hour D	Total E = C + D
1	Allocated Costs			$1,074,829	$771,988	
2	Extra Capacity Demand	hcf / day		5,093	4,044	
3	Unit Cost of Service	per hcf		$211.04	$190.87	
4						
5	Fire Capacity Demand	hcf		401	4,412	
6	Fire Capacity Costs			**$84,641**	**$842,091**	**$926,732**
7	Public Fire Protection		75.7%	$64,101	$637,736	$701,837
8	Private Fire Protection		24.3%	$20,540	$204,355	$224,895

Table 4-16 shows the reallocation of public fire protection costs. Only Delivery, Max Day, Max Hour, Billing & CS, and Meters & Service will have public fire costs reallocated. Columns C and D indicate how public fire costs are reallocated to these cost components. Column E subtracts the maximum day and maximum hour capacity costs derived in Table 4-15 (columns C & D, line 7).

Table 4-16: Reallocation of Public Fire Protection

Line No.	Cost Causation Components	FY 2022 Requirements A	Applicable Cost B	Public Fire Allocation % C = B ÷ B9	Public Fire Reallocation D = $701,837 x C	Less Public Fire Capacity Costs E	Subtotal F = A + D + E
1	Water Supply	$2,051,425	N/A				$2,051,425
2	Delivery	$1,049,609	$1,049,609	27.8%	$195,415		$1,245,024
3	Max Day	$1,378,331	$1,378,331	36.6%	$256,616	($64,101)	$1,570,847
4	Max Hour	$989,976	$989,976	26.3%	$184,313	($637,736)	$536,552
5	Efficiency	$54,343	N/A				$54,343
6	Elevation	$30,632	N/A				$30,632
7	Billing & CS	$272,567	$272,567	7.2%	$50,746		$323,313
8	Meters & Service	$79,206	$79,206	2.1%	$14,747		$93,953
9	**Total**	**$5,906,089**	**$3,769,689**	**100.0%**	**$701,837**	**($701,837)**	**$5,906,089**

Table 4-17 shows how private fire costs are reallocated to the Private Fire cost component. The respective maximum day and maximum hour capacity costs for private fire (Table 4-15, columns C & D, line 8) are subtracted from the total maximum day and maximum hour capacity costs (Table 4-17, column B, lines 3&4) and reallocated to the Private Fire cost component.

Table 4-17: Reallocation of Private Fire

Line No.	Cost Causation Components	Adjusted FY 2022 Requirements A	Private Fire Capacity B	Subtotal C = A + B
1	Water Supply	$2,051,425		$2,051,425
2	Delivery	$1,245,024		$1,245,024
3	Max Day	$1,570,847	($20,540)	$1,550,307
4	Max Hour	$536,552	($204,355)	$332,197
5	Efficiency	$54,343		$54,343
6	Elevation	$30,632		$30,632
7	Billing & CS	$323,313		$323,313
8	Meters & Service	$93,953		$93,953
9	Private Fire		$224,895	$224,895
10	**Total**	**$5,906,089**	**$0**	**$5,906,089**

The extra capacity component of the revenue requirements was partially reallocated to the Delivery component in order to reflect that a portion of costs associated with Extra Capacity are driven by volumetric demand. Column A in Table 4-18 corresponds to the revenue requirements in column C of Table 4-17. The percentage reallocation to Delivery is shown in column C of Table 4-18, and the corresponding dollar value is shown in column C of Table 4-19.

Table 4-18: Reallocation of Extra Capacity (%)

		VARIABLE CHARGE COMPONENTS				FIXED CHARGE COMPONENTS			
Cost Categories	FY 2022 Revenue Requirements A	Water Supply B	Delivery C	Efficiency D	Elevation E	Billing & CS F	Meter & Services G	Capacity H	Private Fire I
Water Supply	$2,051,425	100%	0%	0%	0%	0%	0%	0%	0%
Delivery	$1,245,024	0%	100%	0%	0%	0%	0%	0%	0%
Extra Capacity	$1,882,504	0%	20%	0%	0%	0%	0%	80%	0%
Efficiency	$54,343	0%	0%	100%	0%	0%	0%	0%	0%
Elevation	$30,632	0%	0%	0%	100%	0%	0%	0%	0%
Billing & CS	$323,313	0%	0%	0%	0%	100%	0%	0%	0%
Meters & Service	$93,953	0%	0%	0%	0%	0%	100%	0%	0%
Private Fire	$224,895	0%	0%	0%	0%	0%	0%	0%	100%

Table 4-19: Reallocation of Extra Capacity ($)

		VARIABLE CHARGE COMPONENTS				FIXED CHARGE COMPONENTS			
Cost Categories	FY 2022 Revenue Requirements A	Water Supply B	Delivery C	Efficiency D	Elevation E	Billing & CS F	Meter & Services G	Capacity H	Private Fire I
Water Supply	$2,051,425	$2,051,425	$0	$0	$0	$0	$0	$0	$0
Delivery	$1,245,024	$0	$1,245,024	$0	$0	$0	$0	$0	$0
Extra Capacity	$1,882,504	$0	$376,501	$0	$0	$0	$0	$1,506,003	$0
Efficiency	$54,343	$0	$0	$54,343	$0	$0	$0	$0	$0
Elevation	$30,632	$0	$0	$0	$30,632	$0	$0	$0	$0
Billing & CS	$323,313	$0	$0	$0	$0	$323,313	$0	$0	$0
Meters & Service	$93,953	$0	$0	$0	$0	$0	$93,953	$0	$0
Private Fire	$224,895	$0	$0	$0	$0	$0	$0	$0	$224,895
Total	**$5,906,089**	**$2,051,425**	**$1,621,525**	**$54,343**	**$30,632**	**$323,313**	**$93,953**	**$1,506,003**	**$224,895**

Table 4-20 summarizes the resulting FY 2022 Revenue Requirements by cost causation component and indicates how each cost causation component is proposed to be collected from customers.

Table 4-20: Summary of Revenue Requirements by Cost Components

Cost Categories	FY 2022 Revenue Requirements	Variable	Fixed
Water Supply	$2,051,425	✓	
Delivery	$1,621,525	✓	
Extra Capacity	$1,506,003		✓
Efficiency	$54,343	✓	
Elevation	$30,632	✓	
Billing & CS	$323,313		✓
Meters & Service	$93,953		✓
Private Fire	$224,895		✓
Total	**$5,906,089**	**$3,757,925**	**$2,148,164**
Variable / Fixed Split		***64%***	***36%***

4.6 STEP 4 – DISTRIBUTE COST COMPONENTS TO CUSTOMER CLASSES AND TIERS

In order to allocate costs to different customer classes, unit costs of service need to be developed for each cost causation component. The unit costs of service are developed by dividing the total annual costs allocated to each cost causation component by the total annual service units of the respective cost causation component. The following subsections derive the annual units of service and the unit costs for each cost causation component from Table 4-20.

4.6.1 Fixed System Charge

Three components comprise the monthly Fixed System Charge: Billing & Customer Service, Meters & Services, and Peaking/Capacity. The monthly fixed system charge recognizes that even when a customer does not use any water, the District incurs fixed costs in connection with the maintenance of the meters, the ability or readiness to serve each connection, maintaining the infrastructure, and billing services provided to each connection.

Billing and Customer Service Costs Component

These costs are incurred at the same level regardless of the type of land use, customer class, or the total amount of water that the District delivers. Therefore, the Billing and Customer Service Costs cost causation component is based on the number of accounts and does not fluctuate with increases in meter size. The actual bills were determined by multiplying the number of accounts for each meter size by 12, which is reflective of the number of bills generated per account in a year. The Billing and Customer Service units of service are shown in Table 4-21.

Table 4-21: Billing & Customer Service Costs Component – Units of Service

Meter Size	Number of Accounts A	# of Billing Periods B	Units of Service (# of Bills) C = A x B
5/8"	378	12	4,536
3/4"	2,125	12	25,500
1"	173	12	2,076
1.5"	78	12	936
2"	165	12	1,980
3"	5	12	60
4"	4	12	48
6"	0	12	0
8"	0	12	0
10"	0	12	0
Total	**2,928**	**120**	**35,136**

Note: The total number of bills in Table 4-21 includes private fire accounts.

The Billing and Customer Service Costs revenue requirement (Table 4-20) is divided by the units of service (i.e., number of bills) from the Table above to determine the unit cost of service shown in Table 4-22.

Table 4-22: Billing & Customer Service Costs Component – Unit Rate

Billing and Customer Service Component	
Billing & CS Revenue Requirements	$323,313
÷ # of Bills	35,136
Monthly Unit Rate	**$9.202**

Meters & Service Costs Component

The Meters and Service Costs cost causation component includes costs related to the maintenance and capital costs of the meters serving the District's customers. Maintenance and replacement costs tend to increase as the meter size increases due to more expensive materials and higher amounts of labor. The District used the meter replacement cost for a ¾" meter as a proxy to determine the equivalent meter units (EMU's). The EMU's are developed in Table 4-23 and are based on the meter costs provided by the manufacturer's regional supplier.

Table 4-23: Meters and Service Costs Component – Units of Service

Line No.	Meter Size	Meter Replacement Cost A	Meter Cost Ratio B = A ÷ A2	# of Bills C	Units of Service (EMUs) D = B x C
1	**5/8"**	$280.15	0.93	4,536	4,218
2	**3/4"**	$299.65	1.00	25,500	25,500
3	**1"**	$366.24	1.22	2,076	2,533
4	**1.5"**	$593.76	1.98	936	1,853
5	**2"**	$815.72	2.72	1,980	5,386
6	**3"**	$1,592.60	5.31	60	319
7	**4"**	$1,792.37	5.98	48	287
8	**6"**	$3,189.64	10.64	0	0
9	**8"**	$4,640.18	15.49	0	0
10	**10"**	$7,160.59	23.90	0	0
11	**Total**			**35,136**	**40,096**

Note: The total number of bills in Table 4-23 includes private fire accounts.

The total Meters and Service Costs revenue requirement in Table 4-20 is divided by the units of service (Meter Cost EMU's) to determine the unit cost of service shown in Table 4-24.

Table 4-24: Meters & Service Costs Component – Unit Rate

Meter & Service Component	
Meters & Service Revenue Requirements	$93,953
÷ Meter Cost EMUs	40,096
Monthly Unit Rate	**$2.343**

Extra Capacity Costs Component

Extra Capacity Costs (or peaking costs) represent those costs incurred to meet customer peak demands for water in excess of baseline usage. Total Extra Capacity Costs are apportioned between Max Day and Max Hour demands based on the type of expense. Different facilities are designed to meet different peaking characteristics. Therefore, Extra Capacity Costs include capital improvements and power-related costs, and have been apportioned amongst Base, Max Day, and Max Hour. Costs allocated to Base are part of the delivery costs and will be discussed later. The Extra Capacity Costs revenue requirement of $1,882,504, was determined by adding the Max Day revenue requirement of $1,550,307 and the Max Hour revenue requirement of $332,197 (Table 4-20).

The Extra Capacity Costs cost causation component was allocated based on meter size. In order to create parity across the various meter sizes, each meter size is assigned a factor relative to a 3/4" meter, which is given a value of 1. Larger meters can demand more capacity, or said differently, exert more peaking characteristics compared to smaller meters. The potential capacity demand (peaking) is proportional to the potential flow through each meter size. For this Study, the safe maximum operating capacity by meter type, as identified in the AWWA M1 Manual, 6th Edition, Table B-1, was used as a basis for calculating the equivalent meter ratio. As shown in Table 4-25, each meter's safe maximum operating capacity was divided by the base meters safe

operating capacity (30 gpm) to determine the equivalent meter ratio. The ratios represent the potential flow through each meter size compared to the flow through a 3/4" meter. Multiplying the number of meters by the AWWA Ratio results in the Capacity EMU's.

Table 4-25: Extra Capacity Costs Component – Units of Service

Line No.	Meter Size	Meter Type	AWWA Standards (gpm) A	AWWA Ratio B = A ÷ A2	# of Bills C	Units of Service (EMUs) D = B x C
1	**5/8"**	C713-15 Fluidic-Oscillator Type	20	0.67	4,536	3,024
2	**3/4"**	C701-12 Turbine Type, Class I, Vertical Shaft Type	30	1.00	24,108	24,108
3	**1"**	C701-12 Turbine Type, Class I, Vertical Shaft Type	50	1.67	2,076	3,460
4	**1.5"**	C701-12 Turbine Type, Class I, Vertical Shaft Type	100	3.33	936	3,120
5	**2"**	C704-15 Propeller Type	120	4.00	1,980	7,920
6	**3"**	C704-15 Propeller Type	300	10.00	60	600
7	**4"**	C704-15 Propeller Type	600	20.00	48	960
8	**6"**	C704-15 Propeller Type	1,350	45.00	0	0
9	**8"**	C704-15 Propeller Type	1,800	60.00	0	0
10	**10"**	C704-15 Propeller Type	2,400	80.00	0	0
11	**Total**				**33,744**	**43,192**

Note: The total number of bills in Table 4-25 does not include private fire accounts.

The total Extra Capacity Costs revenue requirement in Table 4-20 is divided by the units of service (Capacity EMU's) to determine the unit cost of service shown in Table 4-26.

Table 4-26: Extra Capacity Costs Component – Unit Rate

Peaking/Capacity Component	
Extra Capacity Revenue Requirement	$1,506,003
÷ Capacity EMUs	43,192
Monthly Unit Rate	**$34.868**

4.6.2 Fixed System Charge for Private Fire

Private Fire charges are comprised of Billing & Customer Service, Meters & Service, and Fire Extra Capacity Costs. Billing & Customer Service and Meters & Service have been derived above in Table 4-22 and Table 4-23, respectively. Table 4-27 derives the unit rate for Fire Extra Capacity Charges. Lines 1 and 2 are the Revenue Requirement and Fire Demand Units derived separately in Table 4-15. The Revenue Requirement (line 1) is divided by Annual Fire Demand (line 3) to arrive at the monthly unit cost. This is assessed based on the fire demand ratio.

Table 4-27: Private Fire Extra Capacity Charges

Line No.	Private Fire Service Charges	Peaking
1	Revenue Requirements	$224,895
2	Fire Demand Units	24,837
3	Annual Fire Demand Units ([2] x 12)	298,039
4	**Monthly Unit Cost of Service ([1] / [3])**	**$0.755**

4.6.3 Variable Charges

The commodity rates are comprised of Water Supply, Delivery, and Efficiency Costs rate components. Proposition 218 does not specify the type of rate structure that should be used to develop rates as long as the rates reflect the proportionate cost of serving customers. In addition to the Commodity Charge, a separate Pumping Charge for Power Zone 8 was determined. Power Zone 8 was renamed to Power Zone 108.

Commodity Charge

Supply Component

The District meets the demands of customers through both groundwater and by importing water from EMWD. Table 4-28 shows the availability of each water supply and their associated effective unit rates. The effective unit rate takes into consideration the 5% water loss factor historically experienced by the District as shown below.

Table 4-28: Water Supply Sources – Quantity and Effective Rate

Water Source	Available for Purchase (AF) A	Available Supply (AF) After 5% Water Loss B = A x (1-5%)	Unit Cost ($/AF) C	Available Supply (HCF) D = B * 435.6	Effective Unit Cost ($/AF) E = (A*C) ÷ B	Effective Unit Cost ($/HCF) F = E ÷ 435.6
Wells	1,452	1,379	$286.93	600,867	$302.03	$0.693
EMWD	1,190	1,131	$1,373.23	492,643	$1,445.51	$3.318

Next, the available water for sale (Table 4-28, column B) is allocated to customer classes and tiers, starting with the least expensive (groundwater) and moving to the next marginal supply (EMWD imported water) until either the projected sales (demand) is met or until the supplies are fully utilized. Table 4-29 shows the allocation of the water supplies and the resulting water supply Unit Rate. The Unit Rate represents the weighted average rate or blended rate and is calculated for each tier and customer class.

Table 4-29: Allocation of Water Supplies & Unit Rate ($/HCF)

Line No.	Tier	Projected Sales (HCF)	Wells (HCF)	EMWD (HCF)	Total Tier Use (HCF)	Unit Rate ($/HCF)
1	Tier 1 (Essential Use)	430,560	430,560	0	430,560	$0.693
2	Tier 2 (Efficient Use)	567,440	170,307	397,133	567,440	$2.531
3	Tier 3 (Inefficient Use)	49,947	0	49,947	49,947	$3.318
4	Tier 4 (Unsustainable Use)	45,563	0	45,563	45,563	$3.318
5	**Total**	**1,093,510**	**600,867**	**492,643**	**1,093,510**	
6	**Total Available Supply**	**1,093,510**	**600,867**	**492,643**	**1,093,510**	

The water supply revenue requirement from Table 4-20 is approximately equal to the projected cost of purchasing water as shown in Table 4-30[13].

Table 4-30: Projected Water Supply Costs

Line No.	Tier	Projected Sales (HCF) A	Water Supply Unit Rate ($/HCF) B	Revenue Requirements C = (A ÷ A5) x Delivery RR frm Table 4-20
1	Tier 1 (Essential Use)	430,560	$0.693	$638,461
2	Tier 2 (Efficient Use)	567,440	$2.531	$841,436
3	Tier 3 (Inefficient Use)	49,947	$3.318	$74,065
4	Tier 4 (Unsustainable Use)	45,563	$3.318	$67,563
5	**Total**	**1,093,510**		**$1,621,525**

Delivery Component

Delivery costs are those operating and capital costs of the water system associated with delivering water to all customers at a constant average rate of use. Therefore, delivery costs from Table 4-20 are spread over all units of water (1,093,510 hcf), irrespective of customer class or tiers. Table 4-31 summarizes the calculation of the uniform rate.

Table 4-31: Delivery Component - Unit Rates

Delivery Component	
Delivery Revenue Requirement	$1,621,525
÷ Projected Sales	1,093,510
Monthly Unit Rate	**$1.483**

Efficiency Component

Costs for the efficiency programs were evaluated to determine the allocation of the Efficiency Component Costs[14]. The costs from Table 4-20 for efficiency programs will be recovered by those targeted by the programs (inefficient users). Tier 1 and Tier 2 water use is deemed to be efficient. Water billed in these tiers do not pay an efficiency component. Appendix B provides additional information regarding the basis for the calculation of the efficiency component.

[13] Any differences are due to rounding.
[14] See Appendix B for additional information provided by the District regarding the Efficiency Component.

Table 4-32: Efficiency Component – Unit Rates

Line No.	Tier	Projected Use	Unit Rate ($/HCF)
1	Tier 1 (Essential Use)	430,560	
2	Tier 2 (Efficient Use)	567,440	
3	Tier 3 (Inefficient Use)	49,947	$0.34
4	Tier 4 (Excessive Use)	45,563	$0.82

Pumping Charge

The Pumping Charge revenue requirements from Table 4-20 were allocated in a manner similar to the existing rates. Certain customers in the Grizzly Ridge community within the Murrieta Service Area require additional pumping to a storage tank serving this community. These customers are in within a boundary of what is called Power Zone 108 (previously Power Zone 8). Table 4-33 summarizes the calculation of the pumping charge unit rate. The projected sales shown in the table represent the projected sales from customers within Power Zone 108. Section 4.3 above, third bullet, provides additional information regarding the basis for the Pumping Charge Revenue amount.

Table 4-33: Pumping Charge – Unit Rates ($/HCF)

Pumping Charge	
Pumping Charge Revenue	$30,632
÷ Projected Sales	144,671
Monthly Unit Rate	**$0.212**

4.7 PROPOSED WATER RATES

4.7.1 Fixed Charges

Table 4-34 summarizes the monthly Fixed System Charge rates by meter size based on the unit rates developed in Section 4.6. The unit rate for Billing and Customer Service Costs cost causation component does not vary based on meter size. In contrast, the unit rates for the Meters and Service, and Extra Capacity Costs increase as the meter's size increases. The Extra Capacity amount is determined by multiplying the unit rate by the appropriate AWWA Capacity Ratio. The Meters and Service rate is determined by multiplying the unit rate by the appropriate Meter Cost Ratio. Table 4-35 presents the proposed monthly Fixed System Charges (FSC) and Table 4-36 presents private fire FSC.

Table 4-34: FY 2022 Rates for Fixed System Charge ($/Meter Size)

Meter Size	Meter Cost Ratio A	AWWA Ratio B	Billing & Customer Service C	Meters & Service D= $2.34 x A	Extra Capacity E = $34.87 x B	Total Fixed System Charge F = C + D + E
5/8"	0.93	0.67	$9.202	$2.179	$23.245	$34.63
3/4"	1.00	1.00	$9.202	$2.343	$34.868	$46.41
1"	1.22	1.67	$9.202	$2.859	$58.113	$70.17
1.5"	1.98	3.33	$9.202	$4.640	$116.225	$130.07
2"	2.72	4.00	$9.202	$6.374	$139.471	$155.05
3"	5.31	10.00	$9.202	$12.442	$348.676	$370.32
4"	5.98	20.00	$9.202	$14.012	$697.353	$720.57
6"	10.64	45.00	$9.202	$24.932	$1,569.044	$1,603.18
8"	15.49	60.00	$9.202	$36.296	$2,092.058	$2,137.56
10"	23.90	80.00	$9.202	$56.003	$2,789.411	$2,854.62

Table 4-35: Proposed Fixed System Charges ($/Meter Size)

Meter Size	Current	Proposed FY 2022	Proposed FY 2023	Proposed FY 2024	Proposed FY 2025
5/8"	$32.00	$34.63	$35.94	$37.30	$38.71
3/4"	$44.39	$46.41	$48.20	$50.05	$51.97
1"	$68.56	$70.17	$72.91	$75.75	$78.70
1.5"	$129.28	$130.07	$135.20	$140.53	$146.08
2"	$154.50	$155.05	$161.17	$167.54	$174.16
3"	$384.49	$370.32	$385.07	$400.40	$416.33
4"	$744.16	$720.57	$749.39	$779.35	$810.49
6"	$1,641.58	$1,603.18	$1,667.43	$1,734.22	$1,803.64
8"	$2,182.15	$2,137.56	$2,223.24	$2,312.29	$2,404.85
10"	$2,907.64	$2,854.62	$2,969.01	$3,087.92	$3,211.51

Table 4-36: FY 2022 Rates for Private Fire Fixed System Charges ($/Meter Size)

Meter Size	No of Meters A	Fire Demand Ratio B	Billing & CS C = $9.20	Meter Service D = $2.34	Peaking E = $0.755 x B	Monthly FSC F = C + D + E
3"	0	17.98	$9.20	$2.34	$13.57	$25.11
4"	5	38.32	$9.20	$2.34	$28.93	$40.47
6"	26	111.31	$9.20	$2.34	$84.04	$95.58
8"	78	237.21	$9.20	$2.34	$179.09	$190.63
10"	6	426.58	$9.20	$2.34	$322.07	$333.61
12"	1	689.04	$9.20	$2.34	$520.23	$531.77

Table 4-37: Proposed Monthly Fixed System Charge for Private Fire ($/Meter Size)

Meter Size	CURRENT 5/8" By-Pass	CURRENT 3/4" By-Pass	Proposed FY 2022	Proposed FY 2023	Proposed FY 2024	Proposed FY 2025
3"	$32.00	$44.39	$25.11	$25.96	$26.85	$27.76
4"	$32.00	$44.39	$40.47	$41.85	$43.28	$44.77
6"	$32.00	$44.39	$95.58	$98.85	$102.26	$105.79
8"	$32.00	$44.39	$190.63	$197.18	$203.99	$211.04
10"	$32.00	$44.39	$333.61	$345.08	$357.00	$369.35
12"	$32.00	$44.39	$531.77	$550.06	$569.06	$588.77

4.7.2 Variable Charges

The unit rates of the cost causation components allocated to the commodity rates are added together to produce rates for each customer class and tier. Table 4-38 shows each unit rate by cost causation component and the final proposed FY 2022 commodity rates. Table 4-39 shows the proposed commodity rates for four years, and Table 4-40 shows the proposed pumping charge rates for four years.

Table 4-38: Proposed FY 2022 Commodity Rates ($/HCF)

Tiers	Water Supply	Delivery	Efficiency	Total FY 2022 Rate
Tier 1 - Essential Use	$0.69	$1.48	$0.00	$2.176
Tier 2 - Efficient Use	$2.53	$1.48	$0.00	$4.014
Tier 3 - Inefficient Use	$3.32	$1.48	$0.34	$5.141
Tier 4 - Unsustainable Use	$3.32	$1.48	$0.82	$5.621

Table 4-39: Proposed 4-Year Commodity Rates ($/HCF)

Tier	Current	Proposed FY 2022	Proposed FY 2023	Proposed FY 2024	Proposed FY 2025
Tier 1 - Essential Use	$2.006	$2.176	$2.258	$2.342	$2.428
Tier 2 - Efficient Use	$4.286	$4.014	$4.221	$4.420	$4.625
Tier 3 - Inefficient Use	$5.118	$5.141	$5.362	$5.565	$5.773
Tier 4 - Wasteful/Unsustainable Use	$5.558	$5.621	$5.842	$6.045	$6.253
Tier 5 - Unsustainable Use	$6.438	N/A	N/A	N/A	N/A

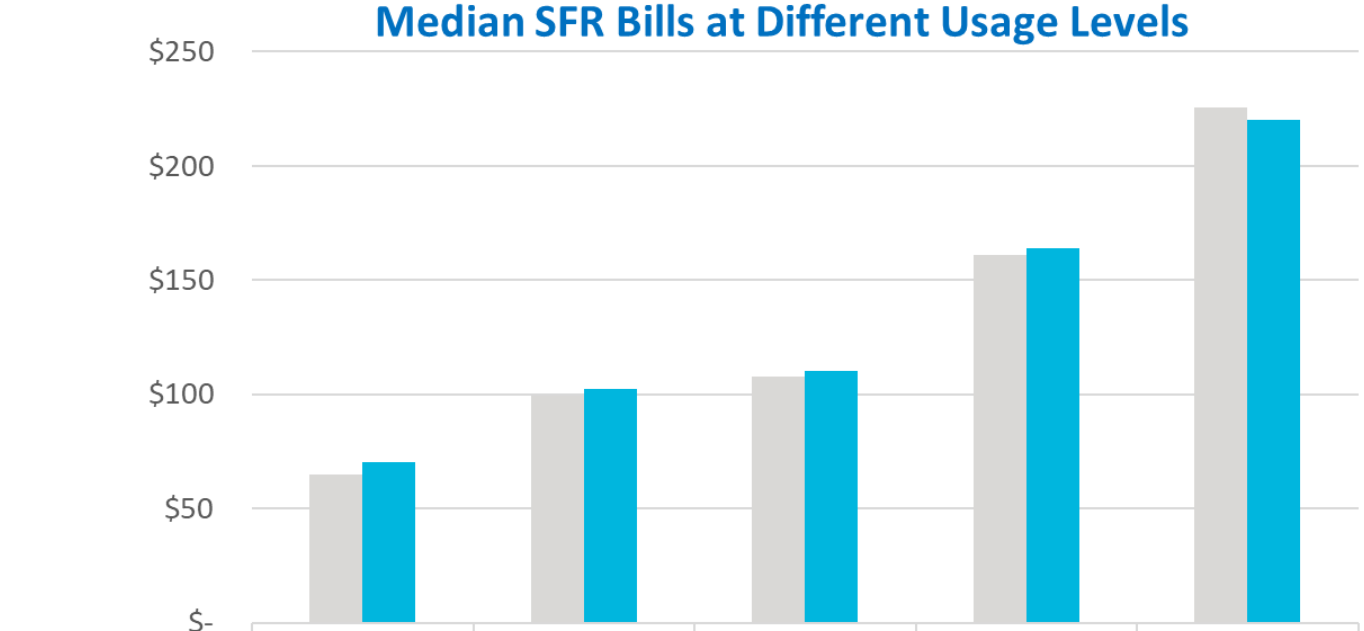
Table 4-40: Proposed Pumping Charge Rates ($/HCF)

Zone	Current (Zone 8)	Proposed FY 2022	Proposed FY 2023	Proposed FY 2024	Proposed FY 2025
Power Zone 108	$0.234	$0.212	$0.223	$0.234	$0.246

4.8 MURRIETA CUSTOMER BILL IMPACT

Figure 3 compares the bill totals at different usage levels for a median residential customer, with a ¾" meter, with a household size of 4 persons, landscape area of 3,376 square feet, and a 30-day billing cycle for the current and proposed (FY 2022) rates. The usage levels are shown as a percentage of the total water budget calculated for the customer (TWB).

Figure 3: Residential Customer Bill Impact



	50% TWB 10 ccf	90% TWB 18 ccf	100% TWB 20 ccf	150% TWB 30 ccf	200% TWB 40 ccf
Current Bill	$65.00	$99.29	$107.86	$161.24	$225.62
Proposed Bill	$70.10	$102.21	$110.24	$164.05	$220.26
Impact ($)	$5.10	$2.93	$2.38	$2.81	$(5.36)
Impact (%)	7.9%	2.9%	2.2%	1.7%	-2.4%

Appendix A: Water Budget Definitions

A. WATER BUDGET DEFINITIONS

The basic definitions used to calculate water budget allotments have been provided below in order to ease understanding. However, since the District has already implemented budget-based rates, a detailed discussion has not been provided within this Study. For more information, please see Ordinance 392, Article V, Section A and Resolution 2974 on file with the District.

Single Family Residential Customer Rate Structure (also applies to Multi-Family Residential Customers)

The indoor water budget (IWB) for residential customers is determined by a customer's household size and a proposed change to the standard consumption per person from the currently adopted 60 gallons per capita per day to 55 gallons. The 55 gallons per capita per day is California's new standard used to calculate a water agency's indoor use target. This new standard is described in Senate Bill 606 and Assembly Bill 1668 passed in 2018 in response to the Governor's mandate to "Make Water Conservation a Way of Life in California." The State requires all retail water agencies to meet water efficiency budgets based on indoor and outdoor efficiency standards. These standards are expected to be lowered further in the future.

Indoor Water Budget Calculation (Tier 1 Width)

$$IWB = \frac{(GPCD \times Household\ Size \times \#\ of\ Dwelling\ Units \times Days\ of\ Service \times DF_{Indoor})}{748} + V_{Indoor}$$

Where:

- GPCD – Gallons per capita per day. The standard consumption per person per day will be set at 55 gallons. This amount includes all indoor water use, such as showers and washing clothes and dishes.
- Household Size – Number of residents per dwelling unit. The default and minimum value for household size is set at 3 persons per household for Single Family residential units. The default and minimum value for Multi-Family residential units is set at 2 persons per bedroom.
- Dwelling Units – The number of dwelling units served by the meter. By way of example, a single-family residence is one dwelling unit.
- Days of Service – The number of days of service varies with each billing period for each customer. The actual number of days of service is applied to calculate the indoor water budget for each billing period.
- DF_{indoor} – Indoor drought factor. This part of the budget equation will be used in extreme water shortage conditions only if needed because of local supply conditions or if required by regional and/or State agencies. A lower percentage of the typical or usual indoor water budget could be allocated during extreme water shortages, supply shortage or emergency conditions. Changing the drought factor will be subject to the approval of the District's Board of Directors. The indoor drought factor is set at 100 percent, representing a 100 percent water budget allotment, in times where no water shortage exists in the District's service area.
- V_{indoor} – Indoor variance. A water allotment can be adjusted to fit the unique circumstances of a customer as described in the District's variance program.
- 748 is the conversion unit from gallons to a billing unit of one hundred cubic feet (hcf).

For illustrative purposes, the following indoor water budget calculations for two different customers are provided.

Customer #1: Household Size = 4 persons, 1 Dwelling Unit, Days of Service in January bill = 30 days

$$IWB = \frac{55\ gallons\ per\ person\ per\ day\ \times 1\ unit\ \times 4\ persons\ \times 30\ days\ \times 100\%}{748\ gallons\ per\ hcf} = 8.82\ hcf$$

Customer #2: Household Size = 6 persons, 1 Dwelling Unit, Days of Service in January bill = 28 days

$$IWB = \frac{55\ gallons\ per\ person\ per\ day\ \times 1\ unit\ \times 6\ persons\ \times 28\ days\ \times 100\%}{748\ gallons\ per\ hcf} = 12.35\ hcf$$

The outdoor water budget (OWB) is calculated using three components: irrigated area, local weather data, and an efficiency adjustment factor as shown below.

Outdoor Water Budget Calculation (Tier 2 Width)

$$OWB = \left(\frac{(Irrigated\ Area\ \times ET_O\ \times ETAF)}{1200} + V_{Outdoor}\right) \times DF_{Outdoor}$$

Where:

- Irrigated Area, also referred to as Landscape Area (in square feet, sq. ft.), is the measured irrigated landscape area served by a specific water meter.
- ET_0 is measured in inches of water during the billing period based on daily weather data acquired from HydroPoint Data Systems, Incorporated (HPDS). The District's service area has more than 450 individual weather microzones. The District updates the actual daily ET for each microzone through a secure link to HPDS FTP site. This allows weather changes to be accurately updated for every account in the District on a daily basis.
- ETAF is a State-legislated efficiency standard in the form of a coefficient that adjusts the outdoor water budget value based on the crop types. Annual Average ETAF for Existing Landscape Service = 80%, Annual Average ETAF for New Landscape = 70%.
- Voutdoor – Outdoor variance. A water budget may be adjusted to fit the circumstances of any customer. If the District chooses to allow a variance program, customers need to contact the District and/or fill-out an adjustment form and return to the District with the necessary documentation.
- DFoutdoor – Outdoor drought factor. This part of the budget equation will be used in extreme water shortage conditions only if needed because of local supply conditions or if required by regional and State agencies. A lower percentage of the typical or usual outdoor water budget could be allocated during extreme drought, supply shortage or emergency conditions. Changing the drought factor will be subject to the approval of the District's Board of Directors. The outdoor drought factor is set at 100 percent, representing a 100 percent water budget allotment, in times where no water shortage exists in the District's service area.
- 1,200 is the factor used to convert to billing units in hundred cubic feet (hcf).

For illustrative purposes, the following outdoor water budget calculations for two different customers are shown.

Customer #1 – Single Family: Landscape Area = 8,000 sq ft, ET_0 for 30-day January bill = 2.28 inches, ETAF = 0.80, no variance:

$$OWB = \frac{8{,}000 \text{ sq ft} \times 2.28 \text{ inches} \times .80}{1{,}200} \times 100\% = 12.16\ hcf$$

Customer #2 – Single Family: Landscape Area = 4,000 sq ft, ET_0 for 28-day January bill = 2.05 inches, ETAF for January = 0.80, Variance = 1 hcf per billing cycle for approved special needs:

$$OWB = \frac{4{,}000\ sq\ ft \times 2.05\ inches \times .80}{1{,}200}\ x\ 100\% + 1\ hcf = 6.47\ hcf$$

In 2011, the District's structure of 5 tiers was adopted with the width of Tiers 3 and 4 each set at 25-percent of the sum of the Tier 1 (indoor budget) plus Tier 2 (outdoor budget), collectively referred to as the Total Water Budget (TWB). Tier 5 is applicable to all water exceeding tier 4. The commodity rate per hcf for each tier escalates based on the rising cost of water supply and an efficiency component that funds water use efficiency programs including customer support and rebate programs. Note that the efficiency component is applicable to tiers 3-5 only.

Since 2011, customer awareness of efficient water use has resulted in significant reductions in residential per capita water use. Therefore, the need for and use of a large variety of water saving programs by customers has changed. The District's future water efficiency programs will be more refined and focused, thus eliminating the need for the five-tier structure and instead utilize a proposed four-tier structure.

The indoor and outdoor budgets have been described above; Tier 4 will comprise any water in excess of Tier 3. The District is proposing to widen the third tier to 54-percent of the Outdoor Water Budget (OWB) for residential customers calculated for Tier 2. The width of Tier 3 is calculated by dividing the OWB by 65-percent (0.65) and then deducting the OWB from the result. Dividing the OWB by 65-percent effectively provides a 35-percent adjustment or allowance for inefficiencies in landscape irrigation. For simplicity in communication, the calculation to be used in the customer billing system to determine the Tier 3 width will be 54-percent times the OWB, which produces virtually the same Tier 3 width result described in the previous sentence.

Commercial Customer Rate Structure

If adopted, the commercial customer rate structure would also consist of four tiers where the total water budget (TWB) is determined based on the average water deliveries during the same billing period of the prior three years for each account. For commercial customers, the percentage of the TWB applied to Tier 1 is proposed to change from 43% to 58% in the Murrieta Service Area. This percentage is equivalent to the percentage of local groundwater in the rate model to the total projected water demand. 1,452 AF of local groundwater from Table 3-1 x 435.6 to convert to hcf = 632,491 hcf of local groundwater; 632,491 hcf divided by total projected demand of 1,093,510 hcf from FY 2022's amount in Table 1-4 = 58%. The remaining 42% of the TWB would be the width of Tier 2. Tier 3 would be 54% of the TWB, with any water deliveries in excess of Tier 3 billed at the Tier 4 rate.

Irrigation Customer Budgets

If adopted, the irrigation customer rate structure would consist of three tiers (Tiers 2-4) where the TWB is based on the same factors as the residential outdoor water budget described above. According to Article X of the California Constitution, water is a scarce resource and should be reserved for beneficial use to the fullest extent possible. In a limited water resource situation, water should be reserved to meet essential uses first before other beneficial uses. With Tier 1 essentially set at 0%, irrigation customers only receive groundwater after all essential use has been met, and the entire TWB (100%) is captured in Tier 2. Like residential customers, irrigation customers would have a Tier 3 width equal to 54% of their Tier 2 budget. Note that irrigation customers are sometimes referred to as landscape customers.

School Customer Budget

Schools with a dedicated water meter serving indoor usage has a Tier 1 indoor water budget (IWB) calculated as follows:

$$IWB_{Schools} = \frac{(Average\ Daily\ Attendance\ \times GPSD^{15}\ \times Days\ of\ Service)}{748}$$

If the school has a mixed-use meter (a single meter serving both indoor and outdoor water demand), then the Tier 2 outdoor water budget would be calculated based on the same factors as the residential outdoor budget described above. In this case, Tier 3 would be 54% of the Tier 2 budget, with any water deliveries in excess of Tier 3 billed at the Tier 4 rate.

[15] GPSD = Gallons per student per day = 3 based on historical average usage of school customers in the District

Appendix B: Efficiency Rate Component

B. EFFICIENCY RATE COMPONENT

The following information pertains to water use efficiency programs that are supported by the efficiency rate component(s) of the District's water rate structure. The District strives to match program offerings with customer needs and available funding. The District, as required by California law, accounts for revenue generated by the efficiency rate component(s) of the rate structure separately and utilizes it only for customer support programs – programs intended to raise awareness of water resources and increase the efficient use of water.

The District's mix of customers include residences, schools, agricultural, and commercial users (example listing only). Each customer type uses water in different manners and as such efficient use by one type of customer may not be an appropriate measure of efficiency for another. The District's 2019 Water Use Efficiency Master Plan provides opportunities and support mechanisms for the different water use sectors.

The District's water use efficiency effort is supported both by staff employed by the District and subject matter experts (consultants) contracted through request for proposal and professional service processes. Subject matter experts may include, but are not limited to, irrigation and horticultural specialists; landscape architects and designers; plumbing contractors; and industrial process engineers.

All customers are eligible to participate in programs designed to increase efficiency and reduce water waste. The following tables define the allocation of general program support costs by service area and water rate tier. Tiers are only applicable in the Murrieta and Riverside potable water service areas.

Table 1: General Program Support Costs

General program support items associated with all service areas:	Water Budget Customers Only	Other Customers Only	Shared by All Customers	Total Budget
Brochures - Printing & Duplicating	$ 5,000			$ 5,000
Online Store Website O&M	$ 6,000			$ 6,000
Public workshops				$ -
Conservation device support (online store)	$ 15,000			$ 15,000
Postage for mailing information	$ 1,000			$ 1,000
Labor			$ 205,763	$ 205,763
Overtime	$ 3,000			$ 3,000
Total	$ 30,000	$ -	$ 205,763	$ 235,763

Table 2: Allocation of Program Support Costs

The hcf in the table below for the Murrieta Service Area is from the FY 2022 column of Table 1-4 "Projected Use in Each Tier" in the body of the Study report.

Allocation of Program Support Costs (Allocated on Percent of Total Projected Water Sales By Service Area)	Projected Sales (HCF)	Projected Sales (AF)	Water Budget Customers Only	Shared by All Customers	Total By Area
Riverside Water Budget Customers	8,581,000	19,699.27	$ 26,609	$ 150,023	$ 176,632
Murrieta Water Budget Customers	1,093,510	2,510.35	$ 3,391	$ 19,118	$ 22,509
Non-Water Budget Customers	2,094,680	4,808.72		$ 36,622	$ 36,622
Total	11,769,190	27,018.34	$ 30,000	$ 205,763	$ 235,763

Table 3: Allocation of Program Support Costs by Over Budget Tier (Tiers 3-4)

The hcf in the table below for the Murrieta Service Area is from the FY 2022 column of Table 1-4 "Projected Use in Each Tier" in the body of the Study report

Allocation of Program Support Costs by Tier	Tier	Riverside Water Budget Customers	Murrieta Water Budget Customers	Non-Water Budget Customers	
Over budget Use	Tier 3 HCF	428,899	49,947	Not applicable	
	Tier 4 HCF	325,101	45,563		
	Total HCF	754,000	95,510		
Over budget percent	Tier 3	56.9%	52.3%		
	Tier 4	43.1%	47.7%	Not applicable	
	Total	100.0%	100.0%		
					Total
Program Support Costs	Tier 3	$ 100,474	$ 11,771		
	Tier 4	$ 76,158	$ 10,738		
	Total	$ 176,632	$ 22,509	$ 36,622	$ 235,763

Murrieta and Riverside Retail Water Service Areas – Water Budget Rates

The customers within the Murrieta and Riverside potable water service areas receive a water allocation or budget for every billing period. Water use above a billing period's water budget results in the customer paying progressively higher water rates. The District includes a progressively higher efficiency rate component in each of the two over-budget rate tiers (3 and 4). The efficiency rate component funds the District's water conservation/efficiency programs.

The foundation of the District's water use efficiency portfolio is an evaluation program that is designed to support the customer and direct them to participate in the other program offerings that are best suited to their needs. The intent of the evaluation is to identify cost-effective solutions to lower water use to within the customer's water budget. A customer that is continually in Tier 4 and frequently using more than their water budget will require more programmatic support than the customer that occasionally has consumption in Tier 3. The District's evaluation consultants use a different "toolbox" for the single-family residential customer than for the large irrigation customer or the industrial water user. Most importantly, customers that find themselves in Tier 4 will also have water use in the lower Tiers as well and will usually require the support of more than one program offered by the District.

Tier 3 – Inefficient Water Use

Programs supported by funding from the Tier 3 efficiency rate component include efficiency reviews that are usually limited to water bill analysis and a focused on-site evaluation of outdoor water use and high-level review for system leaks. This simple site visit usually includes a review of irrigation scheduling and an introductory customer education about water budgets and irrigation timer programming based on the seasonal needs of the landscape plant material. Customers that find themselves slightly over budget usually realize long-term benefits from on-site assistance. The evaluator will also leave behind information about public workshops for water-wise landscaping and efficient irrigation systems.

If the property has older fixtures or appliances, the evaluator provides information about rebates for replacing non-conserving devices with more efficient models. The District participates in Southern California's regional rebate program administered by the Metropolitan Water District of Southern California (MWD). The District adds additional funding to targeted conservation devices within its retail water service areas.

Program funding to reduce residential and commercial water use in Tier 3 through on-going customer programs is outlined in the table below.

Table 4: Water Use Efficiency Programs Associated with Tier 3 Water Use

Water use Efficiency Programs			Quantity		Tier 3 Program Cost	
● Tier 3			Riverside	Murrieta	Riverside	Murrieta
Basic efficiency evaluation	$ 200	each	75	15	$ 15,000	$ 3,000
Conservation device support (online store)	$ 20	each	400	75	$ 8,000	$ 1,500
Rebate support (various devices)	$ 50	each	120	15	$ 6,000	$ 750
Subtotal					$ 29,000	$ 5,250
Program support costs from Table 3 above					$ 100,474	$ 11,771
Tier 3 Total Costs					$ 129,474	$ 17,021
HCF in Tier 3 from Table 3 above					428,899	49,947
Total Costs per HCF					**$ 0.30**	**$ 0.34**

Tier 4 – Unsustainable Water Use

Programs supported by funding from the Tier 4 efficiency rate component include more detailed efficiency reviews that include water bill analysis, station-by-station review of programming and water application efficiency. The evaluator will provide monthly programming recommendations and discuss irrigation system upgrades.

Residential customers will be provided information regarding irrigation controller rebates. Additionally, if the residential customer agrees, the evaluation consultant may replace minor sprinkler components such as sprinkler bodies, bubblers, and drip emitters to immediately increase efficiency. The evaluator may demonstrate high-efficiency sprinkler nozzles and leave some products behind with installation instructions so that the customer can immediately reduce overspray and run-off. Commercial customers will be encouraged to consider the regional rebate or the Water Savings Incentive Program.

Program funding to reduce residential and commercial water use in Tier 4 through on-going customer programs is outlined in the table below.

Table 5: Water Use Efficiency Programs Associated with Tier 4 Water Use

Water use Efficiency Programs			Quantity		Tier 4 Program Cost	
● Tier 4			Riverside	Murrieta	Riverside	Murrieta
Advanced efficiency evaluation (residential & commercial)	$ 400	each	100	10	$ 40,000	$ 4,000
Rebate support (toilets, controllers, washers, other device)	$ 200	each	400	50	$ 80,000	$ 10,000
Turf Replacement	$ 1	per sq. ft.	50,000	9,000	$ 50,000	$ 9,000
Conservation device support (online store)	$ 20	each	2,000	175	$ 40,000	$ 3,500
Subtotal					$ 210,000	$ 26,500
Program support costs from Table 3 above					$ 76,158	$ 10,738
Tier 4 Total Costs					$ 286,158	$ 37,238
HCF in Tier 4 from Table 3 above					325,101	45,563
Total Costs per HCF					**$ 0.88**	**$ 0.82**

Lastly, program funding to help customers who are not on a water budget rate structure to use water more efficiently is outlined in the table below. (Note, not applicable to the Murrieta Service Area since all customers are on a water budget rate structure).

Table 6: Water Use Efficiency Programs Associated with Non-Water Budget Customer Use

Water Use Efficiency Programs					
● Nonpotable/Agricultural/March East (i.e. non-water budget customers)			**Quantity**		**Non-Water Budget Rates**
Basic efficiency evaluation (residential & commercial)	$ 200	each	15		$ 3,000
Toilet Rebates	$ 260	each	10		$ 2,600
Smart Controller Rebates	$ 215	each	10		$ 2,150
Commercial Fixture Replacement	$ 100	each	10		$ 1,000
Turf Replacement Rebates	$ 1	per sq. ft.	-		-
Large Landscape Sprinkler Nozzles	$ 6	each	2,500		$ 15,000
Irrigation Controller Program (Large landscapes)	Varies by Site				$ 5,000
Commercial/Process Evaluations	Varies by Site				-
Water Savings Incentive Program Support	Varies by Site				$ 10,000
Subtotal					$ 38,750
Program support costs from Table 3 above					$ 36,622
Total Costs					$ 75,372
HCF from Table 2 for Non-Water Budget Customers					2,094,680
Total Cost per HCF					**$ 0.04**

Summary of the efficiency rate component for the Murrieta Servia Area from Tables 4 and 5 above:
Note, the efficiency rate components below are used for all four years of the Study period.

Tier 3 = $0.34 per hcf
Tier 4 = $0.82 per hcf