Western Municipal Water District

Murrieta Comprehensive Water Rate Study Report

Final Report / August 17, 2017

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August 17, 2017

Mr. Kevin Mascaro
Director of Finance
Western Municipal Water District
14205 Meridian Parkway
Riverside, CA 92518

Subject: Murrieta Service Area - Water Rate Study

Dear Mr. Mascaro,

Raftelis Financial Consultants, Inc. (Raftelis) is pleased to provide this Comprehensive Water Rate Study Report (Study) for Western Municipal Water District (District). This Study includes a comprehensive review of the District's Murrieta Service Area usage, at the account level, by customer type to establish equitable water rates that provide sufficient revenue over the three-year planning period. Working closely with District Staff, Raftelis developed a water rate structure and rates that promote water use efficiency and financial sustainability. We are confident that the results based on a cost of service analysis will result in fair and equitable rates to the District's customers and comply with the requirements of Proposition 218.

The major objectives of the Study include the following:

- Perform an updated cost-of-service analyses for the Murrieta Service Area
- Examine the fixed and variable split for recovering the District's revenue requirements
- Reexamine the water budget allocation factors and make any necessary adjustments
- Document the nexus between the costs incurred by the District and the proposed rates

The Study summarizes the key findings and recommendations related to the development of the updated water rates. It has been a pleasure working with you, and we thank you and the District staff for the support provided during the course of this Study.

Sincerely,
RAFTELIS FINANCIAL CONSULTANTS, INC.

Sanjay Gaur
Vice President

Andrea Boehling
Senior Consultant

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1. EXECUTIVE SUMMARY

1.1 BACKGROUND OF THE STUDY

Given the regulatory requirements imposed by the State of California (SB x7-7, AB 1420, AB 1881) as well as recent water supply restrictions (Executive Orders B-29-15, B-37-16), Western Municipal Water District (District) engaged Raftelis Financial Consultants, Inc. (Raftelis) in 2015 to conduct a Water Rate Study (Study) to review and update the water rates for the Murrieta service area. Figure 1 summarizes some of the restrictions placed on the District and its customers. Due to these restrictions and strong conservation messaging from the District, Murrieta Service Area customers reduced usage by 26% from fiscal year ending (FYE) 2014 to FYE 2016. This Study provides a detailed summary of our analysis in which Raftelis determined the proposed water rates for the District's Murrieta service area for the three-year Study period, Fiscal Year (FY) 2018, FY 2019, and FY 2020, with effective dates of January 1, 2018, 2019, and 2020.

Figure 1: Emergency Conservation Regulation (Effective May 18, 2015 – February 13, 2016)

1.1.1 Objectives of the Study

The major objectives of the Study include the following:

- Perform an updated cost-of-service analyses for the Murrieta Service Area
- Examine the fixed and variable split for recovering the District's revenue requirements
- Reexamine the water budget allocation factors and make any necessary adjustments
- Document the nexus between the costs incurred by the District and the proposed rates

1.2 RECOMMENDATIONS

Raftelis recommends maintaining the 5-tiered water budget rate structure for Murrieta Customers, with the following slight modifications:

- Base Multi-Family Residential (MFR) indoor allocations on 60 gallons per capita per day (gpcd) using the average number of people per unit and the number of dwelling units
- Adjust the Commercial and Irrigation tier widths based on available local water

1.2.1 Study Framework

During the course of the Study, several scenarios and options were evaluated and discussed with District staff. Raftelis received direction regarding the following key drivers of the Study:

- Revenue recovery split 31% fixed and 69% variable
- No longer charge Murrieta customers a separate Readiness-to-Serve (RTS) Charge
- Delivery costs were spread 100% variable (i.e., equally over all units of water)
- Peaking costs were spread 100% fixed (i.e., based primarily on meter capacity ratios)

1.2.2 Proposed Rates

1.2.2.1 Monthly Fixed Charges

Through discussions with District Staff, Murrieta customers will no longer pay a separate RTS Charge. Table 1 shows the proposed CY 2018, CY 2019, and CY 2020 monthly Fixed System Charge by meter size. The monthly Fixed System Charge will recover approximately 31% of the District's operating needs. The proposed rates are anticipated to go into effect January 1st of each year.

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

Meter Size	Current	Proposed Year 1	Proposed Year 2	Proposed Year 3
5/8"	$ 21.07	$ 26.34	$ 29.05	$ 32.00
3/4"	$ 30.74	$ 36.21	$ 40.11	$ 44.39
1"	$ 49.18	$ 55.40	$ 61.68	$ 68.56
1.5"	$ 122.96	$ 103.64	$ 115.87	$ 129.28
2"	$ 153.80	$ 123.78	$ 138.43	$ 154.50
3"	$ 192.25	$ 307.84	$ 344.39	$ 384.49
4"	$ 192.25	$ 593.01	$ 665.06	$ 744.16
6"	$ -	$ 1,304.31	$ 1,465.04	$ 1,641.58
8"	$ -	$ 1,733.04	$ 1,947.06	$ 2,182.15
10"	$ -	$ 2,308.99	$ 2,594.27	$ 2,907.64

1.2.2.2 Variable Charges

The remaining operating needs of the District will be recovered through two variable charges—a Commodity Charge and a Pumping Charge—as shown in the following tables. Table 2 shows the current and proposed rates for the Commodity Charge per one hundred cubic feet (hcf) of water[1].

[1] One hundred cubic feet (hcf) equals 748 gallons.

Table 2: Current and Proposed Rates for the Commodity Charge ($/HCF)

	Current Charge	Proposed Year 1	Proposed Year 2	Proposed Year 3
Tier 1 - Essential Use	$ 2.254	$ 1.834	$ 1.919	$ 2.006
Tier 2 - Efficient Use	$ 3.217	$ 3.948	$ 4.115	$ 4.286
Tier 3 - Inefficient Use	$ 4.499	$ 4.751	$ 4.932	$ 5.118
Tier 4 - Excessive Use	$ 4.939	$ 5.191	$ 5.372	$ 5.558
Tier 5 - Unsustainable Use	$ 5.819	$ 6.071	$ 6.252	$ 6.438

Table 3 shows the current and proposed rates for the Pumping Charge per hcf of water for those customers in the Grizzly Ridge community. The Pumping Charge is in addition to the Commodity Charge and is intended to recover the energy cost of pumping water to the higher elevation of the Grizzly Ridge community. All customers within the Grizzly Community are located within Power Zone 8. A Power Zone is a regional area of parcels with similar pumping needs and represents multiple pressure zones. However, in the case of Power Zone 8 there is just one pressure zone.

Table 3: Current and Proposed Rates for the Pumping Charge ($/HCF)

	Current	Proposed Year 1	Proposed Year 2	Proposed Year 3
Power Zone 8	$ 0.210	$ 0.216	$ 0.225	$ 0.234

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 with regard to 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 was formed in 1954, and today 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 with an assessed valuation of $83 billion and a population of more than 880,000 people. 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 member agency of Metropolitan Water District of Southern California (MWD), the state's largest water supplier, the District receives most of its water from the Sacramento-San Joaquin Bay-Delta and from 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. Slicing its way through a 200-plus mile journey, Colorado River water travels westward in the aqueduct built by Metropolitan in the 1930s. For the Murrieta Service Area, water sources are local groundwater and an interconnection with Eastern Municipal Water District.

2.2 OBJECTIVES OF THE STUDY

The major objectives of the Study include the following:

- Perform an updated cost-of-service analyses for the Murrieta Service Area
- Examine the fixed and variable split for recovering the District's revenue requirements in order to enhance revenue assurance
- Reexamine the water budget allocation factors and make any necessary adjustments
- 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 ratemaking analysis 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. A number of 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. The revenue requirements for this Study were provided by the District.

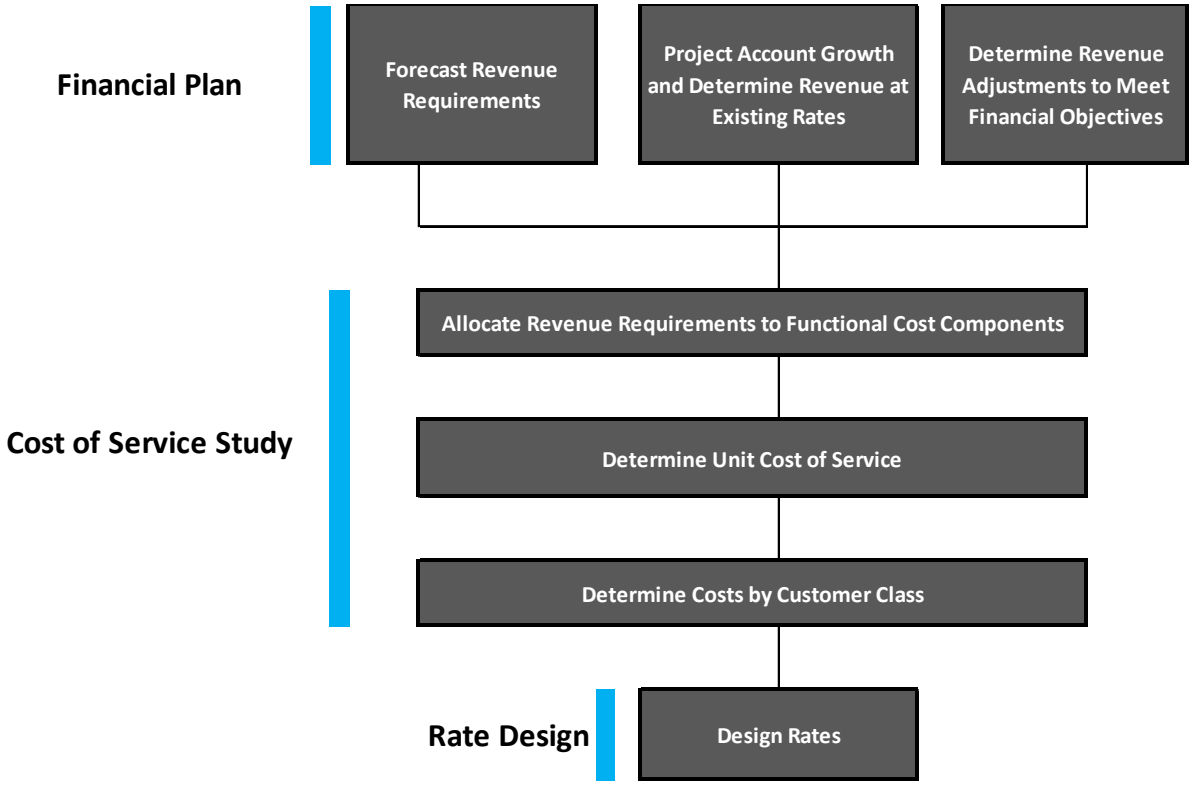
After determining a utility's revenue requirement, the next step is determining the cost of service. Utilizing a public agency's approved budget, financial reports, operating data, and capital improvement plans, a rate study generally categorizes (functionalizes) system costs (e.g., treatment, storage, pumping, etc.), including operating and maintenance and asset costs, among major operating functions to determine the cost of service.

After the asset values and operating costs are properly categorized by function, the functionalized costs are allocated first to cost causation components, and then distributed to the various customer classes (e.g., single family residential, multi-family residential, commercial, etc.[2]). This is done by determining the characteristics of those classes and the contribution of each to 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 reflect 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 build-up to the total commodity rates, and fixed system 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 2 provides a graphic representation of the rate study process described above.

Figure 2: Rate Study Approach



[2] 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 and fees are 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 rates and charges should be recovered from classes of customers in proportion to the cost of serving those customers." Raftelis follows industry standard rate setting methodologies set forth by the AWWA *M1 Manual* to ensure this 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, a nexus between the rates and costs incurred to provide the water must be developed to achieve compliance with Proposition 218.

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."

This Study establishes a standard for efficient usage and then establishes a water budget for each individual customer that defines how much water is considered efficient for indoor and outdoor water usage based upon a number of factors particular to each customer. Customers with usage above this efficient usage budget pay a higher rate for their "inefficient" or "wasteful" usage. 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 reasonably 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, there are four major steps discussed below and previously addressed in Section 2.3.

1. **Calculate Revenue Requirement**
   The rate-making process starts by determining the revenue requirement. The revenue requirements for each year of the Study period were provided by the District. The revenue requirement should 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[3], maximum day, maximum hour[4], conservation, public fire protection, meter service, and customer service and billing costs.

[3] Base costs are those associated with meeting average day demands and unrelated to meeting peaking demands.
[4] 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).[5] Peaking costs are costs that are incurred during peak times of consumption. There are additional costs associated with designing, constructing, and operating and 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. Raftelis documents the rate study results in this Study to serve as the District's administrative record and a public education tool about the proposed changes, the rationale and justifications behind the changes, and their anticipated financial impacts.

[5] 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 Year (FY) 2018, FY 2019, and FY 2020. Various assumptions and inputs were incorporated into the Study based on discussions with and/or direction from District staff. These assumptions include, but are not limited to, the selection of the baseline year, the application of a water demand / "bounce-back" factor to project water sales, the removal of water budget reductions initiated in response to State conservation mandates, available water supply and related cost increases, and the revenue requirements for the Study period. Also, due to rounding, the numbers presented throughout this Study may not add up precisely to the totals provided and percentages may not precisely reflect the absolute figures.

3.1 BASELINE YEAR

The District, like many agencies in California, is dealing with challenges related to the historic drought. These conditions have led to the reduction in water usage as a result of conservation and restrictions, as well as increased costs related to conservation programs, monitoring, and customer outreach. For the purposes of rate setting, it is important to select a baseline year that reflects typical consumption patterns of the District's customers and the respective cost allocations within the budget that represents the normal expenditures or the expected expenditures moving forward. Raftelis worked closely with the District to evaluate different baseline scenarios. It was determined that FY 2016 consumption would be used as the baseline consumption and the revenue requirements would be based on the adopted budget for FY 2018, and projected budgets for FY 2019 and FY 2020.

3.2 WATER DEMAND / BOUNCE-BACK FACTOR

On April 1, 2015, Governor Jerry Brown declared a water shortage emergency and issued an Executive Order that, in part, directed the State Water Resources Control Board (SWRCB) to institute California's first-ever statewide mandatory reductions in water usage on water suppliers to achieve a statewide 25 percent reduction in potable urban usage through February, 2016. On November 15, 2015, Governor Brown extended those conservation measures until October 31, 2016. Under the drought regulation established by the SWRCB, the District was ordered to reduce its water consumption by 32%.

Recognizing persistent yet less severe drought conditions throughout California, on May 18, 2016, the SWRCB adopted an emergency water conservation regulation that replaced the prior emergency regulation. The May 2016 regulation that was in effect from June 2016 through January 2017 required locally developed conservation standards based upon each agency's specific circumstances. It replaced the prior percentage reduction-based water conservation standard with a localized "stress test" approach.

Determining the baseline consumption for rate setting purposes has become more challenging due to the drought and conservation. Customers have responded to conservation messages and signaling and have reduced their overall consumption. Some of the reduction has resulted in permanent reductions in demand (such as turf removal, fixture replacements, and behavioral changes), while other changes have been temporary. Through discussions with District staff, the FY 2016 consumption is reflective of the most recent consumption patterns of their customers, however, they anticipate some level of recovery or increased usage in the upcoming Study period.

Table 4 summarizes the FY 2016 usage and shows the water demand factors used to determine the projected usage. The water demand factors were provided by the District and represent the projected bounce back in water consumption for each customer class or service area. Per direction from staff, the projected usage was held constant for all years of the Study period.

Table 4: Projected Usage in HCF

Line Number	Customer Class	FY 2016 Usage	Water Demand Factors	Projected Annual Usage[6]
		A	B	A × (1 + B)
1	SFR[7]	459,018	23.4%	566,428
2	MFR[8]	71,629	8.3%	77,568
3	Commercial	89,051	4.2%	92,791
4	Irrigation	116,556	53.0%	178,331
5	Total Murrieta	736,254	24.3%	915,118

3.3 WATER BUDGET REDUCTIONS

During FY 2016, Murrieta water budget customers were asked to reduce their consumption and their individual water budgets were reduced according to their customer classification and the water shortage conditions then in effect. Per direction from District staff, these reductions were removed for the Study period since the reductions are no longer in effect. Drought factors were applied to each account's monthly outdoor or total water budget as shown in Table 5. For example, a Single-Family Residential (SFR) customer's outdoor budget was reduced by 30% in FY 2016. In order to remove the reduction, Raftelis divided the outdoor budget by .70 (or 1-.30). To further illustrate, consider a hypothetical SFR customer with a FY 2016 outdoor water budget of 7 hcf. The revised outdoor water budget after removing the budget reduction would be 10 hcf (7 ÷ 0.70 = 10). See Section 4.1 for additional information regarding water budgets.

Table 5: Drought Factors

Customer Class	Drought Factor	Applied to:
SFR	30%	Outdoor Water Budget
MFR	10%	Total Water Budget
Commercial	10%	Total Water Budget
Irrigation	30%	Outdoor Water Budget

3.4 AVAILABLE WATER SUPPLY

The District meets the demands of customers through both local groundwater and by importing water from Eastern Municipal Water District (EMWD). Table 6 lists the water supplies and summarizes the expected acre feet (AF) that will be available from each of the sources. The Study assumes there will be no changes to the AF available from each source during the Study period.

[6] The water demand factors were applied to each customer's monthly usage and the results were rounded to the nearest hundred cubic foot. Differences between the results shown in column C and the calculation of columns A times (1+B) are the result of rounding.
[7] SFR = Single-Family Residential
[8] MFR = Multi-Family Residential

Table 6: Available Water Supplies

Water Supply	Quantity Available (AF) for Years 1-3	Year 1 Cost per AF	Year 2 Cost per AF	Year 3 Cost per AF
Groundwater	1,056	$ 265.69	$ 277.64	$ 290.13
Imported (EMWD)	1,132	$ 1,301.50	$ 1,353.50	$ 1,407.50

4. RATE STRUCTURE EVALUATION

A key component of the Study includes evaluating the current rate structures and determining the most appropriate structures to model moving forward. Rate structures are best designed when built around meeting a utility's revenue requirements while also addressing its unique characteristics and the needs of its locale, customers, and other stakeholders. Several rate structure and framework workshops were held during the course of the Study. The rate structures presented in this Study reflect specific direction received during the workshops and complement the District's objectives of promoting water use efficiency.

4.1 PROPOSED RATE STRUCTURES

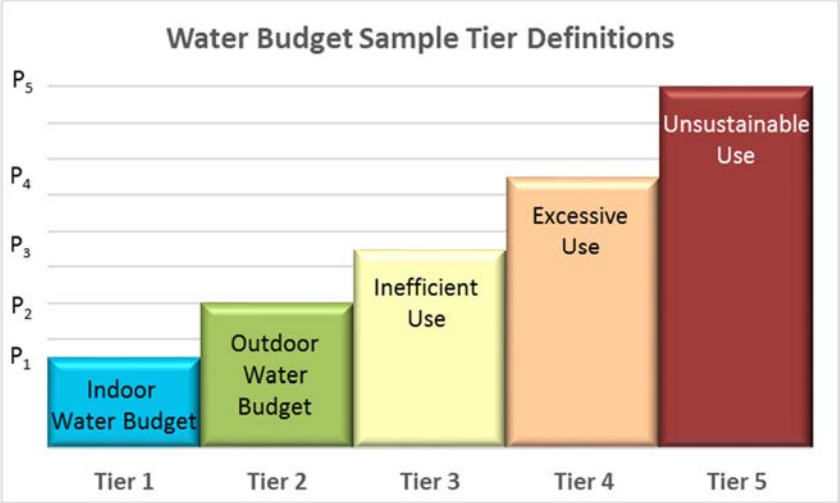
For the Commodity Charge of the District's rate structure, Raftelis recommends maintaining the 5-tiered water budget rate structure for Murrieta customers.

4.1.1 General Water Budget Rate Structure

The District proposes to maintain a 5-tiered water budget rate structure for SFR, MFR, Commercial, and Irrigation. The American Water Works Association Journal defines a water budget as "the quantity of water required for an efficient level of water use by that customer" *(Source: American Water Works Association Journal, May 2008, Volume 100, Number 5).* Under a water budget rate structure each **account** has its own allocation of water for indoor and outdoor water use, or Total Water Budget (TWB). Water bills are calculated based upon how much water is used relative to the individual allocation for that account. As customers increase their water usage in excess of their allocation, their usage is billed at increasingly higher rates, reflecting the increasing costs of producing and delivering more water. Figure 3 shows an example of the tiers for a typical water budget rate structure. In this example:

- Tier 1 is defined as the allotment of water for indoor water usage or the Indoor Water Budget (IWB)
- Tier 2 is defined as the allotment of water for outdoor water usage or the Outdoor Water Budget (OWB)
  - The IWB and OWB combined make up the TWB
- Tier 3 is defined as inefficient usage and is a percentage of the TWB
  - For example, if Tier 1 is 10 units, Tier 2 is 14 units, and Tier 3 is 25% of the TWB, then Tier 3 would be 6 units ([10+14] × .25 = 6)
- Tier 4 is defined as excessive water usage and again is a percentage of the TWB
- Tier 5 is defined as unsustainable water usage and captures any use above Tier 4

Figure 3: Water Budget Tier Definitions



4.1.2 SFR Proposed Rate Structure

Currently, the SFR rate structure consists of 5 tiers where:

Tier 1 represents the indoor water budget and is determined by a customer's household size, a standard consumption per person of 60 gallons per capita per day (GPCD)[9], the number of dwelling units, the number of days of service for a given billing cycle, and accounts for any variances
Tier 2 represents the outdoor water budget and is calculated using irrigated landscape area, local weather data, and an efficiency adjustment factor
Tier 3 represents inefficient water usage and is defined as 25% of the total water budget
Tier 4 represents excessive water usage and is similarly defined as 25% of the total water budget
Tier 5 captures any water usage above Tier 4 and is considered unsustainable water usage

Figure 4 shows the calculation used to derive indoor water budgets and Figure 5 shows the calculation used to derive outdoor water budgets. Additional information regarding the definitions for budget calculations can be found in Appendix A.

Figure 4: Indoor Water Budget Calculation

$$IWB = \frac{(GPCD \times Household\ Size \times \#\ of\ Dwelling\ Units \times Days\ of\ Service \times DF_{Indoor}{}^{10})}{748} + V_{Indoor}{}^{11}$$

Figure 5: Outdoor Water Budget Calculation

$$OWB = \left(\frac{(Irrigable\ Area \times ET_O{}^{12} \times ETAF^{13})}{1200} + V_{Outdoor}{}^{14}\right) \times DF_{Outdoor}{}^{15}$$

[9] See Appendix A – Water Budget Definitions for an explanation of the 60-gallon allotment.
[10] DF_{indoor} = Indoor Drought Factor to be used to adjust budgets under extreme weather or usage conditions
[11] V_{indoor} = Indoor Variance to be used to adjust water allotment to fit unique circumstances of any customer
[12] ET_0 = Inches of water needed to maintain healthy landscape
[13] ETAF = State-Legislated Efficiency Standard in the form of a coefficient
[14] $V_{Outdoor}$ = Outdoor Variance to be used to adjust water allotment to fit unique circumstances of any customer
[15] $DF_{outdoor}$ = Outdoor Drought Factor to be used to adjust outdoor water budgets under extreme weather or usage conditions

Raftelis does not recommend any changes to the 5-tiered budget rate structure currently in effect for the District's SFR customers. Additional details regarding the determination and calculation of budget based rates can be found in Ordinance 381 on file with the District.

4.1.3 Multi-Family Residential Proposed Rate Structure

Currently, the MFR rate structure consists of 5 tiers where the total water budget is determined based on the 3-year rolling average of water usage of each account. The District was able to provide the number of dwelling units and irrigable area for each MFR account; therefore, Raftelis recommends adjusting the MFR rate structure to match the SFR 5-tiered rate structure where Tiers 1 and 2 represent the IWB and OWB respectively. The budgets for each MFR customer can be determined using the formulas in Figure 4 & Figure 5 above.

4.1.4 Commercial Proposed Rate Structure

The Commercial rate structure consists of 5 tiers where the total water budget is determined based on the 3-year rolling average for each account. Under the current structure, 90% of the TWB was considered essential water usage and fell within Tier 1. The remaining 10% was considered efficient water usage and fell within Tier 2. Raftelis recommends maintaining the 5-tier rate structure based on the 3-year rolling average; however, Raftelis recommends adjusting the tier widths (i.e., the amount of water within each tier) for Tier 1 and Tier 2.

Raftelis analyzed the FY 2016 Projected Usage of Commercial customers (Table 4) and determined their water usage accounted for approximately 10% of the total consumption (92,791 hcf ÷ 915,118 hcf = 10%) within the service area. The District currently has available groundwater (as discussed in Section 3.4). Through discussions with District staff, the groundwater is available to serve all customers. Raftelis determined Commercial customers' fair share of the groundwater by multiplying the quantity available times 10%[16] as shown in Table 7.

Table 7: Commercial Allocation of Groundwater

Water Supply	Quantity Available (AF)	% Share	Commercial Allocation (AF)
	A	B	C = (A x B)
Groundwater	1,056	10%	105

Based on this analysis, 105 AF of groundwater is available for Commercial customer use. To ensure Commercial customers receive only their fair share of the groundwater supply, Raftelis needed to adjust the Tier 1 width. Raftelis adjusted the Tier 1 width to approximately 43% of the TWB, which resulted in approximately 105 AF of usage falling within Tier 1[17]. Tier 1 and Tier 2 together represent the TWB; therefore, Tier 2 was adjusted to capture the remaining 57% of the TWB. No adjustments were made to Tiers 3-5.

[16] AF allocated to commercial were rounded to the nearest multiple of 5 (i.e. 107 was rounded to 105)
[17] See Murrieta Water Rate Model, Commercial tab to see the usage broken into tiers.

4.1.5 Irrigation Proposed Rate Structure

The Irrigation rate structure consists of 5 tiers where the TWB is based on irrigated landscape area, local weather data, and an efficiency adjustment factor. Under the current structure, 40% of the TWB was considered essential usage and fell within Tier 1. The remaining 60% of the TWB fell within Tier 2.

According to Article X of the California Constitution, water is a scarce resource and should be reserved to 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. Raftelis recommends adjusting the Tier 1 allotment to 0% of the TWB to more closely align with Article X. Essentially, by setting Tier 1 to 0%, Irrigation customers will only receive groundwater after all essential use has been met. Under this approach, the entire TWB (100%) will be captured in Tier 2. However, in order to mitigate the impact to irrigation customers, the recommended adjustments will be phased-in over the Study period. The proposed tier width definitions for each year of the Study period have been shown in Table 8.

Table 8: Phased-In Irrigation Tier Width Definition

Tier	Tier Definition	Current	Year 1	Year 2	Year 3
Tier 1	Essential Use	40% TWB	20% TWB	10% TWB	0% TWB
Tier 2	Efficient Use	60% TWB	80% TWB	90% TWB	100% TWB
Tier 3	Inefficient Use	25% TWB	25% TWB	25% TWB	25% TWB
Tier 4	Excessive Use	25% TWB	25% TWB	25% TWB	25% TWB
Tier 5	Unsustainable Use	Above Tier 4	Above Tier 4	Above Tier 4	Above Tier 4

4.1.6 Schools Proposed Rate Structure

Currently, the rate structure for Schools consists of 5 tiers where the TWB is based on the 3-year rolling average of water use for each account. Under the current structure, 90% of the TWB was considered essential usage and fell within Tier 1. The remaining 10% was considered efficient usage and fell within Tier 2. The District would like to move to a water budget rate structure such that Tier 1 reflects the IWB and Tier 2 reflects the OWB. A few adjustments must be made to the IWB calculation as is shown in Figure 6[18]. No adjustments need to be made for the OWB calculation (see Figure 5).

Figure 6: Schools IWB Calculation

$$IWB_{Schools} = \frac{(Average\ Daily\ Attendance\ \times GPSD^{19}\ \times Days\ of\ Service\ \times\ DF_{Indoor}{}^{20})}{748}$$

The average daily attendance (ADA) and irrigable area for each school was not available at the time of the Study, therefore, the three School accounts were treated as Commercial. The District proposes to implement the new rate structure once the necessary data become available.

[18] ADA – Varies by Account, GPSD = Gallons per student per day = 10 (obtained from Table G-1 from the State Water Resource Control Board – Revenue Program Guidelines)
[19] GPSD = Gallons per Student per Day
[20] DF_{Indoor} = Indoor Drought Factor to be used to adjust budgets under extreme weather or usage conditions

4.1.7 Summary of Proposed Tier Widths

Table 9 summarizes the proposed tier width definitions based on the proposed changes discussed in the preceding sections. Schools have been treated as commercial customers for the purposes of this Study, however, as average daily attendance and irrigable area data become available the District proposes to implement the water budget rate structure described in Section 4.1.6.

Table 9: Proposed Tier Width Definitions

Tier	Tier Definition	SFR	MFR	Commercial	Irrigation[21]	Schools
Tier 1	Essential Use	100% IWB	100% IWB	43% TWB	20% TWB	100% IWB
Tier 2	Efficient Use	100% OWB	100% OWB	57% TWB	80% TWB	100% OWB
Tier 3	Inefficient Use	25% TWB	25% TWB	25% TWB	25% TWB	25% TWB
Tier 4	Excessive Use	25% TWB	25% TWB	25% TWB	25% TWB	25% TWB
Tier 5	Unsustainable Use	Above Tier 4	Above Tier 4	Above Tier 4	Above Tier 4	Above Tier 4

4.1.8 Summary of Projected Water Usage by Tier

As part of this Study, Raftelis developed "Murrieta Water Rate Model.xlsx". This model contained monthly consumption records and billing data for every customer for FY 2016. Raftelis analyzed the consumption data and calculated the usage in each tier for every account for each month. Table 10 summarizes the projected water usage of 915,118 hcf broken out by the water budget tiers. Note the total usage of 915,118 hcf reflects the total projected usage from Table 4. Per direction from staff, the total projected water usage was held constant for all years of the Study[22].

Table 10: Projected Water Usage by Tier for Year 1 (hcf)

Tier/Class	SFR	MFR	Commercial	Irrigation	Projected Usage by Tier
Tier 1	256,092	73,043	45,738	33,571	**408,444**
Tier 2	295,675	2,498	37,248	86,715	**422,136**
Tier 3	8,729	1,251	3,586	12,866	**26,432**
Tier 4	3,203	523	1,700	8,461	**13,887**
Tier 5	2,728	253	4,520	36,717	**44,219**
Total	**566,428**	**77,568**	**92,791**	**178,331**	**915,118**

[21] Irrigation Tier Width shown is for Year 1 only.
[22] See Appendix C for Water Usage by Tier for each year of the Study Period.

5. 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.

5.1 PROPORTIONALITY

Demonstrating proportionality when calculating rates is a critical component of ensuring compliance with Proposition 218. 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). 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' proportionate allocated cost of service.

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

- The system capacity[23] (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

[23] 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.

based on their service requirements; some specific costs are borne by specific classes based on the characteristics of that group alone.

5.2 COST OF SERVICE PROCESS

A cost of service analysis distributes a utility's revenue requirements (costs) to each customer class. Figure 7 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 7: Cost of Service Process

5.3 STEP 1 – DETERMINE REVENUE REQUIREMENTS

District Staff provided the revenue requirements for the Study period. Table 11 summarizes Revenue Requirements which were modified as follows:

- Purchased Water Costs (line 1) were adjusted to reflect the calculated purchased water cost (based on the projected usage and cost per AF) as opposed to the original budgeted cost.
- Water Use Efficiency costs (line 11) were adjusted to reflect the anticipated costs of the conservation measures for Year 1 and Year 2, and Year 3 as opposed to the prior years' costs as reflected in the budgets.
- Purchased Power (line 12) was adjusted to reflect the calculated costs as determined by the District.

The revenue requirement determination is based upon the premise that the District must generate annual revenues to meet O&M expenses, any debt service needs, reserve funding to achieve target levels, and capital investment needs. As shown in Table 11, the District will be using reserves to mitigate the impact to customers in FY 2018 and FY 2019.

Table 11: Revenue Requirements

Line Number		FY 2018 Revenue Requirements	FY 2019 Revenue Requirements	FY 2020 Revenue Requirements
1	Purchased Water	$ 1,473,541	$ 1,532,860	$ 1,532,860
2	Source of Supply	$ 232,076	$ 242,519	$ 253,432
3	Water Pumping	$ 198,050	$ 206,962	$ 216,275
4	Treatment	$ 48,488	$ 50,670	$ 52,950
5	Transmission & Distribution	$ 1,309,157	$ 1,368,069	$ 1,429,632
6	Customer Accounts	$ 174,999	$ 182,874	$ 191,103
7	Replacement Reserve	$ 481,702	$ 503,379	$ 526,031
8	G&A Allocation	$ 556,043	$ 581,065	$ 607,213
9	Other Operating Expenses	$ 5,495	$ 5,742	$ 6,000
10	Prop Tax Collection	$ 20	$ 21	$ 22
11	Water Use Efficiency	$ 101,706	$ 101,712	$ 102,229
12	Purchased Power	$ 27,842	$ 28,916	$ 30,120
13	**Total O&M Expenditures**	**$ 4,609,119**	**$ 4,804,789**	**$ 4,947,867**
14	Water Supply Offset	$ (71,400)	$ (40,000)	$ -
15	Transfers To/(From) Reserves	$ (90,000)	$ (8,000)	$ 85,000
16	**Base Rate Requirements**	**$ 4,447,719**	**$ 4,756,789**	**$ 5,032,867**

5.4 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 water supply costs to produce local potable water before distributing to customers and the direct costs of purchasing water from EMWD
2. **Source of Supply** – operating and capital costs associated with producing water
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/Meter Service** – 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 repairing and replacing infrastructure
11. **General** – 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

Working closely with District staff, Raftelis reviewed the functionalized costs and asset listing for the Murrieta system. Table 12 shows the functionalized fixed asset listing at original cost (OC)[24]. The functionalized assets will be used to allocate capital costs within the O&M Budget (specifically replacement costs). Table 13 summarizes the functionalized costs for each year of the Study period.

Table 12: Assets by Function

Asset Function	Total Original Cost	% of Assets
General	$ 592,524	4.1%
Meters & Services	$ 1,088,534	7.5%
Water Pumping	$ 1,412,622	9.7%
Source of Supply	$ 2,941,969	20.2%
Transmission & Distribution	$ 6,335,629	43.4%
Transmission	$ 38,393	0.3%
Storage	$ 2,125,417	14.6%
Treatment	$ 59,980	0.4%
Total OC Assets	**$ 14,595,067**	**100.0%**

Table 13: FY 2018, FY 2019, FY 2020 O&M by Function

Line Number	O&M Expenses	FY 2018 O&M	FY 2019 O&M	FY 2020 O&M
1	Customer Accounts	$ 174,999	$ 182,874	$ 191,103
2	General	$ 561,558	$ 586,828	$ 613,235
3	Purchased Power	$ 27,842	$ 28,916	$ 30,120
4	Purchased Water	$ 1,473,541	$ 1,532,860	$ 1,532,860
5	Replacement Reserve	$ 481,702	$ 503,379	$ 526,031
6	Source of Supply	$ 232,076	$ 242,519	$ 253,432
7	Transmission & Distribution	$ 1,309,157	$ 1,368,069	$ 1,429,632
8	Treatment	$ 48,488	$ 50,670	$ 52,950
9	Water Use Efficiency	$ 101,706	$ 101,712	$ 102,229
10	Water Pumping	$ 198,050	$ 206,962	$ 216,275
11	**Total O&M**	**$ 4,609,642**	**$ 4,804,789**	**$ 4,947,867**
12	Water Supply Offset	$ (71,400)	$ (40,000)	$ -
13	Transfers To / From Reserves	$ (90,000)	$ (8,000)	$ 85,000
14	**Base Rate Requirements**	**$ 4,447,719**	**$ 4,756,789**	**$ 5,032,867**

Note the Base Rate Requirements shown in Table 13 (Line 14) matches the requirements from Table 11 (Line 16). With the exception of Lines 3, 4 and 9, O&M expenses came from the District's adopted budget for FY 2018 and were escalated by 4.5% for each of the two subsequent years of the Study. Lines 3 and 4 are based on calculations from the water rate model; Line 9 is based on results from Appendix B.

[24] 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.

5.5 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. ***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*** includes costs of managing the District's water supply through water conservation efforts and efficiency programs.
5. ***Elevation Costs*** includes energy costs incurred to pump treated water to higher elevations.
6. ***Billing and Customer Service Costs*** includes 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*** includes maintenance and capital costs associated with servicing meters. These costs are assigned based on meter cost ratios.
8. ***Water Supply Offset*** includes other non-rate revenues or funds to partially offset supply costs to help mitigate the impact to the District's customers
9. ***Transfers To/From Reserves*** can be either expenses to help build sufficient reserves or offsets to help mitigate the impact on the District's customers
10. ***General Costs*** are either general or administrative in nature. These costs will be distributed to Delivery, Peaking, Billing and Customer Service, and Meters.

5.5.1 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[25] 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.

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

The base demand is assigned a value of 1.0, which signifies no peaking demands. The Max Day and Max Hour values are shown in Table 14[26]. The Max Day peaking factor of 1.50 means that on the day when the maximum amount of water is delivered, the system delivers 1.50 times the amount of water it does during an average day. Similarly, the Max Hour peaking factor of 2.25 means that during the hour when the maximum amount of water was delivered on the Max Day, the system delivered 2.25 times the amount of water it does on an average day.

Table 14: System-Wide Peaking Characteristics

System Peaking Factors	System-Wide Ratio
Base	1.00
Max Day Demand	1.50
Max Hour Demand	2.25

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 that are 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 1.50, which means that Max Day demand is expected to be 150% of the average day capacity. Applying the formula to the system peaking factors found in Table 14 yields the following:

$$\text{Base} = \frac{\text{Base}}{\text{Max Day}} = \frac{1}{1.50} \approx 67\%$$

$$\text{Max Day} = \frac{\text{Max Day} - \text{Base}}{\text{Max Day}} = \frac{1.50 - 1}{1.50} \approx 33\%$$

Max Hour Demand

Facilities designed for Max Hour peaks, such as distribution system facilities, are allocated similarly. The Max Hour factor is 2.25, so Max Hour facilities are designed to provide 225% of the average day capacity. The allocation of Max Hour facilities is shown below:

$$Base = \frac{Base}{Max\ Hour} = \frac{1}{2.25} \approx 44\%$$

$$Max\ Day = \frac{Max\ Day - Base}{Max\ Hour} = \frac{1.50 - 1}{2.25} \approx 22\%$$

$$Max\ Hour = \frac{Max\ Hour - Max\ Day}{Max\ Hour} = \frac{2.25 - 1.50}{2.25} \approx 33\%$$

The base results of the allocation are presented in Table 15 below. These percentages are used as the foundation for allocating operating and capital improvement expenses to cost components, which is explained in detail in the following sub-sections.

[26] Raftelis obtained the Maximum Day and Maximum Hour factors from the 2014 Murrieta Division Water Master Plan.

Table 15: Allocation Factors

	Base	Max Day	Max Hour
Base	100%	0%	0%
Max Day Demand	67%	33%	0%
Max Hour Demand	44%	22%	33%
Average Demand	56%	28%	17%

5.5.2 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 16 provides a matrix of the District's functions, in the left most column, which are then allocated to the cost causation components on the right. The following cost of service analysis documents the FY 2018 analysis. Raftelis followed the same process for the FY 2019 and FY 2020. The results of the FY 2019 and FY 2020 analysis will be summarized within this Study but additional information regarding the Study can be viewed within each respective Murrieta Water Rate Model on file with the District.

Table 16: Allocation to Cost Causation Components

Functions	Allocation Method	Cost Causation Components								
		Water Supply	Delivery	Max Day	Max Hour	Efficiency	Elevation	Billing & CS	Meters & Service	General
Customer Accounts	Specific							100%		
General	Specific									100%
Meters & Services	Specific								100%	
Purchased Power	Specific						100%			
Purchased Water	Specific	100%								
Replacement Reserve	Specific	Based on Asset Allocation								
Source of Supply (Assets)	Specific		100%							
Source of Supply (O&M)	Specific	100%								
Storage	Max Day		67%	33%	0%					
Transmission	Max Day		67%	33%	0%					
Transmission & Distribution	Max Hour		44%	22%	33%					
Treatment (Assets)	Max Day		67%	33%	0%					
Treatment (O&M)	Specific	100%								
Water Use Efficiency	Specific					100%				
Water Pumping	Max Hour		44%	22%	33%					

Table 17 summarizes the percentage allocations for each capital asset and Table 18 summarizes the dollar allocations of **capital assets** to **cost causation components**. The original cost asset value of each functionalized asset (derived from Table 12) is spread to the cost causation components based on the percentages shown in Table 16 and again in Table 17. To determine the dollar amount allocated to each component the original cost asset value is multiplied by the percentages shown. Using Transmission as an example, the amount allocated to the delivery component is $38,393 × ~67% = $25,595 and the amount allocated to Max Day is $38,393 × ~33% = $12,798. The Asset Allocation percentages are calculated by dividing the allocated asset costs for a given cost causation component by the total original cost asset value of $14,595,067.

Table 17: Capital Percentage Allocation

Asset Function	Total Original Cost	Delivery	Max Day	Max Hour	Meters & Service	General
General	$ 592,524					100%
Meters & Service	$ 1,088,534				100%	
Source of Supply	$ 2,941,969	100%				
Storage	$ 2,125,417	67%	33%			
Transmission	$ 38,393	67%	33%			
Trans. & Distr.	$ 6,335,629	44%	22%	33%		
Treatment	$ 59,980	67%	33%			
Water Pumping	$ 1,412,622	44%	22%	33%		
Total Asset Allocation	**$ 14,595,067**	**$ 7,868,163**	**$ 2,463,097**	**$ 2,582,750**	**$1,088,534**	**$ 592,524**
Asset Allocation %		**53.9%**	**16.9%**	**17.7%**	**7.5%**	**4.1%**

Table 18: Capital Allocation

Asset Function	Total Original Cost	Delivery	Max Day	Max Hour	Meters & Service	General
General	$ 592,524	$ -	$ -	$ -	$ -	$ 592,524
Meters & Services	$ 1,088,534	$ -	$ -	$ -	$ 1,088,534	$ -
Source of Supply	$ 2,941,969	$ 2,941,969	$ -	$ -	$ -	$ -
Storage	$ 2,125,417	$ 1,416,945	$ 708,472	$ -	$ -	$ -
Transmission	$ 38,393	$ 25,595	$ 12,798	$ -	$ -	$ -
Trans. & Distr.	$ 6,335,629	$ 2,815,835	$ 1,407,918	$ 2,111,876	$ -	$ -
Treatment	$ 59,980	$ 39,987	$ 19,993	$ -	$ -	$ -
Water Pumping	$ 1,412,622	$ 627,832	$ 313,916	$ 470,874	$ -	$ -
Total Asset Allocation	**$ 14,595,067**	**$ 7,868,163**	**$ 2,463,097**	**$ 2,582,750**	**$ 1,088,534**	**$ 592,524**
Asset Allocation %		**53.9%**	**16.9%**	**17.7%**	**7.5%**	**4.1%**

Please note there may be differences due to rounding. The allocations shown in Table 18 reflect the actual allocations from the Murrieta Water Rate Model which does not use rounding.

Next the O&M functionalized costs from Table 12 are allocated to cost components using the percentages from Table 16. Functionalizing O&M expenses allows Raftelis to follow the principles of rate setting theory in which the end goal is to allocate O&M expenses to cost causation components. Table 19 and Table 20 summarizes the FY 2018 O&M allocation to cost components and determines the O&M Allocation (%) in the last row. Similar to the capital allocation, Table 19 summarizes the percentages from Table 16 and Table 20 shows the FY 2018 O&M allocations to cost components. Note, the Replacement Reserve was allocated based on the Asset Allocation (%) or the last row in Table 18.

Table 19: O&M Percentage Allocation

O&M Expenses	FY 2018	Water Supply	Delivery	Max Day	Max Hour	Efficiency	Elevation	Billing & CS	Meters & Service	Water Supply Offset	Transfer To/From Op Reserve	General
Customer Accounts	$ 174,999							100%				
General	$ 561,558											100%
Purchased Power	$ 27,842						100%					
Purchased Water	$ 1,473,541	100%										
Replacement Reserve	$ 481,702		54%	17%	18%				7%			4%
Source of Supply	$ 232,076	100%										
Transmission & Distribution	$ 1,309,157		44%	22%	33%							
Treatment	$ 48,488	100%										
Water Use Efficiency	$ 101,706					100%						
Water Pumping	$ 198,050		44%	22%	33%							
Water Supply Offset	$ (71,400)									100%		
Transfers To/From Reserves	$ (90,000)										100%	
Total O&M Expenses	**$ 4,447,719**	**$1,754,105**	**$929,554**	**$416,228**	**$587,645**	**$101,706**	**$ 27,842**	**$174,999**	**$ 35,926**	**$(71,400)**	**$ (90,000)**	**$581,114**
2018 O&M Allocation		**39.4%**	**20.9%**	**9.4%**	**13.2%**	**2.3%**	**0.6%**	**3.9%**	**0.8%**	**-1.6%**	**-2.0%**	**13.1%**

Table 20: FY 2018 O&M Allocation

O&M Expenses	FY 2018	Water Supply	Delivery	Max Day	Max Hour	Efficiency	Elevation	Billing & CS	Meters & Service	Water Supply Offset	Transfer To/From Op Reserve	General
Customer Accounts	$ 174,999	$ -	$ -	$ -	$ -	$ -	$ -	$ 174,999	$ -	$ -	$ -	$ -
General	$ 561,558	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 561,558
Purchased Power	$ 27,842	$ -	$ -	$ -	$ -	$ -	$ 27,842	$ -	$ -	$ -	$ -	$ -
Purchased Water	$ 1,473,541	$1,473,541	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Replacement Reserve	$ 481,702	$ -	$ 259,684	$ 81,293	$ 85,242	$ -	$ -	$ -	$ 35,926	$ -	$ -	$ 19,556
Source of Supply	$ 232,076	$ 232,076	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Transmission & Distribution	$ 1,309,157	$ -	$ 581,848	$290,924	$ 436,386	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Treatment	$ 48,488	$ 48,488	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Use Efficiency	$ 101,706	$ -	$ -	$ -	$ -	$ 101,706	$ -	$ -	$ -	$ -	$ -	$ -
Water Pumping	$ 198,050	$ -	$ 88,022	$ 44,011	$ 66,017	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Supply Offset	$ (71,400)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (71,400)	$ -	$ -
Transfers To/From Reserves	$ (90,000)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (90,000)	$ -
Total O&M Expenses	**$ 4,447,719**	**$1,754,105**	**$ 929,554**	**$ 416,228**	**$ 587,645**	**$ 101,706**	**$ 27,842**	**$ 174,999**	**$ 35,926**	**$ (71,400)**	**$ (90,000)**	**$ 581,114**
2018 O&M Allocation		**39.4%**	**20.9%**	**9.4%**	**13.2%**	**2.3%**	**0.6%**	**3.9%**	**0.8%**	**-1.6%**	**-2.0%**	**13.1%**

However, the Total O&M Expenses shown in Table 20

O&M Expenses	FY 2018	Water Supply	Delivery	Max Day	Max Hour	Efficiency	Elevation	Billing & CS	Meters & Service	Water Supply Offset	Transfer To/From Op Reserve	General
Customer Accounts	$ 174,999							100%				
General	$ 561,558											100%
Purchased Power	$ 27,842						100%					
Purchased Water	$ 1,473,541	100%										
Replacement Reserve	$ 481,702		54%	17%	18%				7%			4%
Source of Supply	$ 232,076	100%										
Transmission & Distribution	$ 1,309,157		44%	22%	33%							
Treatment	$ 48,488	100%										
Water Use Efficiency	$ 101,706					100%						
Water Pumping	$ 198,050		44%	22%	33%							
Water Supply Offset	$ (71,400)									100%		
Transfers To/From Reserves	$ (90,000)										100%	
Total O&M Expenses	**$ 4,447,719**	**$1,754,105**	**$929,554**	**$416,228**	**$587,645**	**$101,706**	**$ 27,842**	**$174,999**	**$ 35,926**	**$(71,400)**	**$ (90,000)**	**$581,114**
2018 O&M Allocation		**39.4%**	**20.9%**	**9.4%**	**13.2%**	**2.3%**	**0.6%**	**3.9%**	**0.8%**	**-1.6%**	**-2.0%**	**13.1%**

Table 20 do not represent the revenue requirements to be recovered from rates. The District has other available, unrestricted revenues as shown in Table 21. These revenues can be used to lower the total revenue requirements or they can be used specifically at the discretion of the District. Through discussions with District Staff, the other revenues will be used to lower the general revenue requirement.

Table 21: Other Available Revenues

	FY 2018 Other Revenues
Ad Valorem Property Tax	$ 2,000
Misc. Revenues:	
Interest Income	$ 7,000
Delinquent Penalties	$ 50,000
Water Availability Charge Revenue	$ 131,000
Other	$ 4,000
Subtotal Misc. Revenues	$ 192,000
Total Other Revenues	**$ 194,000**

This was accomplished by lowering the general cost component from Table 20 of $581,114 by the Other Revenues of $194,000 from Table 21. Next, the remaining costs allocated to the General Cost component of $387,114 ($581,114 - $194,000) are reallocated based on the proportionate share of Delivery, Max Day, Max Hour, Billing & Customer Service, and Meters & Service revenue requirements. As an example, the following equation shows the calculation of the Allocation of General Costs (%) for the Delivery Component:

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

$$= \frac{\$929{,}554}{(\$929{,}554 + \$416{,}228 + \$587{,}645 + \$174{,}999 + \$35{,}926)} \approx 43.3\%$$

Therefore, approximately 43.3% (or $167,810) of the $387,114 of General Costs is allocated to the Delivery Costs cost causation component. The reallocation of General Costs is shown in Table 22.

Table 22: General Cost Reallocation

Line Number	Cost Causation Components	FY 2018 Requirements	Net Requirement	Allocation %	General Requirement Reallocation
		A	B[27]	C = B ÷ B12	D = A11 × C
1	Water Supply costs	$ 1,754,105	N/A		$ -
2	Delivery Costs	$ 929,554	$ 929,554	43.3%	$ 167,810
3	Max Day Costs	$ 416,228	$ 416,228	19.4%	$ 75,140
4	Max Hour costs	$ 587,645	$ 587,645	27.4%	$ 106,086
5	Efficiency Costs	$ 101,706	N/A		$ -
6	Elevation Costs	$ 27,842	N/A		$ -
7	Billing & CS Costs	$ 174,999	$ 174,999	8.2%	$ 31,592
8	Meters & Service	$ 35,926	$ 35,926	1.7%	$ 6,486
9	Water Supply Cost Offset	$ (71,400)	N/A		$ -
10	Transfer To / From Operating Reserve	$ (90,000)	N/A		$ -
11	General Costs	$ 387,114	N/A		$ -
12	**Total**	**$ 4,253,719**	**$ 2,144,352**	**100%**	**$ 387,114**

Table 23 summarizes the results from Table 22 to show the revenue from rates after the general cost reallocations.

[27] Items marked N/A do not receive a share of the general requirement reallocation

Table 23: Reallocated Revenue Requirements

Cost Causation Components	FY 2018 Requirements	General Requirement Reallocation	Net Requirements
	A	B (Table 22)	C = A + B
Water Supply Costs	$ 1,754,105	$ -	$ 1,754,105
Delivery Costs	$ 929,554	$ 167,810	$ 1,097,364
Max Day Costs	$ 416,228	$ 75,140	$ 491,368
Max Hour Costs	$ 587,645	$ 106,086	$ 693,730
Efficiency Costs	$ 101,706	$ -	$ 102,229
Elevation Costs	$ 27,842	$ -	$ 27,842
Billing & CS Costs	$ 174,999	$ 31,592	$ 206,591
Meters & Service Costs	$ 35,926	$ 6,486	$ 42,412
Water Supply Cost Offset	$ (71,400)	$ -	$ (71,400)
Transfer To / From Operating Reserve	$ (90,000)	$ -	$ (90,000)
General Costs	$ 387,114	$ (387,114)	$ -
Total	**$ 4,253,719**	**$ -**	**$ 4,253,719**

Table 24 summarizes the resulting FY 2018 Revenue Requirements by cost causation component and indicates how each cost causation component is proposed to be collected from customers.

Table 24: Summary of Revenue Requirements by Cost Components

Cost Categories	FY 2018 Revenue Requirements	Variable	Fixed
Water Supply Costs	$ 1,754,105	✓	
Delivery Costs	$ 1,097,364	✓	
Extra Capacity Costs[28]	$ 1,185,099		✓
Efficiency Costs	$ 101,706	✓	
Elevation Costs	$ 27,842	✓	
Billing & CS Costs	$ 206,591		✓
Meters & Service Costs	$ 42,412		✓
Water Supply Cost Offset	$ (71,400)	✓	
Transfer To/From Operating Reserve	$ (90,000)		✓
Total Base Rate Requirements	**$ 4,253,719**	**$ 2,909,617**	**$ 1,344,102**
Variable / Fixed Split		31%	69%

5.6 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 24. The fixed rate components will be covered first followed by the variable components.

[28] Extra Capacity Costs consist of Max Day and Max Hour combined (~$491,368 + ~$693,730 = $1,185,099)

5.6.1 Fixed System Charge

There are three components that comprise the monthly Fixed System Charge: Billing & Customer Service, Meters & Services, and Peaking/Capacity. The monthly fixed system charge recognizes the fact 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 25.

Table 25: Billing & Customer Service Costs Component – Units of Service

Meter Size	Number of Accounts	# of Billing Periods	Units of Service (# of Bills)
	A	B	C = A × B
5/8"	372	12	4,464
3/4"	1,871	12	22,452
1"	151	12	1,812
1.5"	72	12	864
2"	136	12	1,632
3"	2	12	24
4"	2	12	24
6"	0	12	-
8"	0	12	-
10"	0	12	-
Total	2,606		**31,272**

The total Billing and Customer Service Costs revenue requirement from Table 24 of $206,591 is divided by the units of service (i.e. number of bills) to determine the unit cost of service shown in Table 26.

Table 26: Billing & Customer Service Costs Component – Unit Rate

Billing and Customer Service Component		
Billing & CS Revenue Requirements	$	206,591
÷ # of Bills		31,272
Monthly Unit Rate	**$**	**6.61**

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. District staff provided the Meter Replacement Costs for each size meter. Raftelis used

the meter replacement cost for a ¾" meter as a proxy to determine the equivalent meter units (EMU's). The EMU's were developed in Table 27 and are based on the meter costs provided by the District.

Table 27: Meters and Service Costs Component – Units of Service

Line Number	Meter Size	Meter Replacement Cost	Meter Cost Ratio	# of Annual Accounts	Units of Service (EMU's)
		A	B = A ÷ A2	C	D = B × C
1	5/8"	$ 180	0.67	4,464	2,976
2	3/4"	$ 270	1.00	22,452	22,452
3	1"	$ 330	1.22	1,812	2,211
4	1.5"	$ 535	1.98	864	1,711
5	2"	$ 805	2.98	1,632	4,863
6	3"	$ 3,857	14.29	24	343
7	4"	$ 4,145	15.35	24	368
8	6"	$ 4,500	16.67	-	-
9	8"	$ 5,145	19.06	-	-
10	10"	$ 6,965	25.80	-	-
11	**Total**			31,272	**34,924**

The total Meters and Service Costs revenue requirement from Table 24 of $42,412 is divided by the units of service (Meter Cost EMU's) to determine the unit cost of service shown in Table 28.

Table 28: Meters & Service Costs Component – Unit Rate

Meter & Services Component		
Meters & Service Costs Revenue Requirements	$	42,412
÷ Meter Cost EMU's		34,924
Monthly Unit Rate	**$**	**1.21**

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 between 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 $1,185,099, was determined by adding the Max Day revenue requirement of $491,368 and the Max Hour revenue requirement of $693,730 from Table 23. Through discussions with District staff, the Transfers To / From Operating Reserves (Transfer Component) will be recovered over the Extra Capacity Costs cost causation component. Therefore, the adjusted Extra Capacity revenue requirement of $1,095,099 was determined by adding the Transfer Component to the Extra Capacity Costs cost causation component ($1,185,099 - $90,000 = $1,095,099).

The adjusted 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 have the potential to 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 the purposes of 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 29, the safe maximum operating capacity for each meter 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 29: Extra Capacity Costs Component – Units of Service

Line Number	Meter Size	Meter Type	AWWA Standards (gpm)	AWWA Ratio	# of Annual Accounts	Units of Service (EMU's)
			A	B = A ÷ A2	C	D = B × C
1	5/8"	C713-10 Fluidic-Oscillator Type	20	0.67	4,464	2,976
2	3/4"	C701-12 Turbine Type, Class I, Vertical Shaft Type	30	1.00	22,452	22,452
3	1"	C701-12 Turbine Type, Class I, Vertical Shaft Type	50	1.67	1,812	3,020
4	1.5"	C701-12 Turbine Type, Class I, Vertical Shaft Type	100	3.33	864	2,880
5	2"	C704-08 Propeller Type	120	4.00	1,632	6,528
6	3"	C704-08 Propeller Type	300	10.00	24	240
7	4"	C704-08 Propeller Type	600	20.00	24	480
8	6"	C704-08 Propeller Type	1,350	45.00	-	-
9	8"	C704-08 Propeller Type	1,800	60.00	-	-
10	10"	C704-08 Propeller Type	2,400	80.00	-	-
11		**Total**			31,272	**38,576**

The total Extra Capacity Costs revenue requirement of $1,095,099 is divided by the units of service (Capacity EMU's) to determine the unit cost of service shown in Table 30.

Table 30: Extra Capacity Costs Component – Unit Rate

Peaking/Capacity Component		
Peaking Revenue Requirements	$	1,095,099
÷ Capacity EMU's		38,576
Monthly Unit Rate	**$**	**28.39**

5.6.2 Variable Charges

The variable Commodity Charge rates are comprised of Water Supply, Delivery, Efficiency Costs, and Water Supply Cost Offset 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. Raftelis worked closely with District Staff to develop the variable rate framework shown in Table 31. District Staff provided the framework for the Efficiency component which is designed to recover the costs from customers outside of their water budgets. In addition to the Commodity Charge rates, a separate Pumping Charge for Power Zone 8 was determined.

Table 31: Variable Commodity Rate Component Framework

	Water Supply		Delivery	Efficiency	Water Supply Offset
	Groundwater	EMWD			
Tier 1	✓		✓		
Tier 2	✓	✓	✓		✓
Tier 3		✓	✓	✓	
Tier 4		✓	✓	✓✓	
Tier 5		✓	✓	✓✓✓	

Commodity Charge

Supply Component

The District meets the demands of customers through both groundwater and by importing water from EMWD. Table 32 shows the availability of each water supply and their associated effective unit rates. The effective unit rate takes into consideration the 4% water loss factor as shown below.

Table 32: Water Supply Sources – Quantity and Effective Rate

Water Source	Available for Purchase (AF)	Available for Sales (hcf) (After 4% loss)	Unit Cost (AF)	Effective Rate (hcf) (After 4% Loss)
	A	B = A × (1- 4%) × 435.6	C	D = (C ÷ (1-4%)) ÷ 435.6
Groundwater	1,056 AF	441,594 hcf	$ 265.69	$ 0.635
EMWD	1,132 AF	473,524 hcf	$ 1,301.50	$ 3.112

Next, Raftelis allocated the available water for sale (Table 32, Column B) 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) was met or until the supplies were fully utilized. Table 33 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 was calculated for each tier and customer class.

Table 33: Allocation of Water Supplies & Unit Rate ($/hcf)

Line Number		Projected Sales	Groundwater	EMWD	Unit Rate
		A	B	C	D[29]
1	Available Supply		441,594	473,524	
2					
3	Tier 1	408,444	408,444	-	**$0.635**
4	Tier 2	422,136	33,150	388,986	**$2.918**
5	Tier 3	26,432	-	26,432	**$3.112**
6	Tier 4	13,887	-	13,887	**$3.112**
7	Tier 5	44,219	-	44,219	**$3.112**
8	Total	915,118	441,594	473,524	

[29] Column D represents the weighted average unit rate. For Example, Tier 2 was calculated as follows: [(33,150 × $0.635) + (388,986 × $3.112)] ÷ 422,136, where 422,136 is the total Tier 2 Projected Sales.

The water supply revenue requirement of $1,754,105 from Table 24 is approximately equal to the projected cost of purchasing water as shown in Table 34[30].

Table 34: Projected Water Supply Costs

	Projected Sales (hcf)	Water Supply Unit Rate	Revenue Requirements
	A	B (Table 33, Column D)	C = A × B
Tier 1	408,444	$ 0.635	$ 259,362
Tier 2	422,136	$ 2.918	$ 1,231,793
Tier 3	26,432	$ 3.112	$ 82,257
Tier 4	13,887	$ 3.112	$ 43,217
Tier 5	44,219	$ 3.112	$ 137,608
Total	915,118		$ 1,754,237

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 24 are spread over all units of water (915,118 hcf), irrespective of customer class or tiers. Table 35 summarizes the calculation of the uniform rate.

Table 35: Delivery Component - Unit Rates

Delivery Component		
Delivery Revenue Requirements	$	1,097,364
÷ Projected Sales		915,118
Unit Rate ($ per hcf)	**$**	**1.199**

Efficiency Component

District staff provided the anticipated costs for the efficiency programs and incentives as well as the allocation factors for recovering these costs[31]. Table 36 summarizes the calculation of the unit rate for the efficiency component based on Year 3 Projected Usage at each Tier. Year 3's Projected Usage was used to determine the efficiency component rate per hcf because it reflects the completed phase-in of the Irrigation rate structure change as described in Section 4.1.5. The goal of the efficiency component is to encourage conservation and efficiency, therefore, the costs from Table 24 for efficiency programs and incentives will be recovered by those targeted by the programs (inefficient users). Tier 1 and Tier 2 water use is deemed to be efficient and therefore water billed in these tiers do not pay an efficiency component.

Table 36: Efficiency Component – Unit Rates

Line Number		Projected Usage	Unit Rate ($ per hcf)
1	Tier 1	408,444	-
2	Tier 2	422,136	-
3	Tier 3	26,432	**$ 0.44**
4	Tier 4	13,887	**$ 0.88**
5	Tier 5	44,219	**$ 1.76**
6	**Total**	915,118	

[30] Any differences are due to rounding

[31] See Appendix B for additional information provided by the District regarding the Efficiency Component.

Water Supply Offset Component

District staff also provided other non-rate revenue of $71,400[32] (shown in Table 24) to be used to offset the ***purchased water supply costs***. Through discussions with staff, it was determined the offset would be applied to all Tier 2 usage (as indicated in the Commodity Framework, Table 31), irrespective of customer class. Table 37 summarizes the calculation of the Tier 2 water supply offset.

Table 37: Water Supply Offset Component - Unit Rates

Water Supply Offset Component		
Water Supply Offset	$	(71,400)
÷ Tier 2 Projected Sales		422,136
Unit Rate ($ per hcf)	**$**	**(0.169)**

Pumping Charge

The Pumping Charge revenue requirements from Table 24 were allocated in a manner similar to the existing rates. All Murrieta customers fall under either Power Zone 7 or 8. Based on direction received from the District, only customers in Power Zone 8 pay an elevation surcharge[33]. Table 38 summarizes the calculation of the pumping charge unit rates. The projected sales shown in the table represent the projected sales from customers within Power Zone 8. Appendix D provides additional information regarding the basis for the calculation of the Pumping Charge.

Table 38: Pumping Charge – Unit Rates ($/hcf)

Pumping Charge		
Pumping Charge Revenue Requirements	$	27,842
÷ Projected Sales		128,719
Unit Rate ($ per hcf)	**$**	**0.216**

5.7 PROPOSED WATER RATES

5.7.1 Fixed Charges

Table 39 summarizes the rates for the monthly Fixed System Charges by meter size based on the unit rates developed in the Section 5.6.1. As shown in the table above, the unit rate for Billing and Customer Service Costs cost causation component does not vary based on meter size whereas the unit rates for the Meters and Service, and Extra Capacity Costs increase as the size of the meter 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.

[32] See Appendix C for additional information related to the Water Supply Cost Offset.
[33] See Appendix D for additional information provided by the District regarding Pumping Charge.

Table 39: Year 1 Rates for Fixed System Charge ($/Meter Size)

Meter Size	Meter Cost Ratios	AWWA Ratios	Billing & Customer Service	Meters & Service	Extra Capacity	Fixed System Charge
	A	B	C (Table 26)	D = $1.21 × A (Table 28)	E = $28.39 × B (Table 30)	F = C + D + E
5/8"	0.67	0.67	$ 6.61	$ 0.81	$ 18.93	**$ 26.34**
3/4"	1.00	1.00	$ 6.61	$ 1.21	$ 28.39	**$ 36.21**
1"	1.22	1.67	$ 6.61	$ 1.48	$ 47.31	**$ 55.40**
1.5"	1.98	3.33	$ 6.61	$ 2.40	$ 94.63	**$ 103.64**
2"	2.98	4.00	$ 6.61	$ 3.62	$ 113.55	**$ 123.78**
3"	14.29	10.00	$ 6.61	$ 17.35	$ 283.88	**$ 307.84**
4"	15.35	20.00	$ 6.61	$ 18.64	$ 567.76	**$ 593.01**
6"	16.67	45.00	$ 6.61	$ 20.24	$ 1,277.46	**$ 1,304.31**
8"	19.06	60.00	$ 6.61	$ 23.15	$ 1,703.29	**$ 1,733.04**
10"	25.80	80.00	$ 6.61	$ 31.33	$ 2,271.05	**$ 2,308.99**

Raftelis completed the cost of service analysis for Year 2 and Year 3. Separate rate models (Murrieta Water Rate 2019 Model and Murrieta Water Rate 2020 Model) showing the detailed cost of service analysis are on file with the District, however, the results (i.e. proposed rates) are shown in Table 40.

Table 40: Proposed Rates for Fixed System Charges ($/Meter Size)

Meter Size	Year 1	Year 2	Year 3
5/8"	$ 26.34	$ 29.05	$ 32.00
3/4"	$ 36.21	$ 40.11	$ 44.39
1"	$ 55.40	$ 61.68	$ 68.56
1.5"	$ 103.64	$ 115.87	$ 129.28
2"	$ 123.78	$ 138.43	$ 154.50
3"	$ 307.84	$ 344.39	$ 384.49
4"	$ 593.01	$ 665.06	$ 744.16
6"	$ 1,304.31	$ 1,465.04	$ 1,641.58
8"	$ 1,733.04	$ 1,947.06	$ 2,182.15
10"	$ 2,308.99	$ 2,594.27	$ 2,907.64

5.7.2 Variable Charges

The unit rates of the cost causation components allocated to the variable Commodity Charge rates are added together to produce rates for each customer class and tier. Table 41 shows each unit rate by cost causation component and the final proposed Year 1 variable Commodity Charge rates. Table 42 shows the proposed variable Commodity Charge rates for three years, and Table 43 shows the proposed Pumping Charge rates for three years.

Table 41: Proposed Year 1 Commodity Charge Rates ($/hcf)

	Water Supply	Delivery	Efficiency	Water Supply Offset	Total Year 1 Commodity Rate
	A (Table 33)	B (Table 35)	C (Table 36)	D (Table 37)	E = A + B + C + D
Tier 1 - Essential Use	$ 0.635	$ 1.199	$ -	$ -	**$ 1.834**
Tier 2 - Efficient Use	$ 2.918	$ 1.199	$ -	$ (0.169)	**$ 3.948**
Tier 3 - Inefficient Use	$ 3.112	$ 1.199	$ 0.440	$ -	**$ 4.751**
Tier 4 - Excessive Use	$ 3.112	$ 1.199	$ 0.880	$ -	**$ 5.191**
Tier 5 - Unsustainable Use	$ 3.112	$ 1.199	$ 1.760	$ -	**$ 6.071**

Table 42: Proposed 3-Year Commodity Charge Rates ($/hcf)

	Year 1 Commodity Rate	Year 2 Commodity Rate	Year 3 Commodity Rate
Tier 1 - Essential Use	$ 1.834	$ 1.919	$ 2.006
Tier 2 - Efficient Use	$ 3.948	$ 4.115	$ 4.286
Tier 3 - Inefficient Use	$ 4.751	$ 4.932	$ 5.118
Tier 4 - Excessive Use	$ 5.191	$ 5.372	$ 5.558
Tier 5 - Unsustainable Use	$ 6.071	$ 6.252	$ 6.438

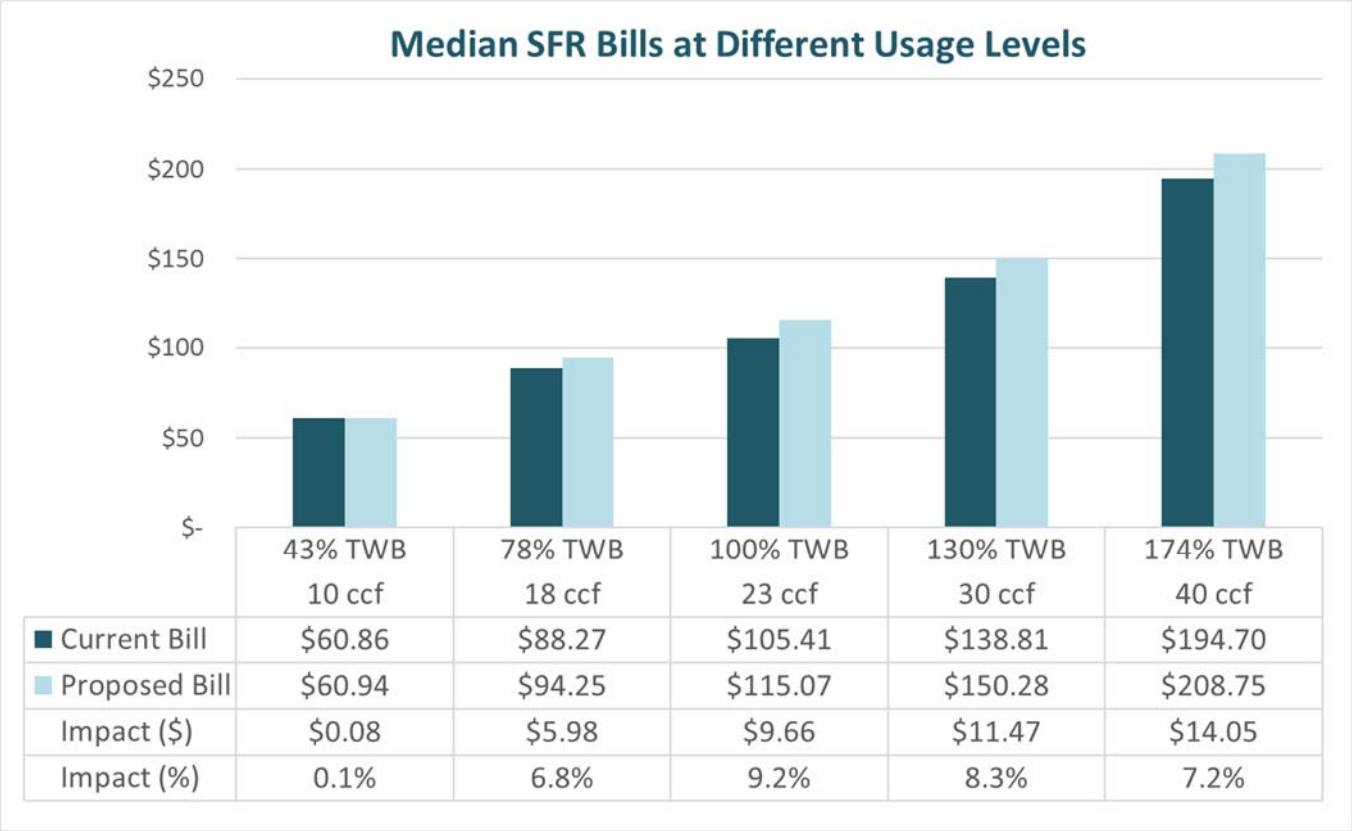
Table 43: Proposed Pumping Charge Rates ($/hcf)

Power Zone	Year 1 Pumping Rate	Year 2 Pumping Rate	Year 3 Pumping Rate
Power Zone 7	$ -	$ -	$ -
Power Zone 8	$ 0.216	$ 0.225	$ 0.234

5.8 MURRIETA CUSTOMER BILL IMPACT

Figure 8 compares the bill totals at different usage levels for a median Residential customer, with a ¾" meter, located in Pumping Zone 8, with a household size of 3 persons, landscape area of 3,856 square feet, and a 30-day billing cycle for the current rates and proposed Year 1 rates.

Figure 8: Residential Customer Bill Impact



	43% TWB 10 ccf	78% TWB 18 ccf	100% TWB 23 ccf	130% TWB 30 ccf	174% TWB 40 ccf
Current Bill	$60.86	$88.27	$105.41	$138.81	$194.70
Proposed Bill	$60.94	$94.25	$115.07	$150.28	$208.75
Impact ($)	$0.08	$5.98	$9.66	$11.47	$14.05
Impact (%)	0.1%	6.8%	9.2%	8.3%	7.2%

APPENDIX A:

Water Budget Definitions

A. WATER BUDGET DEFINITIONS

The basic definitions used to calculate 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 381 on file with the District. The indoor water budget (IWB) for residential customers is determined by a customer's household size and a standard consumption per person.

Indoor Water Budget Calculation

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

Where:

- GPCD – Gallons per capita per day. The standard consumption per person per day will be set at 60 gallons.[34]
- Household Size – Number of residents per dwelling unit. The default values for household size will be set at 3 persons per household for both Single Family and Multi-Family residential units, however, any variances previously submitted by the District's customers have been maintained during the course of the Study.
- 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 cycle for each customer. The actual number of days of service was applied to calculate the indoor water budget for each billing cycle.
- 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 will be 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 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 supporting documentation.
- 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

$$IWB = \frac{60\ gallons\ per\ person\ per\ day \times 1\ unit \times 4\ persons \times 30\ days \times 100\%}{748\ gallons\ per\ hcf} = 9.63\ hcf$$

[34] Studies show that, on average, a typical person uses less than 60 gallons of water each day indoors. This amount includes all indoor water use, such as showers and washing clothes, and is based on the use of common water-efficient devices, including low-flow toilets and shower heads. Based on this data, and a review of the District's customers' historical water use, the District adopted an indoor water budget of 60 gallons per person per day.

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

$$IWB = \frac{60\ gallons\ per\ person\ per\ day\ \times 1\ unit\ \times 6\ persons\ \times 28\ days\ \times 100\%}{748\ gallons\ per\ hcf} = 13.47\ hcf$$

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

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

Where:

- Irrigable Area, also referred to as Landscape Area (in square feet, sq. ft.), is the measured irrigable 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). Western's service area has 450+ individual weather microzones. Western 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 and irrigation efficiency. Annual Average ETAF for Existing Landscape Service = 80%, Annual Average ETAF for New Landscape = 70%.
- 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 will be set at 100 percent, representing a 100 percent water budget allotment, in times where no water shortage exists in the District's service area.
- Voutdoor – Outdoor variance. A water budget may be adjusted to fit the circumstances of any customer. If the District chooses to allow variance program, customers need to contact the District and/or fill-out an adjustment form and return to the District with the necessary documentation.
- 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:

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

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 Western Municipal Water District's water rate structure. Western strives to match program offerings with customer needs and available funding. Western, 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 water use efficiency support programs.

Western's mix of customers include: residences, schools, restaurants, and industrial users (example listing only). Each customer sector 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. Western's 2008 Water Use Efficiency Master Plan provides opportunities and support mechanisms for every water use sector.

The District's water use efficiency effort is supported both by staff employed by the District and subject matter experts (consultants) contracted through formal request for proposal processes. Subject matter experts 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 budget 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 tiers and service areas:	Water Budget Customers Only	Other Customers Only	Shared by All Customers	Total Budget
Brochures - Printing & Duplicating	$ 8,500			$ 8,500
Website Info Development, O&M	$ 15,000			$ 15,000
Public workshops	$ 2,000			$ 2,000
Conservation giveaways	$ 2,500			$ 2,500
Postage for mailing information	$ 1,000			$ 1,000
Labor			$ 91,000	$ 91,000
Overtime	$ 5,000			$ 5,000
Total	$ 34,000	$ -	$ 91,000	$ 125,000

Table 2: Allocation of Program Support Costs by Service Area

The HCF in the table below for the Murrieta Service Area is from Table 10 "Projected Water Usage by Tier" in the body of the Study report.

Allocation of Program Support Costs (Allocated on Percent of Total Water Use By Service Area)	HCF	AF	Water Budget Customers Only	Shared by All Customers	Total By Area
Murrieta	915,118	2,100.82	$ 3,651	$ 7,897	$ 11,548
Riverside	7,607,439	17,464.28	$ 30,349	$ 65,650	$ 96,000
Non-Water Budget Rates	2,022,342	4,642.66		$ 17,452	$ 17,452
Total	10,544,899	24,207.76	$ 34,000	$ 91,000	$ 125,000

Table 3: Allocation of Program Support Costs by Over Budget Tier (Tiers 3-5)

The HCF in the table below for the Murrieta Service Area is from the Murrieta Water Rate 2020 Model.

Allocation of Program Support Costs by Tier	Tier	Murrieta	Riverside	Non-Water Budget Rates	
Over budget Use	Tier 3 HCF	26,531	353,511	Not applicable	
	Tier 4 HCF	13,975	195,731		
	Tier 5 HCF	44,464	380,319		
	Total	84,970	929,561		
Over budget percent	Tier 3	31.2%	38.0%		
	Tier 4	16.4%	21.1%	Not applicable	
	Tier 5	52.3%	40.9%		
	Total	100.0%	100.0%		
					Total
Program Support Costs	Tier 3	$ 3,606	$ 36,509		
	Tier 4	$ 1,899	$ 20,214		
	Tier 5	$ 6,043	$ 39,277		
	Total	$ 11,548	$ 96,000	$ 17,452	$ 125,000

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 three over-budget rate tiers (3, 4, and 5). The efficiency rate component funds the District's water conservation/efficiency programs.

The foundation of Western's water use efficiency portfolio is an evaluation program that is designed to support the customer and channel 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 the upper tiers (Tiers 4 and 5) and frequently using more than their water budget will require more programmatic support than the customer that occasionally has consumption in Tier 3. Western'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 5 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 – water use between 100 and 125% of water budget

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). Western adds additional funding to targeted conservation devices within its retail water service areas. For example, Western customers are eligible for a high-efficiency toilet rebate of $300 per unit ($260 in Western funding and $40 from MWD). Not all customers qualify for this rebate because they may live in newer homes with water efficient devices already installed. Western uses funding from over-budget water use penalties to supplement the regional rebate.

Program funding required 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			Murrieta	Riverside	Murrieta	Riverside
T3 efficiency evaluation	$ 175.00	each	8	70	$ 1,400	$ 12,250
Toilet Rebates	$ 260.00	each	14	120	$ 3,640	$ 31,200
FreeSprinklerNozzles.com	$ 4.00	each	500	4500	$ 2,000	$ 18,000
Smart Controller Rebates	$ 215.00	each	5	40	$ 1,075	$ 8,600
Subtotal					$ 8,115	$ 70,050
Program support costs from Table 3 above					$ 3,606	$ 36,509
Tier 3 Total Costs					$ 11,721	$ 106,559
HCF in Tier 3 from Table 3 above					26,531	353,511
Total Costs per HCF					**$ 0.44**	**$ 0.30**

Tier 4 – Wasteful Water Use – water use between 125 and 150% of water budget

Programs supported by funding from the Tier 4 conservation 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. The District supplements the regional rebate and offers $300 per unit. 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 directed to FreeSprinklerNozzles.com, FreeIrrigationRebates.com or encouraged to consider the regional rebate or the Water Savings Incentive Program.

Program funding required 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			Murrieta	Riverside		Murrieta	Riverside
T4 efficiency evaluation(residential & commercial)	$ 300.00	each	5	100		$ 1,500	$ 30,000
Toilet Rebates	$ 260.00	each	8	100		$ 2,080	$ 26,000
FreeSprinklerNozzles.com	$ 4.00	each	200	6,000		$ 800	$ 24,000
Smart Controller Rebates	$ 215.00	each	5	80		$ 1,075	$ 17,200
Commercial Fixture Replacement	$ 200.00	each	5	130		$ 1,000	$ 26,000
Turf Replacement	$ 1.00	per sq. ft.	3,000	22,500		$ 3,000	$ 22,500
Irrigation Controller Program (Large landscape)	Varies by Site					$ 1,000	$ 10,000
Subtotal						$ 10,455	$ 155,700
Program support costs from Table 3 above						$ 1,899	$ 20,214
Tier 4 Total Costs						$ 12,354	$ 175,914
HCF in Tier 4 from Table 3 above						13,975	195,731
Total Costs per HCF						**$ 0.88**	**$ 0.90**

Tier 5 – Unsustainable Water Use – greater than 150% of water budget

A customer in Tier 5 will likely require more than one program offering to drive water use back toward efficiency. Like the process for those in tier 4, the approach in tier 5 begins with a detailed evaluation. This evaluation may also include recommendation for changes to plant pallets and wholesale conversion of select irrigation stations from sprinklers to drip irrigation. The evaluator will physically measure select "indicator" stations or all irrigation stations to develop specific irrigation budgets and conversion plans.

Program funding required to reduce residential and commercial water use in Tier 5 through on-going customer programs is outlined in the table below.

Table 6: Water Use Efficiency Programs Associated with Tier 5 Water Use

Water use Efficiency Programs			Quantity			Tier 5 Program Cost		
● Tier 5 and Nonpotable/Agricultural/March East			Murrieta	Riverside	Non-Water Budget Rates	Murrieta	Riverside	Non-Water Budget Rates
T5 efficiency evaluation(residential & commercial)	$ 400.00	each	35	100	10	$ 14,000	$ 40,000	$ 4,000
Toilet Rebates	$ 260.00	each	10	75	10	$ 2,600	$ 19,500	$ 2,600
FreeSprinklerNozzles.com	$ 4.00	each	3,000	5,000	2,000	$ 12,000	$ 20,000	$ 8,000
Smart Controller Rebates	$ 215.00	each	10	50	10	$ 2,150	$ 10,750	$ 2,150
Commercial Fixture Replacement	$ 100.00	each	10	120	10	$ 1,000	$ 12,000	$ 1,000
Turf Replacement Rebates	$ 1.00	per sq. ft.	3,500	40,000	-	$ 3,500	$ 40,000	-
Large Landscape Sprinkler Nozzles	$ 6.00	each	2,000	10,000	2,500	$ 12,000	$ 60,000	$ 15,000
Irrigation Controller Program (Large landscapes)	Varies by Site					$ 10,000	$ 30,000	$ 5,000
Commercial/Process Evaluations	Varies by Site					$ 5,000	$ 45,000	-
Water Savings Incentive Program Support	varies by Site					$ 10,000	$ 100,000	$ 10,000
Subtotal						$ 72,250	$ 377,250	$ 47,750
Program support costs from Table 3 above						$ 6,043	$ 39,277	$ 17,452
Tier 5 Total Costs						$ 78,293	$ 416,527	$ 65,202
HCF in Tier 5 from Table 3 above (or Table 2 for Non-Water Budget Rates)						44,464	380,319	2,022,342
Total Costs per HCF						**$ 1.76**	**$ 1.10**	**$ 0.03**

Summary of the efficiency rate component for the Murrieta Servia Area from Tables 4-6 above:

Tier 3 - $0.44 per HCF
Tier 4 - $0.88 per HCF
Tier 5 - $1.76 per HCF

APPENDIX C:

Water Supply and Water Supply Offset

C. WATER SUPPLY AND WATER SUPPLY OFFSET

According to Article X of the California Constitution, water is a scarce resource and should be reserved to 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. As part of the Cost of Service Study, Raftelis recommends adjusting Irrigation Customer's Tier 1 allotment to 0% of the total water budget (TWB) to more closely align with Article X. Essentially, by setting Tier 1 to 0%, Irrigation customers will only receive groundwater after all essential use has been met. Under this approach, the entire TWB (100%) will be captured in Tier 2.

Under the existing irrigation rate structure, 40% of the TWB fell within the lowest Tier 1 rate and the remaining 60% fell within a blended Tier 2 rate. The impact of switching from 40% to 0% in a single year was considered too significant, therefore, the District decided to phase-in the recommendation over the three-year study period. The District provided additional non-rate revenues to help offset a portion of the purchased water costs (Tier 2 Water Supply Costs) in Year 1 and Year 2.

As shown in the following table, the irrigation tier widths will be phased-in over the course of the study period and will achieve the recommended definition of 0% of TWB in Tier 1 and 100% of TWB in Tier 2 in FYE 2020.

Tier	Tier Definition	Current	Year 1	Year 2	Year 3
Tier 1	Essential Use	40% TWB	20% TWB	10% TWB	0% TWB
Tier 2	Efficient Use	60% TWB	80% TWB	90% TWB	100% TWB
Tier 3	Inefficient Use	25% TWB	25% TWB	25% TWB	25% TWB
Tier 4	Excessive Use	25% TWB	25% TWB	25% TWB	25% TWB
Tier 5	Unsustainable Use	Above Tier 4	Above Tier 4	Above Tier 4	Above Tier 4

The adjusted tier widths from the table above impacts the projected usage by tier. The following tables show the projected usage by tier for each of the years in the Study period.

Year 1

Tier/Class	SFR	MFR	Commercial	Irrigation	Year 1 Projected Usage by Tier
Tier 1	256,092	73,043	45,738	33,571	**408,444**
Tier 2	295,675	2,498	37,248	86,715	**422,136**
Tier 3	8,729	1,251	3,586	12,866	**26,432**
Tier 4	3,203	523	1,700	8,461	**13,887**
Tier 5	2,728	253	4,520	36,717	**44,219**
Total	**566,428**	**77,568**	**92,791**	**178,331**	**915,118**

Year 2

Tier/Class	SFR	MFR	Commercial	Irrigation	Year 2 Projected Usage by Tier
Tier 1	256,092	73,043	45,738	18,035	**392,909**
Tier 2	295,675	2,498	37,248	102,311	**437,732**
Tier 3	8,729	1,251	3,586	12,853	**26,419**
Tier 4	3,203	523	1,700	8,453	**13,879**
Tier 5	2,728	253	4,520	36,679	**44,180**
Total	**566,428**	**77,568**	**92,791**	**178,331**	**915,118**

Year 3

Tier/Class	SFR	MFR	Commercial	Irrigation	Year 3 Projected Usage by Tier
Tier 1	256,092	73,043	45,738	-	**374,873**
Tier 2	295,675	2,498	37,248	119,854	**455,274**
Tier 3	8,729	1,251	3,586	12,965	**26,531**
Tier 4	3,203	523	1,700	8,549	**13,975**
Tier 5	2,728	253	4,520	36,963	**44,464**
Total	**566,428**	**77,568**	**92,791**	**178,331**	**915,118**

The District meets the demands of customers through both groundwater and by importing water from EMWD. The availability of each water supply and their associated effective unit rates is shown below for each year. The effective unit rate takes into consideration the 4% water loss factor.

Year 1

Water Source	Available for Purchase (AF)	Available for Sales (hcf) (After 4% loss)	Unit Cost (AF)	Effective Rate (hcf) (After 4% Loss)
	A	B = A × (1- 4%) × 435.6	C	D = (C ÷ (1-4%)) ÷ 435.6
Groundwater	1,056 AF	441,594 hcf	$ 265.69	$ 0.635
EMWD	1,132 AF	473,524 hcf	$ 1,301.50	$ 3.112

Year 2

Water Source	Available for Purchase (AF)	Available for Sales (hcf) (After 4% loss)	Unit Cost (AF)	Effective Rate (hcf) (After 4% Loss)
	A	B = A × (1- 4%) × 435.6	C	D = (C ÷ (1-4%)) ÷ 435.6
Groundwater	1,056 AF	441,594 hcf	$ 277.64	$ 0.664
EMWD	1,132 AF	473,524 hcf	$ 1,353.50	$ 3.237

Year 3

Water Source	Available for Purchase (AF)	Available for Sales (hcf) (After 4% loss)	Unit Cost (AF)	Effective Rate (hcf) (After 4% Loss)
	A	B = A × (1- 4%) × 435.6	C	D = (C ÷ (1-4%)) ÷ 435.6
Groundwater	1,056 AF	441,594 hcf	$ 290.13	$ 0.694
EMWD	1,132 AF	473,524 hcf	$ 1,407.50	$ 3.366

Next, the available water for sale 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) was met or until the supplies were fully utilized. The following tables show the allocation of the water supplies and the resulting water supply Unit Rates for each year. The Unit Rate represents the weighted average rate or blended rate and was calculated as follows:

Example Year 1 Tier 2 Calculation

[(33,150 × $0.635) + (388,986 × $3.112)] ÷ 422,136, where 422,136 is the total Tier 2 Projected Sales.

Year 1

Line Number		Projected Sales	Groundwater	EMWD	Unit Rate
		A	B	C	D
1	Available Supply		441,594	473,524	
2	Effective Rate		$0.635	$3.112	
3	Tier 1	408,444	408,444	-	**$0.635**
4	Tier 2	422,136	33,150	388,986	**$2.918**
5	Tier 3	26,432	-	26,432	**$3.112**
6	Tier 4	13,887	-	13,887	**$3.112**
7	Tier 5	44,219	-	44,219	**$3.112**
8	Total	915,118	441,594	473,524	

Year 2

Line Number		Projected Sales	Groundwater	EMWD	Unit Rate
		A	B	C	D
1	Available Supply		441,594	473,524	
2	Effective Rate		$0.664	$3.237	
3	Tier 1	392,909	392,909	-	**$0.664**
4	Tier 2	437,732	48,685	389,047	**$2.951**
5	Tier 3	26,419	-	26,419	**$3.237**
6	Tier 4	13,879	-	13,879	**$3.237**
7	Tier 5	44,180	-	44,180	**$3.237**
8	Total	915,118	441,594	473,524	

Year 3

Line Number		Projected Sales	Groundwater	EMWD	Unit Rate
		A	B	C	D
1	Available Supply		441,594	473,524	
2	Effective Rate		$0.694	$3.366	
3	Tier 1	374,873	374,873	-	**$0.694**
4	Tier 2	455,274	66,720	388,554	**$2.974**
5	Tier 3	26,531	-	26,531	**$3.366**
6	Tier 4	13,975	-	13,975	**$3.366**
7	Tier 5	44,464	-	44,464	**$3.366**
8	Total	915,118	441,594	473,524	

As previously mentioned, the District is using other non-rate revenues to offset the Tier 2 Water Supply costs. The table below summarizes revenue available each year and the resulting Tier 2 Water Supply Offset. The offset applies to **ALL** Tier 2 Usage irrespective of customer class. Also, note there will be no offset in Year 3.

	Year 1	Year 2	Year 3
Water Supply Offset	$ (71,400)	$ (40,000)	$ -
÷ Tier 2 Usage	422,136	437,732	455,274
Unit Rate (offset)	**$ (0.169)**	**$ (0.091)**	**$ -**

APPENDIX D:

Pumping Charge Rates

D. PUMPING CHARGE RATES

The following information was provided by District Staff:

Basis for the Annual Pumping Charge Rate Percentage Increase:
To project the needed increase to the Pumping Charge rate for the Murrieta Service Areas, the District compared the actual purchased power expense incurred during the fiscal year ending June 30, 2016 ("FY 2016") with actual Pumping Charge revenue received during the same period. The result of the comparison was that revenue was under-collected by 4%.

For the Murrieta Service Area, actual revenue compared with actual purchased power expenses necessitate only a 4% increase in Year 1 since the pumping charge is to move water from the main system to an elevated area called Grizzly Ridge, and is not influenced by the ratio of water sources (groundwater vs. imported water from Eastern Municipal Water District). In Year 2 and Year 3, the District is projecting the need for a 4% rate increase based on historical trends in the prices of electricity and natural gas.

Year 1

Power Zone	Projected Sales (hcf) A	Current Rate ($/hcf) B	4% Increase C = B x (1+4%)	Revenue Requirement FY 2018 D = A x C
	Table 38			
Power Zone 8	128,719	$ 0.210	$ 0.216	$ 27,842

Year 2

Power Zone	Projected Sales (hcf) A	Current Rate ($/hcf) B	4% Increase C = B x (1+4%)	Revenue Requirement FY 2019 D = A x C
	Table 38			
Power Zone 8	128,719	$ 0.216	$ 0.225	$ 28,916

Year 3

Power Zone	Projected Sales (hcf) A	Current Rate ($/hcf) B	4% Increase C = B x (1+4%)	Revenue Requirement FY 2020 D = A x C
	Table 38			
Power Zone 8	128,719	$ 0.225	$ 0.234	$ 30,120