CITY OF TORRANCE

2018 – 2022 Water Rate and Cost of Service Study

November 1, 2017

RAFTELIS
FINANCIAL CONSULTANTS, INC.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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1. EXECUTIVE SUMMARY

The City of Torrance (City) engaged Raftelis Financial Consultants, Inc. (Raftelis) to conduct a comprehensive financial plan and develop cost of service water rates for implementation in fiscal years (FY) 2018 and FY 2019. The rate study process was conducted in conjunction with input from City staff. This report documents the resultant findings, analyses, and proposed changes that were developed with input from and approved by City staff. The City is implementing rates for a five-year period; a planning period of five years is included in the projections and results in this report.

The major objectives of the study include the following:

1. Ensure *Revenue Sufficiency* to meet the operation and maintenance (O&M) and capital needs of the City's water utility.
2. Address the water supply and reduction in water use in the municipal service area.
3. Ensure that rates are *Fair and Equitable* and are based on *Cost of Service* guidelines used in the industry.
4. Plan for *Rate and Revenue Stability* to prevent rate spikes and provide for adequate operating and capital reserves and the overall financial health of the water utility under varying conditions.

This executive summary provides an overview of the study and includes findings and recommendations for water rates.

The remainder of the report defines a unit of water as a hundred cubic feet (abbreviated as HCF, hcf, or CCF). A hundred cubic feet of water equals 748 gallons. In addition, a fiscal year for the City is from July 1 to June 30 the following year. Therefore, July 1, 2016 through June 30, 2017 is identified as FY 2017; July 1, 2017 through June 30, 2018 is identified as FY 2018 and so on.

System Background

The water utility provides service to over 26,800 customer accounts covering 78 percent of the City. The City is responsible for local water supply, the monitoring and maintenance of water quality, preventive and predicative maintenance, the operation and repair of the water system facilities and the distribution system, water resource and planning and development, coordination with other outside agencies and interfacing with the State Water Resources Control Board (SWRCB) Division of Drinking Water and other agencies regarding water quality matters. The water system consists of approximately 320 miles of transmission and distribution pipelines, 2,700 fire hydrants, and 7,500 valves. Potable water (drinking water) is supplied through three main sources: local groundwater derived from fresh groundwater wells, water produced from the Goldsworthy Desalter (Desalter) Project, and imported water purchased from Metropolitan Water District of Southern California (MWD). The City also purchases recycled water from the West Basin Municipal Water District (WBMWD) for non-potable uses including process water for the Torrance Refining Company (formerly Exxon-Mobil) and landscape irrigation purposes. The cost of water supply has increased in the last several years due to continued years of drought, tightening of water supplies, the higher

cost of developing alternative supplies, the financial impacts on MWD due lower sales of imported water supplies, and environmental and regulatory requirements.

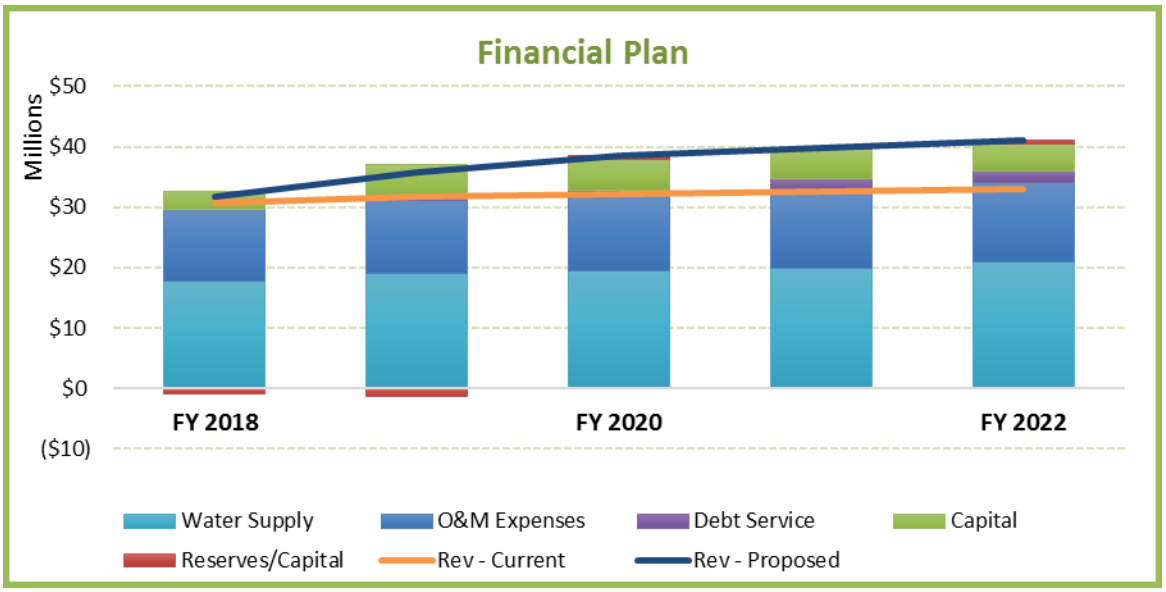
Financial Plan

To determine the revenue adjustments needed to meet the ongoing expenses of the City and provide fiscal stability, Raftelis projected the revenue requirements, including O&M expenses, capital improvement expenses, debt service costs, reserve requirements, etc., for the five-year study period from FY 2018 to 2022. O&M expenses include the cost of operating and maintaining water supply, treatment, storage, and distribution facilities, as well as the costs of providing technical services such as engineering services and other administrative costs of the water system such as meter reading and billing. O&M projections are based on the City's FY 2018 budget using an inflationary factor of 3 percent per year starting in FY 2019 to project all O&M expenditures, except purchased water, chemical, and utilities. Purchased water costs, treatment chemical costs, and energy costs are projected to increase at 5 percent each year during the study period. Groundwater pumping assessment (RA) costs charged by the Water Replenishment District of Southern California (WRD) on groundwater extractions are projected to increase at 7 percent each year during the study period.

Figure 1-1 shows the projected financial plan for the City. The light blue bar represents the water supply cost (groundwater pumping, desalter water, and purchased water from MWD), the dark blue bars represent other O&M expenses, the purple bars represent the City's existing debt service, and the green bars represent capital project costs. The red bars, if shown as negative, represent the additional revenues from reserves needed to meet the revenue requirements, and if shown as positive, represent the revenues that the City puts aside in reserves after meeting the revenue requirements. The orange line represents the projected revenue at current rates; the dark blue line represents the projected revenue with an addition of the proposed revenue adjustments. The figure clearly shows that without revenue adjustments the water enterprise would not be able to fund its expenses.

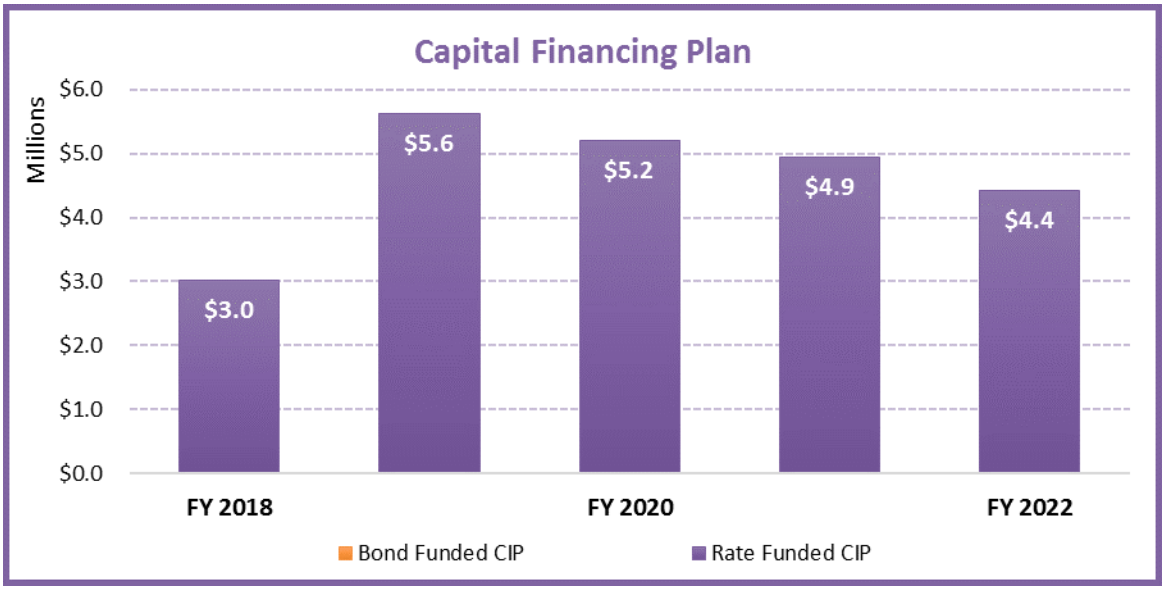
Due to the current drought and ongoing conservation efforts, the "new normal" potable water usage is projected to be approximately 20 percent lower during the planning period than FY 2013 usage levels. The proposed financial plan and water rates are based on the new normal water usage.

Figure 1-1: Projected Financial Plan



In addition to the operating expenses, the City is planning significant capital expenditures over the next five years (FY 2018 to 2022), totaling approximately $23.2 million. Existing and anticipated annual debt service payments range from $0.4 to $2.0 million over the planning period. The debt service payments are to fund the development of approximately $25 million local water resource projects to diversify the municipal system's potable supply portfolio and lower long-term water costs. **Figure 1-2** shows the water CIP funding plan over the planning period.

Figure 1-2: Capital Financing Plan (numbers rounded)



To ensure that the City will have adequate revenues to fund water operating and capital expenses and to maintain sufficient reserves, Raftelis recommends the revenue adjustments in **Table 1-1.**

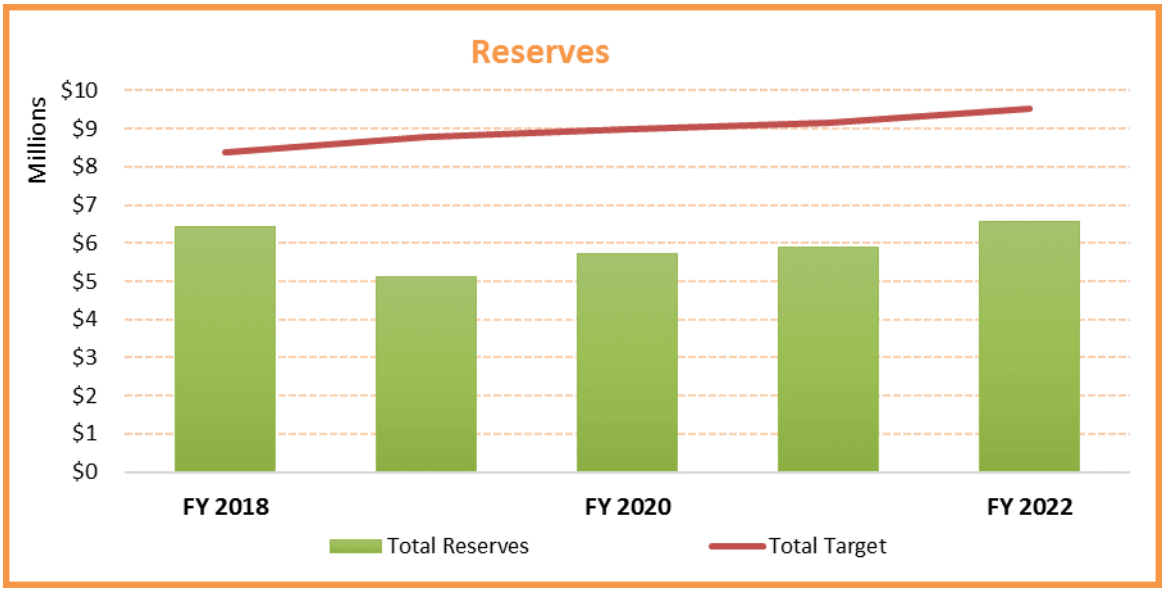
These increases are needed to finance the capital and inflationary expenses. The primary reason for these rate increases is the reduced revenues from lower water sales, capital improvements costs along with the large increases in the cost of water.

Table 1-1: Annual Revenue Increases

Effective Date	Increases
January 2018	12.5%
January 2019	10.0%
January 2020	3.0%
January 2021	3.0%
January 2022	3.0%

Figure 1-3 shows the resulting reserves balance for the water utility. The red line represents the total target, which is composed of operating and emergency reserves targets consistent with industry standards. The operating reserve target is set at 25 percent of the operating expenses to provide working capital and unanticipated operating expenses and the emergency reserve target is set at $1 million, consistent with the City's policy. To reduce the impact on customers, the reserves targets will be met gradually over the next ten years.

Figure 1-3: Projected Reserves



Cost of Service Analysis and Rate Design

To calculate fair and equitable rates so that users pay in proportion to the cost of providing service, Raftelis performed a cost allocation of the total revenue requirements consistent with industry standards. The cost of service allocation is based on the Base-Extra Capacity Method described in the American Water Works Association (AWWA) *Manual M1*. Under this method, costs are apportioned amongst various cost parameters to determine the costs to provide service under average conditions, meet peaking requirements, provide meter capacity and provide customer service. Costs to serve different customer classes are determined; rates are then designed to recover the costs equitably consistent with Proposition 218 requirements.

Proposed Water Rates

Raftelis recommends that the City retains its current rate structure, with a minor change in the single family residential (SFR) tiers. The proposed tiers are: Tier 1 is set at 0 to 7 hcf per month, which represents the estimated indoor water usage; Tier 2 is set at 8 to 12 hcf per month, which represents the average estimated outdoor and other water usage; Tier 3 is any usage above Tier 2. The tiers for all other standard customers remain the same at 0 to 10 hcf per month in the first tier. The rates are revised to be more consistent with cost of service. **Table 1-2** shows the proposed rates for the next five years. Years 2020 through 2022 will be based on the annual change in the cost of living index (CPI) for the Los Angeles region and are estimated at a 3 percent annual increase for calculation purposes. These rates are effective in January 1, 2018 and in January of each subsequent year.

Table 1-2: Proposed Monthly Water Rates

	January 1, 2018	January 1, 2019	January 1, 2020	January 1, 2021	January 1, 2022
Monthly Readiness-to-Serve Charge					
Meter Size					
3/4"	$6.43	$6.83	$7.63	$8.47	$9.35
1"	$9.24	$9.81	$10.95	$12.15	$13.41
1 1/2"	$16.25	$17.26	$19.26	$21.37	$23.59
2"	$24.67	$26.20	$29.24	$32.44	$35.80
3"	$51.32	$54.49	$60.81	$67.46	$74.45
4"	$90.61	$96.20	$107.35	$119.08	$131.42
6"	$184.60	$195.98	$218.69	$242.58	$267.71
8"	$338.92	$359.82	$401.50	$445.36	$491.49
10"	$535.33	$568.33	$634.17	$703.45	$776.31
12"	$703.68	$747.06	$833.60	$924.66	$1,020.43
14"	$1,054.40	$1,119.40	$1,249.07	$1,385.51	$1,529.01
Monthly Pumping Service Charge					
Meter Size					
3/4"	$5.50	$5.84	$6.52	$7.24	$7.99
1"	$9.17	$9.74	$10.87	$12.06	$13.31
1 1/2"	$18.33	$19.46	$21.72	$24.10	$26.60
2"	$29.33	$31.14	$34.75	$38.55	$42.55
3"	$64.15	$68.11	$76.00	$84.31	$93.05
4"	$115.46	$122.58	$136.78	$151.73	$167.45
6"	$238.25	$252.94	$282.24	$313.07	$345.50
8"	$439.85	$466.97	$521.07	$577.99	$637.86
10"	$696.42	$739.35	$825.00	$915.12	$1,009.91
12"	$916.34	$972.83	$1,085.52	$1,204.10	$1,328.82
Monthly Private Fire Protection Service Charge					
Meter Size					
2"	$5.52	$5.87	$6.55	$7.27	$8.03
3"	$11.79	$12.52	$13.98	$15.51	$17.12
4"	$22.61	$24.01	$26.80	$29.73	$32.81
6"	$61.45	$65.24	$72.80	$80.76	$89.13
8"	$128.44	$136.36	$152.16	$168.79	$186.28
10"	$229.20	$243.33	$271.52	$301.18	$332.38
12"	$368.86	$391.60	$436.97	$484.71	$534.92

Table 1-2: Proposed Monthly Water Rates (cont'd)

		January 1, 2018	January 1, 2019	January 1, 2020	January 1, 2021	January 1, 2022
Commodity Rate ($/hcf)						
SFR	Monthly					
Tier 1	7	$2.82	$3.12	$3.18	$3.23	$3.29
Tier 2	12	$4.77	$5.27	$5.37	$5.47	$5.57
Tier 3	12+	$5.77	$6.38	$6.50	$6.62	$6.74
All Other Standard Customers						
Tier 1	10	$3.21	$3.55	$3.62	$3.68	$3.75
Tier 2	10+	$4.59	$5.07	$5.16	$5.26	$5.35
Low Income Senior & Disabled						
Tier 1	7	$2.42	$2.68	$2.73	$2.78	$2.83
Tier 2	12	$4.37	$4.83	$4.92	$5.01	$5.10
Tier 3	12+	$5.37	$5.94	$6.05	$6.16	$6.27
Recycled Water						
All Usage		$3.21	$3.55	$3.62	$3.68	$3.75

Customer Impacts

Table 1-3 below shows the impacts of an average SFR customer with a ¾ inch meter using an average 12 hcf of water monthly, assuming no pumping service charge. For comparison purposes, the impacts on very low-end to very high-end users are also shown. Due to rounding in the calculations, some values may not add to the penny.

Table 1-3: SFR Water Monthly Rate Impacts

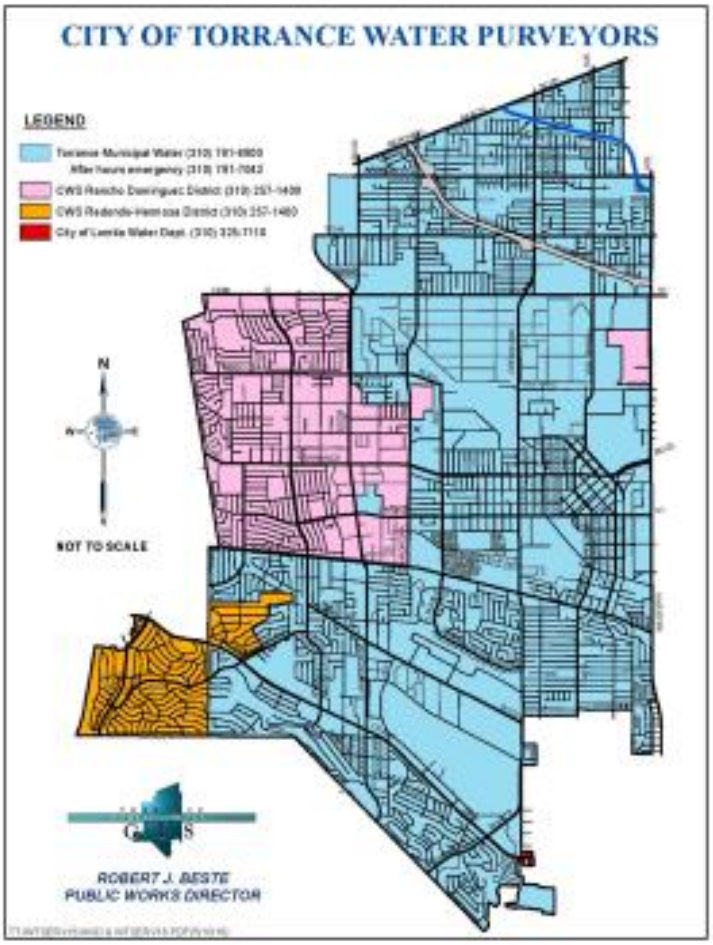
Usage Level	Meter Size	Monthly Usage (hcf)	Current Bill	Proposed Bill	Difference
Low	3/4"	5	$22.18	$20.53	-7%
Median	3/4"	10	$39.83	$40.47	2%
Average	3/4"	12	$47.68	$50.01	5%
High	3/4"	30	$137.04	$153.91	12%
Very High	3/4"	40	$194.10	$211.63	9%

2. OVERVIEW

INTRODUCTION

In August 2017, the City engaged Raftelis to conduct a cost of service rate study for the water utility to meet regulatory requirements and ensure that there is a recovery of costs proportionate to the service provided to its customers. This Report documents the resultant findings, analyses, and proposed changes. The subject Water Rate and Cost of Service Study addresses rates in the Torrance Municipal Water (TMW) service area, as shown on **Figure 2-1.**

Figure 2-1: Map of Torrance Municipal Water Service Area



The major objectives of the study include the following:

1. Ensure *Revenue Sufficiency* to meet the operation and maintenance and capital needs of the City's water utility.
2. Address the water supply and reduction in water use in the municipal service area.

3. Ensure that rates are *Fair and Equitable* and are based on *Cost of Service* guidelines used in the industry.
4. Plan for *Rate and Revenue Stability* to prevent rate spikes and provide for adequate operating and capital reserves and the overall financial health of the water utility under varying conditions.

This Report provides an overview of the Study and includes findings and recommendations for water rates.

ORGANIZATION OF THE REPORT

This Report includes four sections in addition to the Executive Summary and this Overview. A brief description of the remaining sections follows.

1. ***Section 3 – Water Rates*** describes the long-range financial plan for the water utility, findings and results of the water rate study, and a detailed discussion of the proposed water rates and the customer impacts resulting from the proposed rates. It also includes a description of the water system, the water cost of service methodology, the determination of annual revenues required from rates, and a detailed discussion on the Cost of Service, which includes allocation of costs to water parameters and the determination of unit costs, and water rates derivation along with bill impacts.
2. ***Section 4 – Appendix A*** provides the long-range financial plan and rates for Scenario 2, which involves a different set of revenue adjustments.
3. ***Section 5 – Appendix B*** provides larger, easier to read tables found in the body of the report and show the data and the various calculations conducted to derive the unit costs and rates. The original table number from the main body of the report is retained for easy reference.

3. WATER RATES

This section describes the long-range financial plan for the water utility, findings and results of the water rate study, and a detailed discussion of the proposed water rates and the customer impacts resulting from the proposed rates. It also includes a description of the water system, the water cost of service methodology, the determination of annual revenues required from rates, and a detailed discussion on the Cost of Service, which includes allocation of costs to water cost causation parameters and the determination of unit costs.

SYSTEM BACKGROUND

The water utility provides service to approximately 26,800 customer accounts covering 78 percent of the City. The City is responsible for local water supply, the monitoring and maintenance of water quality, preventive and predicative maintenance, the operation and repair of the water system facilities and the distribution system, water resource planning and development , long range financial planning and water rate assessment, coordination with outside agencies and interfacing with regulatory bodies including the State Water Resources Control Board's Division of Drinking Water and other agencies regarding water quality matters. The water system consists of approximately 320 miles of transmission and distribution pipelines, 2,700 fire hydrants and 7,500 valves. Potable water (drinking water) is supplied through three main sources: local groundwater produced from fresh water wells, water produced from the Goldsworthy Desalter, and imported water supplies purchased from the Metropolitan Water District of Southern California. The City also purchases recycled water from the West Basin Municipal Water District for non-potable uses including process water for the Torrance Refining Company (formerly ExxonMobil) and for landscape irrigation of various sites throughout the city. The cost of water supply has increased in the last several years due to continued years of drought, tightening water supplies, and environmental and regulatory requirements.

ACCOUNT AND USAGE ASSUMPTIONS

Table 3-1 shows the estimated number of potable water accounts by meter size for FY 2018 through FY 2022. Raftelis estimated the number of accounts by tabulating FY 2017 (actual) account data provided by the City and escalating the number of SFR accounts by approximately 0.3 percent per year. All other customers are projected to have no growth in the planning period. The number of accounts are used to forecast the amount of fixed revenue the City will receive from the meter service charge.

Table 3-1: Projected Potable Water Accounts by Meter Size

Accounts Data	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
TOTAL REGULAR METERS					
3/4"	21,550	21,608	21,667	21,726	21,786
1"	2,682	2,686	2,689	2,693	2,697
1 1/2"	1,050	1,050	1,050	1,050	1,050
2"	683	683	683	683	683
3"	154	154	154	154	154
4"	75	75	75	75	75
6"	29	29	29	29	29
8"	30	30	30	30	30
10"	10	10	10	10	10
12"	0	0	0	0	0
14"	1	1	1	1	1
TOTAL REGULAR METERS	**26,263**	**26,326**	**26,389**	**26,452**	**26,515**
High Pressure Zone					
3/4"	1,786	1,791	1,795	1,799	1,803
1"	217	217	218	218	219
1 1/2"	18	18	18	18	18
2"	9	9	9	9	9
3"	3	3	3	3	3
4"	2	2	2	2	2
6"	0	0	0	0	0
8"	0	0	0	0	0
10"	1	1	1	1	1
12"	0	0	0	0	0
14"	0	0	0	0	0
Subtotal High Pressure Zone	**2,036**	**2,041**	**2,046**	**2,050**	**2,055**
Private Fire Meters					
2"	31	31	31	31	31
3"	1	1	1	1	1
4"	125	125	125	125	125
6"	199	199	199	199	199
8"	186	186	186	186	186
10"	33	33	33	33	33
12"	1	1	1	1	1
Subtotal Private Fire Meters	**576**	**576**	**576**	**576**	**576**

The revenue calculated for each of the fiscal years in the Financial Plan is a function of the number of accounts, account growth, water use, and existing rates. Due to the residual effects of the 2012-2015 drought on long-term water usage, the City has, like most water purveyors, realized reduced water use due to conservation. The rate study is designed to determine water rates for the next five years; thus, the water usage projections are based on a "new normal" assumption for FY 2018 through FY 2022. For purposes of this rate cycle, City staff has determined that the "new normal" usage is

approximately 20 percent less than FY 2013 water usage levels and remains constant for the five-year planning period. Any incremental increase in projected account growth is projected to be offset by continued lower customer use.

Water Use

Table 3-2 shows the projected water use for FY 2018 through FY 2022 by customer class. The projections are based on a "new normal" assumption for FY 2018 through FY 2022.

Table 3-2: Projected Water Use by Customer Class

Usage Data by Tier (HCF)		FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
SFR						
Tier 1	0-8	1,666,000	1,666,000	1,666,000	1,666,000	1,666,000
Tier 2	9-14	507,445	507,445	507,445	507,445	507,445
Tier 3	15-24	202,636	202,636	202,636	202,636	202,636
Tier 4	25+	63,548	63,548	63,548	63,548	63,548
Subtotal SFR		**2,439,629**	**2,439,629**	**2,439,629**	**2,439,629**	**2,439,629**
All Other Standard Customers						
Tier 1	0-10	496,183	496,183	496,183	496,183	496,183
Tier 2	11+	2,933,595	2,933,595	2,933,595	2,933,595	2,933,595
Subtotal MFR		**3,429,779**	**3,429,779**	**3,429,779**	**3,429,779**	**3,429,779**
Low Income Senior & Disabled						
Tier 1	0-8	21,572	21,572	21,572	21,572	21,572
Tier 2	9-14	5,181	5,181	5,181	5,181	5,181
Tier 3	15-24	1,849	1,849	1,849	1,849	1,849
Tier 4	25+	813	813	813	813	813
Subtotal Low Income Senior & Disabled		**29,415**	**29,415**	**29,415**	**29,415**	**29,415**
Recycled Water						
All Usage (exclude Mobil)		152,460	152,460	152,460	152,460	152,460
Subtotal Recycled Water		**152,460**	**152,460**	**152,460**	**152,460**	**152,460**

INFLATIONARY AND OTHER ASSUMPTIONS

This section describes the assumptions used in projecting operating and capital expenses as well as reserve and debt coverage requirements that determine the overall revenue adjustments required to ensure the financial stability of the City. Revenue adjustments represent the average increase in rates for the City as a whole, and rate changes for individual classes will depend on the cost of service.

To ensure that future costs are reasonably projected, it is necessary to make informed assumptions about inflationary factors and water costs and use. **Table 3-3** shows the water purchases and other inflationary assumptions incorporated in the five-year Financial Plan. O&M projections are based on the City's FY 2018 budget using an inflationary factor of 3 percent per year starting in FY 2019 to project all O&M expenditures, except purchased water, chemical, and utilities. Purchased water costs,

treatment chemical costs, and energy costs are projected to increase at 5 percent each year during the study period. Groundwater pumping assessment costs are projected to increase at 7 percent each year during the study period. Miscellaneous revenues are projected to increase at 1 percent per year. Interest earned on reserves are based on the low interest rates of the past several years for FY 2018 and increased marginally beyond that time frame.

Table 3-3: Inflationary Assumptions

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
General	3.0%	3.0%	3.0%	3.0%	3.0%
Salaries/Benefits	3.0%	3.0%	3.0%	3.0%	3.0%
Purchased Water	5.0%	5.0%	5.0%	5.0%	5.0%
Power	5.0%	5.0%	5.0%	5.0%	5.0%
Chemical	5.0%	5.0%	5.0%	5.0%	5.0%
Capital	4.0%	0.0%	0.0%	0.0%	0.0%
Miscellaneous Revenue	1.0%	1.0%	1.0%	1.0%	1.0%
Reserve Interest Rate	1.0%	2.0%	2.0%	2.0%	2.0%

FINANCIAL PLAN

The assumptions shown above were incorporated into the five-year Financial Plan. To develop the Financial Plan, Raftelis projected annual expenses and revenues, modeled reserve balances, capital expenditures and calculated debt service coverage ratios to estimate the amount of additional rate revenue needed per year. This section of the report provides a discussion of O&M expenses, the Capital Improvement Plan (CIP), reserve funding, projected revenue under existing rates and the revenue adjustments needed to ensure the fiscal sustainability and solvency of the water enterprise.

Revenue Requirement

A utility's yearly revenue requirement is the amount of yearly revenue needed to operate, maintain and ensure fiscal solvency of the City. The revenue requirement includes O&M expenses, rate funded capital expenditures, debt service payments and reserve requirements (funding for reserves).

O&M Expenses

The City's FY 2018 O&M budget and projected O&M expenses are shown in **Table 3-4**. The Financial Plan study period is from FY 2018 to 2022. The O&M budget incorporates the inflationary factors shown in **Table 3-3**. O&M expenses include the cost of purchased water, operating and maintaining groundwater wells, treatment, storage, and distribution facilities, as well as the costs of providing technical services such as engineering services and other administrative and operating costs of the water system such as meter reading and billing.

Table 3-4: Projected Water O&M Expenses

	Budgeted FY 2018	Projected FY 2019	Projected FY 2020	Projected FY 2021	Projected FY 2022
Salaries and Employee Benefits	$6,333,156	$6,523,151	$6,718,845	$6,920,411	$7,128,023
Materials, Supplies, and Maintenance	$2,616,043	$2,567,246	$2,644,264	$2,723,591	$2,805,299
Professional/Contract Services & Utilities	$1,277,560	$1,315,887	$1,355,363	$1,396,024	$1,437,905
Water Supply Costs	$24,961,507	$26,681,331	$27,616,206	$28,479,056	$30,020,811
Training, Travel & Membership Dues	$42,275	$43,543	$44,850	$46,195	$47,581
Liabilities, Settlements & Insurance	$92,109	$94,872	$97,718	$100,650	$103,669
Interdepartmental Charges	$1,436,139	$1,479,223	$1,523,600	$1,569,308	$1,616,387
Debt Service	$0	$0	$0	$0	$0
Capital Acquisitions	$0	$0	$0	$0	$0
Bad Debts and Other Losses	$80,000	$82,400	$84,872	$87,418	$90,041
Other Operating Transfers Out	$0	$0	$0	$0	$0
TOTAL O&M EXPENSES	**$36,838,789**	**$38,787,653**	**$40,085,718**	**$41,322,654**	**$43,249,716**

Capital Improvement Plan

Table 3-5 shows the City's five-year CIP, which total approximately $23.2 million. The projects will be funded on a pay -as –you-go basis (pay-go) from revenues derived through rates.

Table 3-5: Detailed Capital Improvement Plan – Inflated

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Main Replacement: Crenshaw to R.B. Blvd.; Hawthorne 244th St. to Newton	$0	$0	$0	$0	$0
s/o PCH; 242nd St. s/o PCH	$0	$0	$0	$0	$0
Annual Incremental Main Replacement in N. Torrance	$520,000	$520,000	$520,000	$520,000	$520,000
Main Replacement : in Hawthorne PCH to Lomita and adjacent Residential	$0	$780,000	$780,000	$780,000	$0
streets. Crenshaw Blvd. from RB Blvd. to Artesia Blvd -phases.	$0	$0	$0	$0	$0
Systematic Main Replacement Program	$780,000	$780,000	$1,560,000	$3,380,000	$3,640,000
Annual Facility Rehabilitation and Replacement Projects (R & R)	$520,000	$260,000	$260,000	$260,000	$260,000
High Pressure Zone Improvement and Walteria Pump Station Upgrades	$0	$1,040,000	$1,040,000	$0	$0
SCADA and related System Upgrades	$0	$1,040,000	$0	$0	$0
Improvements in conjunction with Downtown Sewer Ph. II	$0	$0	$1,040,000	$0	$0
Conjunctive Use Storage Program	$910,000	$910,000	$0	$0	$0
Park Improvements related to Well Development Projects	$286,000	$286,000	$0	$0	$0
TOTAL CIP - INFLATED	**$3,016,000**	**$5,616,000**	**$5,200,000**	**$4,940,000**	**$4,420,000**

Debt Service

Table 3-6 shows the debt service payments for the next five years. Debt service payments range for the planning period range from $0.4 million to $2.0 million. The debt service is to fund local water resource projects to diversify municipal water supplies and lower long-term water costs.

Table 3-6: Debt Service Payments

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Debt Service on Capital Projects					
North Torrance Wellfield Project	$0	$390,000	$780,000	$780,000	$780,000
Van Ness Wellfield Project	$0	$0	$0	$1,220,000	$1,220,000
Total Debt Service	**$0**	**$390,000**	**$780,000**	**$2,000,000**	**$2,000,000**

Proposed Financial Plan and Revenue Adjustments

The proposed revenue adjustments help ensure adequate revenue to fund operating expenses, capital expenditures and compliance with bond covenants. The Financial Plan model assumes the

revenue adjustment occurs on January 1, 2018 and on January of each subsequent year. The proposed revenue adjustments would enable the City to execute the CIP shown in **Table 3-5** and exceed its debt service coverage requirement of 100 percent over the five-year study period.

Table 3-7 shows the proposed revenue adjustments for the next five years. These increases are needed to finance the capital improvement projects, develop local water resources to offset revenue losses due to lower water sales, and cover inflationary increases in expenses. In 2020 through 2022, rates would be adjusted by the annual change in the consumer price index, for the Los Angeles region, which has been estimated at 3 percent for calculation purposes.

Table 3-7: Proposed Rate Adjustments

Effective Date	Increases
January 2018	12.5%
January 2019	10.0%
January 2020	3.0%
January 2021	3.0%
January 2022	3.0%

Table 3-8 shows the cash flow detail over the next five years. The projected O&M expenses on this table do not include recycled water costs.

Table 3-8: Five-Year Water Cash Flow

Line #				FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
1	Revenue at Current Rates (exclude RW)			$25,178,307	$25,183,056	$25,187,820	$25,192,598	$25,197,390
2	Additional Revenue:							
3	**Fiscal**	**Revenue**	**Month**					
4	**Year**	**Adjustments**	**Effective**					
5	2018	12.5%	January	$1,049,096	$3,147,882	$3,148,478	$3,149,075	$3,149,674
6	2019	10.0%	January		$944,365	$2,833,630	$2,834,167	$2,834,706
7	2020	3.0%	January			$311,699	$935,275	$935,453
8	2021	3.0%	January				$321,111	$963,517
9	2022	3.0%	January					$330,807
10	Additional Rate Revenue			$1,049,096	$4,092,247	$6,293,807	$7,239,628	$8,214,157
11	Total Rate Revenue			$26,227,403	$29,275,303	$31,481,627	$32,432,226	$33,411,548
12	**Other Revenue**							
13	Late Charge			$100,000	$101,000	$102,010	$103,030	$104,060
14	Water Disconnect Fees			$25,000	$25,250	$25,503	$25,758	$26,015
15	Wholesale Water Sales			$820,000	$1,257,000	$1,320,000	$1,385,000	$1,454,250
16	Water Start Service Fee			$65,000	$65,650	$66,307	$66,970	$67,639
17	Fire Flow Test			$4,000	$4,040	$4,080	$4,121	$4,162
18	Mobil Potable			$2,400,000	$2,573,000	$2,702,000	$2,837,000	$2,978,850
19	Mobil Fixed Contribution			$1,181,700	$1,375,000	$1,444,000	$1,516,000	$1,591,800
20	Additional Mobil Fixed Revenue			$83,333	$310,000	$510,000	$570,000	$630,000
21	Engineering,Overhead & Inspect			$100,000	$101,000	$102,010	$103,030	$104,060
22	Capital Received-Parts & Installation			$35,000	$35,350	$35,704	$36,061	$36,421
23	Investment Earnings			$205,000	$109,174	$101,706	$109,022	$117,255
24	Miscellaneous Revenue			$25,000	$25,250	$25,503	$25,758	$26,015
25	Water Operations Revenue			$0	$0	$0	$0	$0
26	WRD Goldsworthy Desalter			$495,000	$519,750	$545,738	$573,024	$601,676
27	**TOTAL REVENUE**			**$31,766,436**	**$35,776,767**	**$38,466,185**	**$39,786,999**	**$41,153,753**
28	**O&M Expenses**							
29	Salaries and Employee Benefits			$6,333,156	$6,523,151	$6,718,845	$6,920,411	$7,128,023
30	Materials, Supplies, and Maintenance			$2,616,043	$2,567,246	$2,644,264	$2,723,591	$2,805,299
31	Professional/Contract Services & Utilitie			$1,277,560	$1,315,887	$1,355,363	$1,396,024	$1,437,905
32	Potable Water Supply Costs			$17,685,296	$18,968,547	$19,440,655	$19,812,972	$20,834,762
33	Training, Travel & Membership Dues			$42,275	$43,543	$44,850	$46,195	$47,581
34	Liabilities, Settlements & Insurance			$92,109	$94,872	$97,718	$100,650	$103,669
35	Interdepartmental Charges			$1,436,139	$1,479,223	$1,523,600	$1,569,308	$1,616,387
36	Debt Service			$0	$0	$0	$0	$0
37	Capital Acquisitions			$0	$0	$0	$0	$0
38	Bad Debts and Other Losses			$80,000	$82,400	$84,872	$87,418	$90,041
39	Other Operating Transfers Out			$0	$0	$0	$0	$0
40	**Total O&M Expenses**			**$29,562,578**	**$31,074,869**	**$31,910,167**	**$32,656,570**	**$34,063,668**
41	Existing Debt Service			$0	$390,000	$780,000	$2,000,000	$2,000,000
42	Proposed Debt Service			$0	$0	$0	$0	$0
43	Rate Funded Capital Projects			$3,016,000	$5,616,000	$5,200,000	$4,940,000	$4,420,000
44	**TOTAL EXPENSES**			**$32,578,578**	**$37,080,869**	**$37,890,167**	**$39,596,570**	**$40,483,668**
45	**Net Cash Flow**			**($812,141)**	**($1,304,102)**	**$576,018**	**$190,429**	**$670,085**
46	Calculated Debt Coverage			#N/A	1206%	841%	357%	355%
47	Required Debt Coverage			100%	100%	100%	100%	100%

Figures 3-1 through **3-4** display the FY 2018 through FY 2022 Financial Plan in graphical format. **Figure 3-1** shows the modeled revenue adjustments for the next five years on the left-hand axis. The City is implementing rates for FY 2018 and FY 2019. FY 2020 and beyond will be evaluated on a yearly basis in the future and expected to increase by the Consumer Price Index. **Figure 3-1** also graphs the calculated and required debt coverage requirements as shown by the green and red lines, respectively, on the right-hand axis. The debt coverage ratio is calculated by dividing net operating revenue (revenues minus O&M expenses) by the annual debt service for each year.

Figure 3-1: Proposed Revenue Adjustments and Debt Coverage Ratio

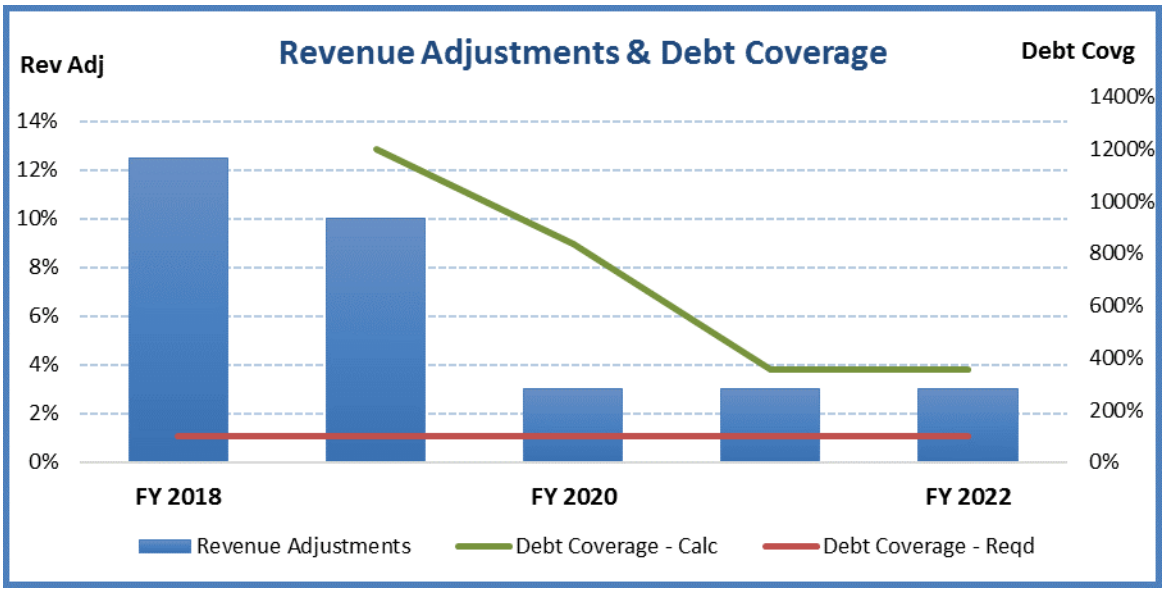


Figure 3-2 graphically illustrates the Financial Plan – it compares existing and proposed revenues with projected expenses. The expenses include water supply, O&M, debt service, capital costs, and net income are shown by the stacked bars; and total revenues at existing and proposed rates are shown by the horizontal orange and blue lines, respectively. Current revenue from existing rates, shown by the orange line, does not meet future total expenses and clearly shows the need for revenue adjustments.

Figure 3-2: Proposed Financial Plan

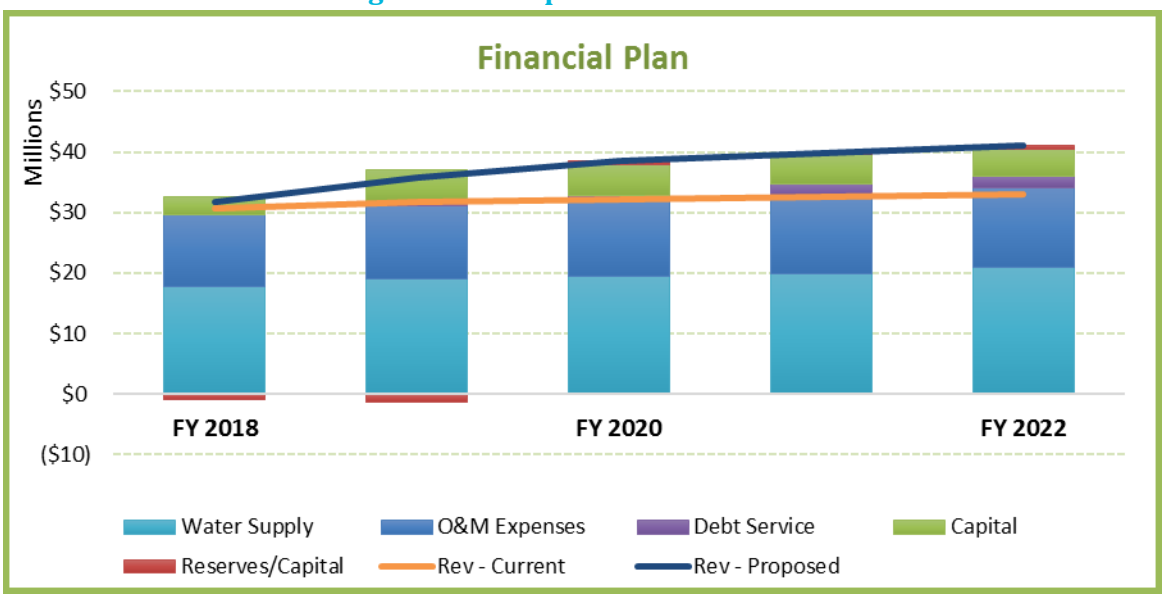


Figure 3-3 summarizes the projected CIP and its funding sources – debt and/or rate/reserve. As shown, the City will fund all its replacement and modernization of infrastructure capital projects through rates and/or reserves, as shown by the purple bars.

Figure 3-3: Projected CIP and Funding Sources

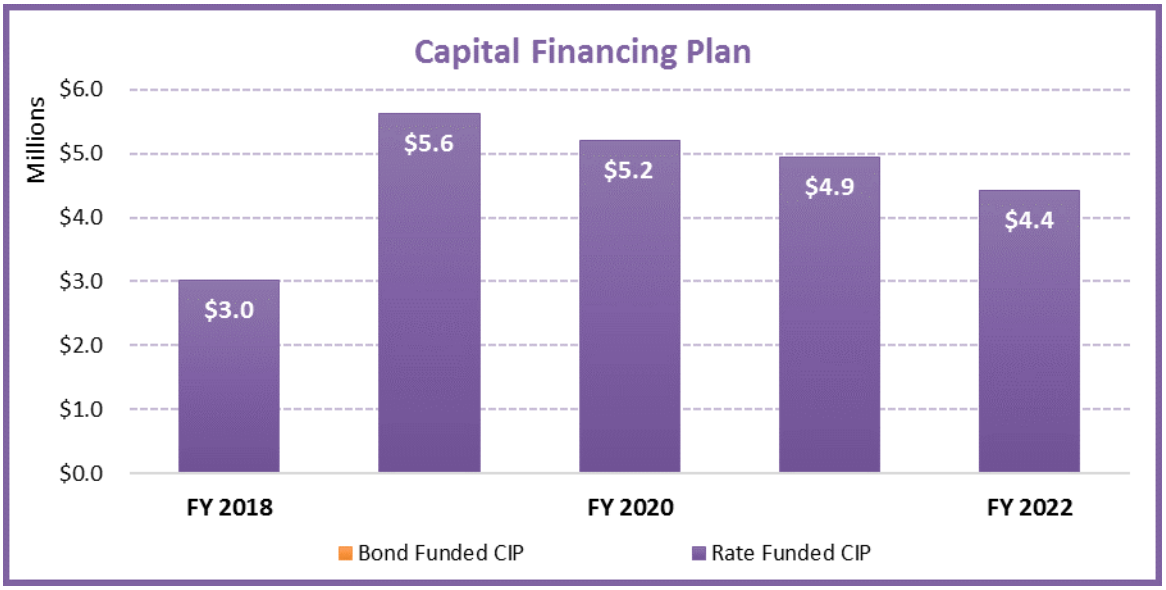


Figure 3-4 displays the resulting fund balance for the water utility. The red line represents the total target, which is composed of operating and emergency reserves targets consistent with the City's policy. The operating reserve target is set at 25 percent of the operating expenses to provide working capital and unanticipated operating expenses and the emergency reserve target is set at $1 million. To reduce the impact on customers, the reserves targets will be met gradually over the next ten years.

Figure 3-4: Total Fund Balance

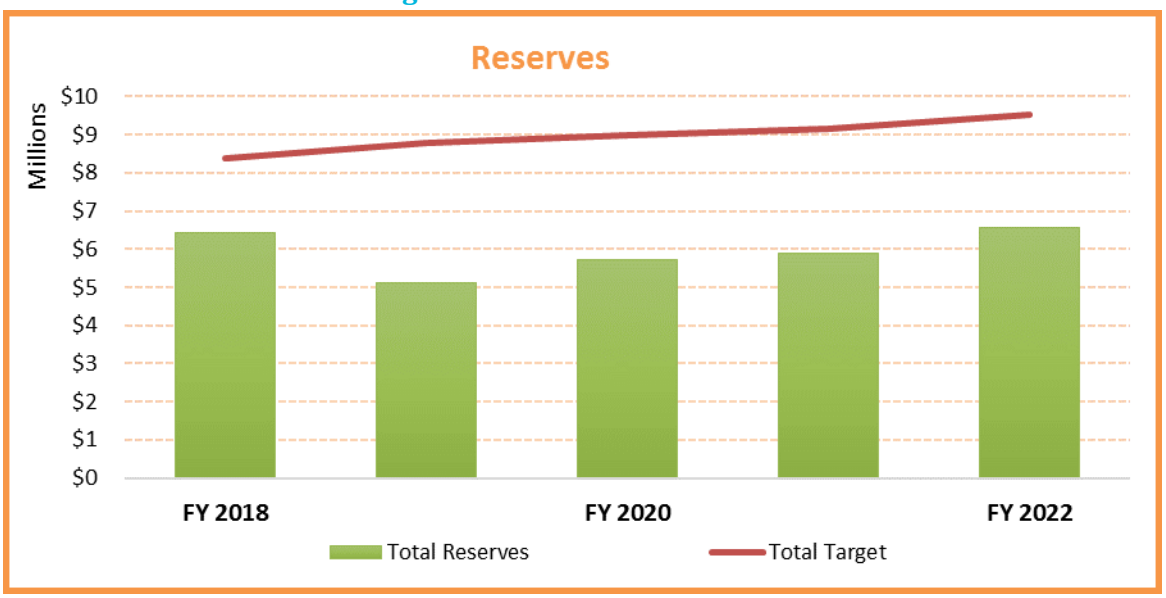


Table 3-9 shows the projected fund balance and the reserves target for each of the proposed reserves in the water utility. This table corresponds with **Figure 3-4**.

Table 3-9: Projected Fund Balance

Water Fund	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Beginning Balance	$7,250,000	$6,437,859	$5,133,757	$5,709,776	$5,900,205
Net Cash Flow	($812,141)	($1,304,102)	$576,018	$190,429	$670,085
Ending Balance	**$6,437,859**	**$5,133,757**	**$5,709,776**	**$5,900,205**	**$6,570,290**
Interest Income	*$64,814*	*$109,174*	*$101,706*	*$109,022*	*$117,255*
Reserves Target					
Operating Reserve Target	$7,390,644	$7,768,717	$7,977,542	$8,164,142	$8,515,917
Emergency Target	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Total Target	**$8,390,644**	**$8,768,717**	**$8,977,542**	**$9,164,142**	**$9,515,917**

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 utility, there are four major steps discussed below.

1) Calculate Revenue Requirement

The rate-making process starts by determining the test year revenue requirement - which for this study is FY 2018. The revenue requirement should sufficiently fund the utility's O&M, debt service, and capital expenses, and reserve funding.

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:

1. Functionalizing costs. Examples of functions are supply, treatment, transmission, distribution, storage, meter servicing and customer billing and collection.
2. Allocating functionalized costs to cost causation components. Cost causation components include supply, base delivery, maximum day, maximum hour[1], meter service, customer servicing and conservation costs.
3. Distributing the cost causation components. Distribute cost causation 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 (supply costs), the cost of delivering water under average conditions (base delivery), and the peak rate at which it is consumed (peaking or capacity costs as identified by maximum day and maximum hour demands).[2] Peaking costs are costs that are incurred during peak times of consumption. The water system is designed to handle peak demands and additional costs are associated with designing, constructing, and operating and maintaining facilities to meet peak demands. The peak demand costs need to be allocated to those imposing such costs on the utility. In other words, not all customer classes 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 conservation, affordability for essential needs and 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 documented the rate study results in this Study Report to help educate the public about the proposed changes, the rationale and justifications behind the changes and their anticipated financial impacts in lay terms.

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[1] Collectively maximum day and maximum hour costs are known as peaking costs or capacity costs.

[2] System capacity is the system's ability to supply water to all delivery points at the time when demanded. It is measured by each customer's water demand at the time of greatest system demand. The time of greatest demand is known as peak demand. Both the operating costs and the capital asset related costs incurred to accommodate the peak flows are generally allocated to each customer class based upon the class's contribution to the peak event.

COST OF SERVICE ANALYSIS

The principles and methodology of a cost of service analysis were described in the preceding section. A cost of service analysis distributes a utility's revenue requirements (costs) to each customer class. After determining a utility's revenue requirements, the next step in a cost of service analysis is to functionalize its O&M costs, based on the City's current O&M classification:

1. Water Supply – include the costs of purchasing and producing water
2. Water Operations – include operational costs to maintain the water system, as well as billing and meter maintenance costs
3. Water Resources – include the costs of the engineering department
4. Water Administration – include administrative cost of the water system
5. Financial Obligations – include the indirect costs charged by other departments
6. WRD Goldsworthy Desalter – include the costs of operating the Goldsworthy Desalter

The functionalization of costs allows us to better allocate the functionalized costs to the **cost causation components**. The cost causation components include:

1. Supply
2. Base Delivery (average) costs
3. Peaking costs (maximum day and maximum hour)
4. Fire protection
5. Pumping
6. Meter service
7. Billing and customer service
8. General and administrative costs

Peaking costs are further divided into maximum day and maximum hour demand. The maximum day (Max Day) demand is the maximum amount of water used in a single day in a year. The maximum hour (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 demands of customers. Therefore, extra capacity[3] costs include the O&M and capital costs associated with meeting peak customer demand. This method is consistent with the AWWA M1 Manual, and is widely used in the water industry to perform cost of service analyses.

Allocation of Functionalized Expenses to Cost Components

After functionalizing expenses, the next step is to allocate the functionalized expenses to cost causation components. To do so we must identify system wide peaking factors which are shown in **Table 3-10**. The system-wide peaking factors, provided by the City, are used to derive the cost component allocation bases (i.e., percentages) shown in **Table 3-10**. The Max Day factor is 1.78 which means that the maximum amount of water used on one day in a year is 1.78 times the average.

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

The Max Hour factor is 2.67 which means that the maximum amount of water per hour used on the max day is 2.67 times the average. Functionalized expenses are then allocated to the cost components using these allocation bases. To understand the interpretation of the percentages, we must first establish the base use as the average daily demand during the year.

To determine the relative proportion of costs to assign to Base, Max Day and Max Hour, allocations are calculated based on these factors. Cost components that are solely Base related to provide average day demand (ADD), such as source of supply, are allocated 100 percent to Base. Cost components that are designed to meet Max Day peaks, such as reservoirs and transmission facilities, are allocated to Base and Max Day factors. Since facilities such as reservoirs and distribution systems are also designed to handle fire flow, an allocation is also provided for fire flow. The fire flow component is based on Insurance Services Office (ISO) standards; since the City has large industrial customers, the fire flow component is 20 percent of the design capacity of those facilities that require fire flow capacity. Normalizing Base Delivery to a factor of 1, the Max Day allocation is as follows:

Base Delivery:	46%	= (1.00/1.78)x100 – 10% (half the fire allocation)
Max Day:	34%	= (1.78-1.00)/1.78x100 – 10% (half the fire allocation)
Fire:	20%	

Cost components such as those related to the distribution system that are designed for Max Hour peaks are allocated similarly. The allocation of Max Hour facilities is shown below:

Base Delivery:	31%	= (1.00/2.67)x100 – 6.67% (1/3 fire allocation)
Max Day:	23%	= (1.78-1.00)/2.67x100 – 6.67% (1/3 fire allocation)
Max Hour:	27%	= (2.67-1.78)/2.67x100 – 6.67% (1/3 fire allocation)
Fire:	20%	

Collectively the maximum day and hour cost components are known as peaking costs. These allocation bases are used to assign the functionalized costs to the cost components.

Table 3-10: System-Wide Peaking Factors and Allocation to Cost Components

	City wide	Base Delivery	Max Day	Max Hour	Fire
Base	1.00	100%	0%	0%	0%
Max Day	1.78	46%	34%	0%	20%
Max Hour	2.67	31%	23%	27%	20%

Table 3-11 shows derivation of the peaking factors by customer class and tier by dividing the total maximum bi-monthly usage by the average bi-monthly usage for each customer class and tier. Low Income Senior & Disabled customers are considered to peak at the same rate as SFR customers. These peaking factors are used to allocate the peaking costs to each customer class and tier. In the absence of daily data for the different customer classes and tiers, the bi-monthly peaks are used as a proxy for max day factors. It should be noted that the ratio of these factors drives the cost allocation and therefore max month factors serve the purpose of allocating costs equitably.

Table 3-11: Peaking Factors by Customer Class

Customer Specific		Max Bi-Monthly	Average Bi-Monthly	Peaking Factor
SFR		558,415	456,004	1.22
Tier 1	0-7	133,149	122,133	1.09
Tier 2	8-12	68,575	51,953	1.32
Tier 3	12+	63,676	36,187	1.76
All Other Standard Customers		352,715	290,471	1.21
Tier 1	0-10	41,442	38,827	1.07
Tier 2	11+	311,273	251,644	1.24

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

Equivalent meters are based on meter hydraulic capacity. A ratio of hydraulic capacity is calculated by dividing large meter capacities by the base meter capacity. The base meter is the smallest meter, in our case, a 3/4-inch meter. The actual number of meters by size is multiplied by the corresponding capacity ratio to calculate equivalent meters. The capacity ratio is calculated using the meter capacity in gallons per minute (gpm) provided in the AWWA M22 Manual. **Table 3-12** shows the equivalent meters for FY 2018 for regular meters, high pressure meters, and private fire meters, respectively.

Table 3-12: Equivalent Meters

Meter Size	Capacity (gpm)	AWWA Ratio	Number of Meters	Equivalent Meters	No. of Meters High Pressure	Equivalent Meters	Fire Line Ratio	Number of Meters	Equivalent Meters
3/4"	30	1.00	21,550	21,550	1,786	1,786			
1"	50	1.67	2,682	4,470	217	361			
1 1/2"	100	3.33	1,050	3,500	18	60			
2"	160	5.33	683	3,643	9	48	0.06	31	2
3"	350	11.67	154	1,797	3	35	0.16	1	0
4"	630	21.00	75	1,575	2	42	0.34	125	43
6"	1,300	43.33	29	1,257	0	0	1.00	199	199
8"	2,400	80.00	30	2,400	0	0	2.13	186	396
10"	3,800	126.67	10	1,267	1	127	3.83	33	126
12"	5,000	166.67	0	0	0	0	6.19	1	6
14"	7,500	250.00	1	250	0	0			
TOTAL			**26,263**	**41,707**	**2,036**	**2,460**		**576**	**773**

Table 3-13 allocates the O&M and capital expenses to each cost component. The functional costs are allocated according to industry standards based on the nature of the water function. For example, water supply costs are allocated 100 percent to the Supply component, distribution lines are designed for max hour plus fire flow and are allocated to max hour, reservoirs are designed for max

day and are allocated to max day. Water resources costs, which represent engineering costs, are allocated based on the assets distribution, represented by the capital allocation. Water operations costs, excluding the meters and billing costs, are allocated based on the average of max day and max hour.

Table 3-13 shows the total resulting cost causation component allocation for O&M expenses. This resulting allocation is used to allocate the City's operating revenue requirement to the cost causation components.

Capital costs are allocated based on the assets so as not cause significant changes to the capital allocation from year to year as different projects are implemented. Over the long term this provides stability and equitability as the assets are replaced over time. **Table 3-13** also shows the total resulting allocation for the City's assets. The resulting total asset allocation is derived in a similar manner as the O&M allocation - first, Raftelis functionalized the City's assets and then allocated them to the cost causation components resulting in the asset total allocation shown at the bottom of **Table 3-13**. Pump Stations are designed for Max Day and are allocated to Max Day, except the power costs associated with pumping are allocated to Pumping based on pumping costs.

Table 3-13: Allocation of Functionalized O&M and Capital Expenses to Cost Causation Components

O&M Allocation	Supply	Base	Max Day	Max Hour	Fire	Pumping	Meter	Customer	General	TOTAL
9881105 - Water Supply	100%									
981106 - Water Operations		38%	28%	13%	20%					
Meters							100%			
Billing								100%		
981107 - Water Resources	0%	34%	25%	20%	17%	4%	0%	0%	0%	
981108 - Water Administration								2%	98%	
981109 - Financial Obligations									100%	
981110 - WRD Goldsworth Desalter	100%									

O&M Allocation	Supply	Base	Max Day	Max Hour	Fire	Pumping	Meter	Customer	General	TOTAL
9881105 - Water Supply	$19,562,217	$0	$0	$0	$0	$0	$0	$0	$0	$19,562,217
981106 - Water Operations	$0	$1,703,779	$1,250,413	$590,838	$886,258	$0	$0	$0	$0	$4,431,289
Meters	$0	$0	$0	$0	$0	$0	$215,374	$0	$0	$215,374
Billing	$0	$0	$0	$0	$0	$0	$0	$608,955	$0	$608,955
981107 - Water Resources	$0	$162,110	$120,720	$97,091	$78,577	$16,835	$0	$0	$0	$475,333
981108 - Water Administration	$0	$0	$0	$0	$0	$0	$0	$46,982	$2,302,122	$2,349,105
981109 - Financial Obligations	$0	$0	$0	$0	$0	$0	$0	$0	$1,346,585	$1,346,585
981110 - WRD Goldsworth Desalter	$573,720	$0	$0	$0	$0	$0	$0	$0	$0	$573,720
TOTAL O&M EXPENSES	**$20,135,937**	**$1,865,890**	**$1,371,133**	**$687,930**	**$964,834**	**$16,835**	**$215,374**	**$655,937**	**$3,648,708**	**$29,562,578**
% Allocation	68%	6%	5%	2%	3%	0.1%	1%	2%	12%	100%

Capital Allocation		Supply	Delivery	Max Day	Max Hour	Fire	Pumping	Meter	Customer	General	TOTAL
Pipelines	Max Hour		31%	23%	27%	20%					100%
Wells	Max Day		56%	44%							100%
Reservoirs	Max Day +Fire		46%	34%	0%	20%					100%
Pump Stations			34%	26%			40%				100%
Treatment Stations	Max Day		56%	44%							100%
Turn Outs	Max hour		31%	23%	27%	20%					100%

Capital Allocation	Supply	Delivery	Max Day	Max Hour	Fire	Pumping	Meter	Customer	General	TOTAL
Pipelines	$0	$13,347,563	$9,795,851	$11,571,707	$8,678,780	$0	$0	$0	$0	$43,393,901
Wells	$0	$2,549,896	$1,992,247	$0	$0	$0	$0	$0	$0	$4,542,143
Reservoirs	$0	$1,615,306	$1,185,482	$0	$700,197	$0	$0	$0	$0	$3,500,985
Pump Stations	$0	$1,723,824	$1,346,832	$0	$0	$2,047,104	$0	$0	$0	$5,117,760
Treatment Stations	$0	$205,345	$160,437	$0	$0	$0	$0	$0	$0	$365,782
Turn Outs	$0	$270,431	$198,471	$234,451	$175,838	$0	$0	$0	$0	$879,192
TOTAL ASSETS	**$0**	**$19,712,365**	**$14,679,320**	**$11,806,158**	**$9,554,816**	**$2,047,104**	**$0**	**$0**	**$0**	**$57,799,763**
% Allocation	0%	34%	25%	20%	17%	4%	0%	0%	0%	100%

Revenue Requirement Determination

Table 3-14 shows the revenue requirement derivation with the total revenue required from rates. The totals shown in the "Operating" and "Capital" columns are the total O&M and capital revenue requirements, respectively, that are allocated to the cost components using the allocation percentages shown in **Table 3-13**.

Raftelis calculated the revenue requirement using FY 2018 expenses, which include O&M expenses, rate funded capital expenses and existing and proposed debt service. To arrive at the rate revenue requirement, we subtract revenue offsets from other expenses and make adjustments for annual cash balances (Table 3-8, line 57) and for the fact that the impending rate adjustment will generate the additional revenue for four months of the fiscal year (Table 3-8, line 6) and we must therefore annualize the rate increase to determine the rates. The adjustments, shown as negative values are subtracted (therefore added as a result of subtracting a negative number) to arrive at the total revenue requirement from rates. This is the amount that fixed charge and commodity rates are designed to collect.

Table 3-14: Revenue Requirement Determination

Line #		FY 2018		
		Operating	**Capital**	**Total**
1	**Revenue Requirements**			
2	O&M Expenses	$29,562,578		$29,562,578
3	Existing Debt Service		$0	$0
4	Proposed Debt Service		$0	$0
5	Rate Funded Capital Projects		$3,016,000	$3,016,000
6	**Total Revenue Requirements**	**$29,562,578**	**$3,016,000**	**$32,578,578**
7	**Less: Revenue Offsets**			
8	Late Charge	$100,000		$100,000
9	Water Disconnect Fees	$25,000		$25,000
10	Wholesale Water Sales	$820,000		$820,000
11	Water Start Service Fee	$65,000		$65,000
12	Fire Flow Test	$4,000		$4,000
13	Mobil Potable	$2,400,000		$2,400,000
14	Mobil Fixed Contribution	$1,181,700		$1,181,700
15	Engineering,Overhead & Inspect	$100,000		$100,000
16	Capital Received-Parts & Installation	$35,000		$35,000
17	Placeholder	$0		$0
18	Placeholder	$0		$0
19	Investment Earnings		$205,000	$205,000
20	Miscellaneous Revenue	$25,000		$25,000
21	Water Operations Revenue	$0		$0
22	WRD Goldsworthy Desalter	$495,000		$495,000
23	**Total Revenue Offsets**	**$5,250,700**	**$205,000**	**$5,455,700**
24	**Less: Adjustments**			
25	Adjustment for Cash Balance	$812,141		$812,141
26	Adjustment for Midyear Increase	($2,098,192)		($2,098,192)
27	**Total Adjustments**	**($1,286,051)**	**$0**	**($1,286,051)**
28	**Revenue Requirement from Rates**	**$25,597,929**	**$2,811,000**	**$28,408,929**

Unit Cost Component Derivation

Our end goal is to proportionately distribute the cost causation components to each user class. To do so we must calculate the cost causation component unit costs, which starts by assessing the total units demanded by each class for each cost causation component. This is shown in **Table 3-15**. The capacity or peaking factor for each customer class is taken from **Table 3-11**.

Table 3-15: Derivation of Cost Component Units

				Maximum Day Requirements			Maximum Hour Requirements		
		Annual Use (hcf)	Average Daily Use (hcf/day)	Capacity Factor	Total Capacity (hcf/day)	Extra Capacity (hcf/day)	Capacity Factor	Total Capacity (hcf/day)	Extra Capacity (hcf/day)
SFR									
Tier 1	7	1,417,014	3,882	1.09	4,232	349	1.64	6,347	2,116
Tier 2	12	536,783	1,471	1.32	1,941	471	1.98	2,912	971
Tier 3	12+	485,832	1,331	1.76	2,343	1,012	2.64	3,514	1,171
Tier 4									
All Other Standard Customers									
Tier 1	10	496,183	1,359	1.07	1,455	95	1.61	2,182	727
Tier 2	10+	2,933,595	8,037	1.24	9,966	1,929	1.86	14,949	4,983
Low Income Senior & Disabled									
Tier 1	7	19,377	53	1.09	58	5	1.64	87	29
Tier 2	12	5,631	15	1.32	20	5	1.98	31	10
Tier 3	12+	4,407	12	1.76	21	9	2.64	32	11
Tier 4									
TOTAL		**5,898,823**				**3,875**			**10,018**

Table 3-16 shows the allocation of the revenue offsets (from **Table 3-14**) to the different cost causation components based on their function.

Table 3-16: Revenue Offsets Allocation

Revenue Offset	Supply	Base Delivery	Max Day	Max Hour	Fire	Pumping	Meter	Customer	General	TOTAL
Late Charge								100%		$100,000
Water Disconnect Fees								100%		$25,000
Wholesale Water Sales	100%									$820,000
Water Start Service Fee								100%		$65,000
Fire Flow Test					100%					$4,000
Mobil Potable	100%									$2,400,000
Mobil Fixed Contribution	100%									$1,181,700
Engineering,Overhead & Inspect	0%	34%	25%	20%	17%	4%	0%	0%	0%	$100,000
Capital Received-Parts & Installation	0%	34%	25%	20%	17%	4%	0%	0%	0%	$35,000
Placeholder									100%	$0
Placeholder									100%	$0
Investment Earnings	68%	6%	5%	2%	3%	0%	1%	2%	12%	$205,000
Miscellaneous Revenue									100%	$25,000
Water Operations Revenue	68%	6%	5%	2%	3%	0%	1%	2%	12%	$0
WRD Goldsworthy Desalter	100%									$495,000
Total Revenue Offsets	**$5,036,332**	**$58,980**	**$43,794**	**$32,345**	**$33,007**	**$4,898**	**$1,493**	**$194,549**	**$50,302**	**$5,455,700**

Table 3-17 shows the cost causation component unit cost derivation. The operating revenue requirement shown in **Table 3-14** is allocated to the cost causation components using the resulting O&M allocation from **Table 3-13**. Similarly, the capital revenue requirement in **Table 3-14** is allocated to the cost causation components using the asset resulting allocation from **Table 3-13**. The Revenue Offset is based on the allocation developed in **Table 3-16**. General and Administrative costs, which cannot be tied to a specific function, are redistributed in proportion to the resulting allocation of the other cost causation components, excluding Supply. The Fire cost component includes public fire protection costs and private fire service. To determine the charges for the private fire service, the public protection costs are reallocated to the meter component based on the total fire protection capacity of the system. The total adjusted cost of service is divided by the units of service from **Table 3-15** to calculate the unit cost. For example, the unit cost for the base component is determined by

dividing the total base cost by total water use in hcf, annual billing and customer service costs are divided by the estimated number of annual monthly bills. The unit costs are used to distribute the cost causation components to the customer classes. **Table 3-15** through **Table 3-17** are reproduced in the Appendix in a larger format.

Table 3-17: Unit Cost Calculation

	Supply	Base Delivery	Max Day	Max Hour	Fire	Pumping	Meter	Customer	General	TOTAL
Operating Expenses	$21,151,536	$1,960,000	$1,440,289	$722,627	$1,013,498	$17,684	$226,237	$689,021	$3,832,738	$31,053,629
Revenue Offset	($5,036,332)	($58,980)	($43,794)	($32,345)	($33,007)	($4,898)	($1,493)	($194,549)	($50,302)	($5,455,700)
Capital Expenses	$0	$958,680	$713,906	$574,174	$464,683	$99,558	$0	$0	$0	$2,811,000
Total Cost of Service	**$16,115,204**	**$2,859,699**	**$2,110,400**	**$1,264,455**	**$1,445,174**	**$112,344**	**$224,744**	**$494,472**	**$3,782,436**	**$28,408,929**
Allocation of General Cost		$1,270,857	$937,867	$561,927	$642,239	$49,926	$99,877	$219,745	($3,782,436)	$0
Allocation of Public Fire Protection Cost					($1,538,055)		$1,538,055			$0
Allocation of Peaking Cost to Meter			($152,413)	($91,319)			$243,732			$0
Total Adjusted Cost of Service	**$16,115,204**	**$4,130,556**	**$2,895,854**	**$1,735,063**	**$549,358**	**$162,269**	**$2,106,407**	**$714,217**	**$0**	**$28,408,929**
Unit of Service	5,898,823	5,898,823	3,875	10,018	773	2,460	41,707	322,073		
Unit	hcf	hcf	hcf/day	hcf/day	equiv meters	equiv meters	equiv meters	bills		
Unit Cost	$2.73	$0.70	$747.40	$173.20	$59.23	$5.50	$4.21	$2.22		

Distribution of Cost Causation Components to Customer Classes

The final step in a cost of service analysis is to distribute the cost causation components to the user classes using the unit costs derived in **Table 3-17**. This is the ultimate goal of a cost of service analysis and yields the cost to serve each customer class. **Table 3-18** shows the derivation of the cost to serve (i.e., cost of service for) each class. The Supply, Delivery, Max Day, and Max Hour cost components are collected through the commodity (volumetric) rates ($/hcf) for potable water. The Fire, Pumping, Meter, and Customer cost components are collected through the City's monthly meter service charges providing fixed revenue. The proposed fixed revenue from rates is approximately 12.4 percent, compared to the existing fixed revenue of approximately 11.8 percent and conversely, the variable revenue decreases from the current 88.2 percent to 87.6 percent, providing for greater revenue stability.

To derive the cost to serve each class, the unit costs from **Table 3-17** are multiplied by the service units shown in **Table 3-15** for each customer class. For example, the *supply* costs for the SFR class is calculated by multiplying the *supply* unit cost ($2.73 per HCF) by the annual SFR use in each tier (**Table 3-15**). Similarly, the *customer* costs are derived by multiplying the *customer* unit cost ($2.22 per bill) (**Table 3-17**) by the number of bills (322,073 bills) (**Table 3-15**). Similar calculations for each of the remaining user classes and tiers and cost components yield the total cost to serve each user class shown in **Table 3-18**. Note that the total cost of service is equal to the revenue requirement in **Table 3-14** as intended. We have now calculated the cost to serve each user class and can proceed to derive rates to collect the cost to serve each class.

Table 3-18: Allocation of Cost to Customer Class

	Supply	Base Delivery	Max Day	Max Hour	Fire	Pumping	Meter	Customer	General	TOTAL
SFR										
Tier 1	$3,871,191	$992,241	$261,141	$366,452						$5,491,026
Tier 2	$1,466,457	$375,874	$351,728	$168,108						$2,362,167
Tier 3	$1,327,262	$340,196	$756,063	$202,869						$2,626,390
Tier 4	$0	$0	$0	$0						$0
All Other Standard Customers										
Tier 1	$1,355,541	$347,444	$71,121	$125,963						$1,900,069
Tier 2	$8,014,394	$2,054,203	$1,441,682	$863,056						$12,373,335
Low Income Senior & Disabled										
Tier 1	$52,937	$13,569	$3,571	$5,011						$75,088
Tier 2	$15,383	$3,943	$3,690	$1,763						$24,779
Tier 3	$12,039	$3,086	$6,858	$1,840						$23,824
Tier 4	$0	$0	$0	$0						$0
Private Fire					$549,358					$549,358
Normal Meters							$2,106,407	$714,217		$2,820,624
High Pressure Zone Meters						$162,269				$162,269
TOTAL	**$16,115,204**	**$4,130,556**	**$2,895,854**	**$1,735,063**	**$549,358**	**$162,269**	**$2,106,407**	**$714,217**	**$0**	**$28,408,929**

RATE DERIVATION

Existing Rate Structure and Rates

The City's existing rate structure consists of a monthly Readiness-to-Serve (RTS) charge, a monthly pumping service charge, and a monthly private fire service charge. These charges are fixed charges determined on the basis of the size of the meter serving a property. In addition, the City has a tiered commodity rate structure for SFR customers, Low Income Senior & Disabled customers, and All Other customers. Recycled water customers have a different uniform rate. **Table 3-19** shows the existing rate structure and rates. The monthly rates are shown; however, the City bills every two months.

Table 3-19: Existing Monthly Rate Structure and Rates

		Monthly RTS Charge	Pumping Charge	Private Fire Charge
Meter Size				
3/4"		$5.84	$3.33	
1"		$7.90	$8.24	
1 1/2"		$13.05	$16.48	
2"		$19.24	$26.37	$5.63
3"		$38.83	$52.75	$11.14
4"		$67.68	$82.40	$20.62
6"		$147.03	$164.82	$54.69
8"		$250.09	$263.71	$113.42
10"		$394.37	$378.35	$210.78
12"		$518.04	$708.71	$325.34
14"		$775.68		
Commodity Rate ($/hcf)				
SFR				
Tier 1	0-8		$3.268	
Tier 2	9-14		$3.925	
Tier 3	15-24		$4.727	
Tier 4	25+		$5.706	
All Other Standard Customers				
Tier 1	0-10		$3.268	
Tier 2	11+		$3.981	
Low Income Senior & Disabled				
Tier 1	0-8		$2.869	
Tier 2	9-14		$3.525	
Tier 3	15-24		$4.326	
Tier 4	25+		$5.305	
Recycled Water			$2.787	

Proposed Monthly Fixed Charges

Table 3-20 through **Table 3-22** show the derivation of the RTS charge, the monthly pumping service charge and the monthly fire service charge, respectively. The cost of service analysis from **Table 3-18** feeds into the meter charge derivation as the meter charge is designed to collect the amount of revenue shown in the "Meter" and "Customer" columns of **Table 3-18**.

Fixed Meter Charges Components

There are two components that comprise the fixed meter charges: meter capacity and customer service (or billing), both are described below. This charge recognizes the fact that even when a customer does not use any water, the City incurs fixed costs in connection with maintaining the ability or readiness to serve each connection.

Meter Capacity Component

The meter capacity component collects capacity (also known as peaking) related costs. Capacity related costs can be allocated to and collected through the meter service charge by meter size. This reflects the fact that larger meters have the potential to demand more capacity compared to smaller meters. The potential capacity demanded is proportional to the potential flow through each meter size as established by the computed AWWA hydraulic capacity ratios which are shown in the "Meter Ratio" column of **Table 3-20** through **Table 3-22**. The ratios show the potential flow through each meter size compared to the flow through a 3/4-inch meter. For example, the "Meter Ratio" column in **Table 3-20** shows that the flow through a 2-inch meter is 5.3 times that of a 3/4-inch and therefore the meter capacity component of the RTS charge is 5.3 times that of the 3/4-inch meter. The meter capacity component for a 3/4-inch meter is normalized to one (1) in the "Meter" column of **Table 3-20** and the capacity component for larger meters is scaled up using the AWWA capacity ratios shown in the "Meter Ratio" column of **Table 3-20**. **Table 3-21** shows similar calculations for the meters that require pumping services and **Table 3-22** shows similar calculations for private fire lines. The only difference is that private fire lines have different ratios than the regular meters. In this case, the standard or base line size is 6-inches.

Allocating higher capacity costs by meter size is a common way to provide greater revenue stability, especially in light of decreasing revenues during a drought or other water shortage. Two drawbacks are that it creates higher bills for low volume water users and reduces incentives for conservation by reducing the commodity (or variable) rates. In the City's case, the fixed or meter portion of the revenue is increasing so that there is greater revenue stability.

Customer/Billing Component

The customer/billing component recovers costs associated with meter reading, customer billing and collection as well as customer service costs. These costs are the same for all meter sizes as it costs the same to provide billing and customer services to a small meter as it does a larger meter. The customer/billing component is derived in the "Customer" column of **Table 3-18.**

Table 3-20: Derivation of the Monthly RTS Charge

Meter Size	Meter Ratio	Meter	Billing	Total Charges	Current Charges	Difference
3/4"	1.00	$4.21	$2.22	$6.43	$5.84	10%
1"	1.67	$7.01	$2.22	$9.24	$7.90	17%
1 1/2"	3.33	$14.03	$2.22	$16.25	$13.05	25%
2"	5.33	$22.45	$2.22	$24.67	$19.24	28%
3"	11.67	$49.10	$2.22	$51.32	$38.83	32%
4"	21.00	$88.38	$2.22	$90.61	$67.68	34%
6"	43.33	$182.38	$2.22	$184.60	$147.03	26%
8"	80.00	$336.70	$2.22	$338.92	$250.09	36%
10"	126.67	$533.10	$2.22	$535.33	$394.37	36%
12"	166.67	$701.45	$2.22	$703.68	$518.04	36%
14"	250.00	$1,052.18	$2.22	$1,054.40	$775.68	36%

Table 3-21: Derivation of the Monthly Pumping Service Charge

Meter Size	Meter Ratio	Meter	Total Charges	Current Charges	Difference
3/4"	1.00	$5.50	$5.50	$3.33	65%
1"	1.67	$9.16	$9.17	$8.24	11%
1 1/2"	3.33	$18.33	$18.33	$16.48	11%
2"	5.33	$29.32	$29.33	$26.37	11%
3"	11.67	$64.14	$64.15	$52.75	22%
4"	21.00	$115.46	$115.46	$82.40	40%
6"	43.33	$238.25	$238.25	$164.82	45%
8"	80.00	$439.84	$439.85	$263.71	67%
10"	126.67	$696.42	$696.42	$378.35	84%
12"	166.67	$916.34	$916.34	$708.71	29%

Table 3-22: Derivation of the Monthly Fire Service Charge

Line Size	Capacity Ratio	Capacity Cost	Billing	Total Charges	Current Charges	Difference
2"	0.06	$3.29	$2.22	$5.52	$5.63	-2%
3"	0.16	$9.57	$2.22	$11.79	$11.14	6%
4"	0.34	$20.39	$2.22	$22.61	$20.62	10%
6"	1.00	$59.23	$2.22	$61.45	$54.69	12%
8"	2.13	$126.22	$2.22	$128.44	$113.42	13%
10"	3.83	$226.98	$2.22	$229.20	$210.78	9%
12"	6.19	$366.64	$2.22	$368.86	$325.34	13%

Proposed Commodity Rates

Residential Tier Definitions

The City's current rate structure includes four tiers for residential customers (SFR and Low Income Senior & Disabled). Tier 1 is from 0 to 8 hcf per month, Tier 2 is 9 to 14 hcf per month, Tier 3 is 15 to 24 hcf per month, and Tier 4 is 25 hcf per month or more. Raftelis is proposing new tiers for residential customers based upon the class' usage consumption patterns. The new proposed tiers are as follows:

- Tier 1: 0 to 7 hcf per month – this represents the estimated indoor water usage for an average residential customer. The average winter water usage in FY 2015 is approximately 8 hcf per month. The tier is set at one unit lower to reflect irrigation use during winter.
- Tier 2: 8 to 12 hcf per month – this represents the estimated outdoor water usage for an average residential customer. In FY 2015, the average water use is approximately 12 hcf per month.
- Tier 3: Over 12 hcf per month

Unit Cost Definitions

The commodity rates for each class and tier are derived by summing of the unit rates ($/HCF) for:

1. Supply
2. Base Delivery
3. Peaking

Supply costs are costs related to the cost of purchasing and producing water. The City has three sources of water, each incurring different costs, as shown in **Table 3-23**. Each source of supply is allocated to the two customer classes based on the number of accounts in each class. Thus, each customer is allocated the same amount of each source of water supply. Within each customer class, each available supply is allocated to each tier based on the usage in each tier, with priority given to the lower tiers. For example, the SFR class is allocated 545,996 hcf of groundwater, which is in turn allocated entirely to Tier 1 because it represents the most essential use. This principle applies to the All Other Standard Customers and Low Income Senior & Disabled customer classes as well.

Table 3-23: Allocation of Water Supply

	Usage (hcf)	GW Wells	Desalter	MWD	TOTAL	Unit Cost
SFR						
Tier 1	1,417,014	545,996	545,996	325,023	1,417,014	$1.68
Tier 2	536,783	0	0	536,783	536,783	$3.10
Tier 3	485,832	0	0	485,832	485,832	$3.10
Tier 4	0	0	0	0	0	$0.00
Subtotal SFR	**2,439,629**	**545,996**	**545,996**	**1,347,638**	**2,439,629**	**$2.27**
All Other Standard Customers						
Tier 1	496,183	132,200	132,200	231,782	496,183	$2.12
Tier 2	2,933,595	0	0	2,933,595	2,933,595	$3.10
Subtotal All Other Customers	**3,429,779**	**132,200**	**132,200**	**3,165,378**	**3,429,779**	**$2.96**
Low Income Senior & Disabled						
Tier 1	19,377	7,637	7,637	4,104	19,377	$1.68
Tier 2	5,631	0	0	5,631	5,631	$3.10
Tier 3	4,407	0	0	4,407	4,407	$3.10
Tier 4	0	0	0	0	0	$0.00
Subtotal Low Income Senior & Disabled	**29,415**	**7,637**	**7,637**	**14,142**	**29,415**	**$2.14**
TOTAL	**5,898,823**	**685,833**	**685,833**	**4,527,157**	**5,898,823**	**$2.67**

Base Delivery costs are the operating and capital costs associated with delivering water to all customers at a constant average rate of use – also known as serving customers under average daily demand conditions. Therefore, base delivery costs are spread over all units of water irrespective of customer class or tiers. Based on **Table 3-17**, the delivery or base unit cost is $0.70 per hcf.

Peaking costs, or extra-capacity costs, represent costs incurred to meet customer peak demands in excess of a base use (or average daily demand). Total extra capacity costs are comprised of maximum day and maximum hour demands. The peaking costs are distributed to each tier and class using peaking factors derived from customer use data. **Table 3-24** shows the peaking unit cost for each customer class and tier, which is calculated by dividing the total peaking costs (sum of max day and max hour) for each class and tier, from **Table 3-18**, by the total usage in each class and tier, from **Table 3-15**.

Table 3-24: Peaking Cost Calculation

Customer Class	Monthly Tier (hcf)	Peaking Costs	Peaking Unit Cost
SFR			
Tier 1	7	$627,593	$0.44
Tier 2	12	$519,836	$0.97
Tier 3	12+	$958,932	$1.97
Subtotal SFR		**$2,106,361**	
All Other Standard Customers			
Tier 1	10	$197,084	$0.40
Tier 2	10+	$2,304,738	$0.79
Subtotal All Other Customers		**$2,501,822**	
Low Income Senior & Disabled			
Tier 1	7	$8,582	$0.44
Tier 2	12	$5,453	$0.97
Tier 3	12+	$8,698	$1.97
Subtotal Low Income Senior & Disabled		**$22,734**	

Table 3-25 shows the proposed commodity rate, which is the sum of the three previously discussed rate components, for each customer class. The Supply component is from **Table 3-23**; the Delivery component is from **Table 3-17**; and the Peaking component is from **Table 3-24**. The Low Income Senior & Disabled Rate has a discount of $0.40 from the SFR rate and the discount to those customers is provided from non-rate revenues.

Table 3-25: Proposed Commodity Rates

ustomer Class	Monthly Tier (hcf)	% Bills	Usage (hcf)	Supply	Delivery	Peaking	Discount	Total Rate	Current Rate	Difference
FR										
Tier 1	7	39%	1,417,014	$1.68	$0.70	$0.44		**$2.820**	$3.268	-14%
Tier 2	12	33%	536,783	$3.10	$0.70	$0.97		**$4.769**	$3.925	22%
Tier 3	12+	29%	485,832	$3.10	$0.70	$1.97		**$5.774**	$4.727	22%
ll Other Standard Customers										
Tier 1	10	34%	496,183	$2.12	$0.70	$0.40		**$3.213**	$3.268	-2%
Tier 2	10+	66%	2,933,595	$3.10	$0.70	$0.79		**$4.586**	$3.981	15%
ow Income Senior & Disabled										
Tier 1	7	87%	19,377	$1.68	$0.70	$0.44	($0.40)	**$2.420**	$2.869	-16%
Tier 2	12	11%	5,631	$3.10	$0.70	$0.97	($0.40)	**$4.369**	$3.525	24%
Tier 3	12+	2%	4,407	$3.10	$0.70	$1.97	($0.40)	**$5.374**	$4.326	24%

Table 3-26 shows the proposed rates for the next five years. These rates are effective in January 1, 2018 and in January of each subsequent year.

Table 3-26: Proposed Monthly Water Rates

	January 1, 2018	January 1, 2019	January 1, 2020	January 1, 2021	January 1, 2022
Monthly Readiness-to-Serve Charge					
Meter Size					
3/4"	$6.43	$6.83	$7.63	$8.47	$9.35
1"	$9.24	$9.81	$10.95	$12.15	$13.41
1 1/2"	$16.25	$17.26	$19.26	$21.37	$23.59
2"	$24.67	$26.20	$29.24	$32.44	$35.80
3"	$51.32	$54.49	$60.81	$67.46	$74.45
4"	$90.61	$96.20	$107.35	$119.08	$131.42
6"	$184.60	$195.98	$218.69	$242.58	$267.71
8"	$338.92	$359.82	$401.50	$445.36	$491.49
10"	$535.33	$568.33	$634.17	$703.45	$776.31
12"	$703.68	$747.06	$833.60	$924.66	$1,020.43
14"	$1,054.40	$1,119.40	$1,249.07	$1,385.51	$1,529.01
Monthly Pumping Service Charge					
Meter Size					
3/4"	$5.50	$5.84	$6.52	$7.24	$7.99
1"	$9.17	$9.74	$10.87	$12.06	$13.31
1 1/2"	$18.33	$19.46	$21.72	$24.10	$26.60
2"	$29.33	$31.14	$34.75	$38.55	$42.55
3"	$64.15	$68.11	$76.00	$84.31	$93.05
4"	$115.46	$122.58	$136.78	$151.73	$167.45
6"	$238.25	$252.94	$282.24	$313.07	$345.50
8"	$439.85	$466.97	$521.07	$577.99	$637.86
10"	$696.42	$739.35	$825.00	$915.12	$1,009.91
12"	$916.34	$972.83	$1,085.52	$1,204.10	$1,328.82
Monthly Private Fire Protection Service Charge					
Meter Size					
2"	$5.52	$5.87	$6.55	$7.27	$8.03
3"	$11.79	$12.52	$13.98	$15.51	$17.12
4"	$22.61	$24.01	$26.80	$29.73	$32.81
6"	$61.45	$65.24	$72.80	$80.76	$89.13
8"	$128.44	$136.36	$152.16	$168.79	$186.28
10"	$229.20	$243.33	$271.52	$301.18	$332.38
12"	$368.86	$391.60	$436.97	$484.71	$534.92

Table 3-26: Proposed Monthly Water Rates (cont'd)

		January 1, 2018	January 1, 2019	January 1, 2020	January 1, 2021	January 1, 2022
Commodity Rate ($/hcf)						
SFR	Monthly					
Tier 1	7	$2.82	$3.12	$3.18	$3.23	$3.29
Tier 2	12	$4.77	$5.27	$5.37	$5.47	$5.57
Tier 3	12+	$5.77	$6.38	$6.50	$6.62	$6.74
All Other Standard Customers						
Tier 1	10	$3.21	$3.55	$3.62	$3.68	$3.75
Tier 2	10+	$4.59	$5.07	$5.16	$5.26	$5.35
Low Income Senior & Disabled						
Tier 1	7	$2.42	$2.68	$2.73	$2.78	$2.83
Tier 2	12	$4.37	$4.83	$4.92	$5.01	$5.10
Tier 3	12+	$5.37	$5.94	$6.05	$6.16	$6.27
Recycled Water						
All Usage		$3.21	$3.55	$3.62	$3.68	$3.75

The recycled water rate includes a 22.5 percent surcharge for overhead administrative costs in addition to the cost of purchasing recycled water shown in **Table 3-25**. The City's policy has been to charge recycled water at 70 percent of the Tier 2 rate for All Other customers. The calculated and policy rate are close enough to retain the current policy.

SUMMARY OF COST OF SERVICE

Raftelis was engaged to perform a water rate study for the City of Torrance. Raftelis has prepared a report that details the steps in conducting the COS study with numerous tables and graphics to show the development of rates. The COS study is conducted consistent with Proposition 218 requirements and industry guidelines which are detailed in the American Water Works Association (AWWA) *Principal of Water Rates, Fees, and Charges, M1 Manual of Water Supply Practices*. Some of the analysis and descriptions can be complex, and therefore a simple explanation of the COS analysis is provided.

COS is the process by which we identify the total revenue requirements of the utility, allocate those costs equitably amongst the different customer classes, and then design rates to meet the City's objectives, such as conservation and affordability.

Revenue requirements are the revenues that need to be recovered from rates charged to customers. Revenue requirements include operating expenses, capital expenses, and reserve requirements (which are like checking and saving accounts for the utility). To ensure that these revenue requirements are equitably divided between user classes, we must follow an industry approved process. These revenue requirements must be separated into the different functions of the utility.

These functions include cost of supply, cost of providing service under average conditions and peak conditions, and costs related to maintenance of meters and customer service costs such as meter reading, billing, customer service. The COS analysis requires us to take each function of the water utility and spread the cost to those elements that cause the cost to be incurred.

Since water systems are designed to provide service under peak conditions, there are costs associated with this. For example, a reservoir may be a 1 million-gallon (mg) tank that is used to meet average use requirements. However, storage is needed to meet peak summer requirements and therefore it may be sized twice as large at 2 mg. In this case, half of the cost of maintaining the tank gets charged to average cost and the other half to peaking cost.

To ensure that the costs are being appropriately allocated to customer classes, we first need to identify these classes. Typical classes are single family residential, multi-family residential, industrial and commercial. In the case of the City, multi-family and commercial use patterns are similar and are lumped into a single class called Other Standard Customers.

To determine the average cost and the peak cost applied to the customer classes, we identify the average and peak use of these classes so that the average and peak costs are appropriately shared. In addition, the customer service costs are shared equally amongst all customers since it costs the same to read each meter and bill each customer. Larger meters impose greater demands on the system and the system must be designed to meet those demands, and therefore meter costs are based on the amount of flow that can pass through a meter

The next step is to design rates. The meter costs and the customer costs represent the meter charge for each account. The variable water rate for each unit of water used is composed of three elements: cost of supply; cost to provide service under average conditions, which is the same for all customers; and peaking costs.

To determine the supply cost, we take the lowest cost supply which is the local water produced from wells and allocate it equally among all accounts so that each account receives the same amount of this water. This allocation defines the total low-cost water to each class. The next lowest cost water is the desalter water is allocated in the same manner. The remaining water required by each class is the water purchased from Metropolitan Water District. For the SFR class we define the tiers: the first tier provides the basic indoor usage, the second tier defines the average usage for the class, and any usage above that falls in the third tier. The supply is then allocated to each tier with the lowest costs to Tier 1, the next low-cost supply to Tier 2, and the remaining cost supply to Tier 3. The Other Standard Customers class is a single tier and all the supply costs are blended to determine the supply rate.

The cost of average delivery represents the second component and is the same for all classes and tiers. The third component takes the peaking characteristic which represent the maximum usage of the class compared to the average of the class and spreads the peaking costs proportionately. For the SFR class, each tier is treated as a separate class with its own peaking factor.

BILL IMPACTS

Table 3-27 below shows the impacts of an average SFR customer with a 3/4-inch meter using an average 12 hcf of water monthly, assuming no pumping service charge. For comparison purposes, the impacts on very low-end to very high-end users are also shown. Due to rounding in the calculations, some values may not add to the penny.

Table 3-27: SFR Water Monthly Rate Impacts

Usage Level	Meter Size	Monthly Usage (hcf)	Current Bill	Proposed Bill	Difference
Low	3/4"	5	$22.18	$20.53	-7%
Median	3/4"	10	$39.83	$40.47	2%
Average	3/4"	12	$47.68	$50.01	5%
High	3/4"	30	$137.04	$153.91	12%
Very High	3/4"	40	$194.10	$211.63	9%

4. APPENDIX A: Alternative Rates

The City wanted to see the impacts resulting from a different scenario which required a one-time big increase followed by CPI increases. The charts, tables and rates for this scenario are shown here.

Figure 1-1: Projected Financial Plan

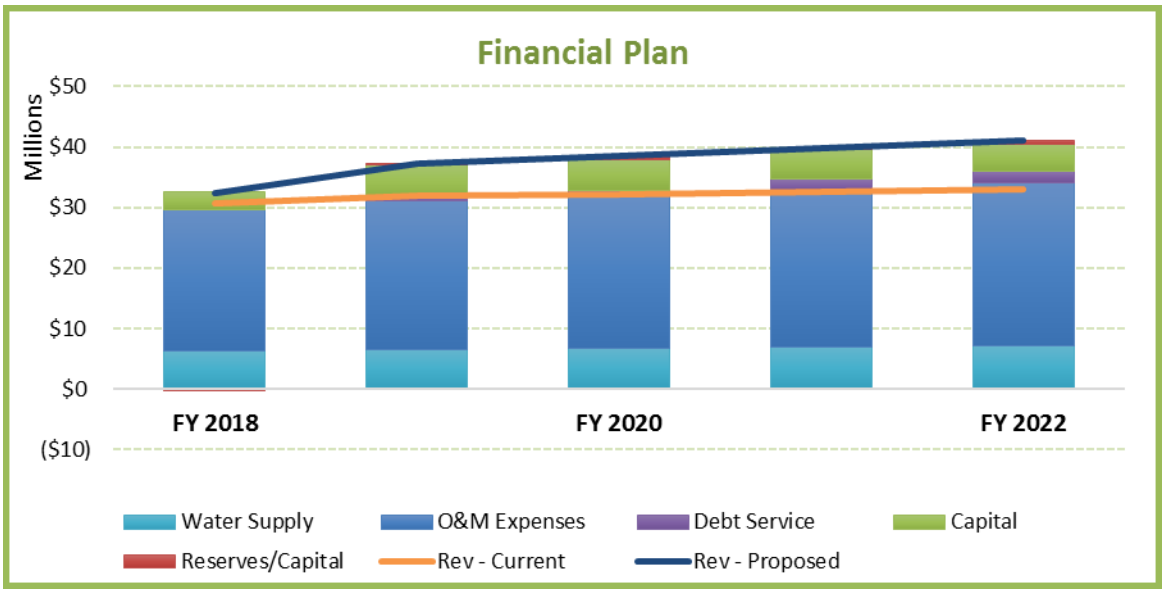

Figure 1-2: Capital Financing Plan

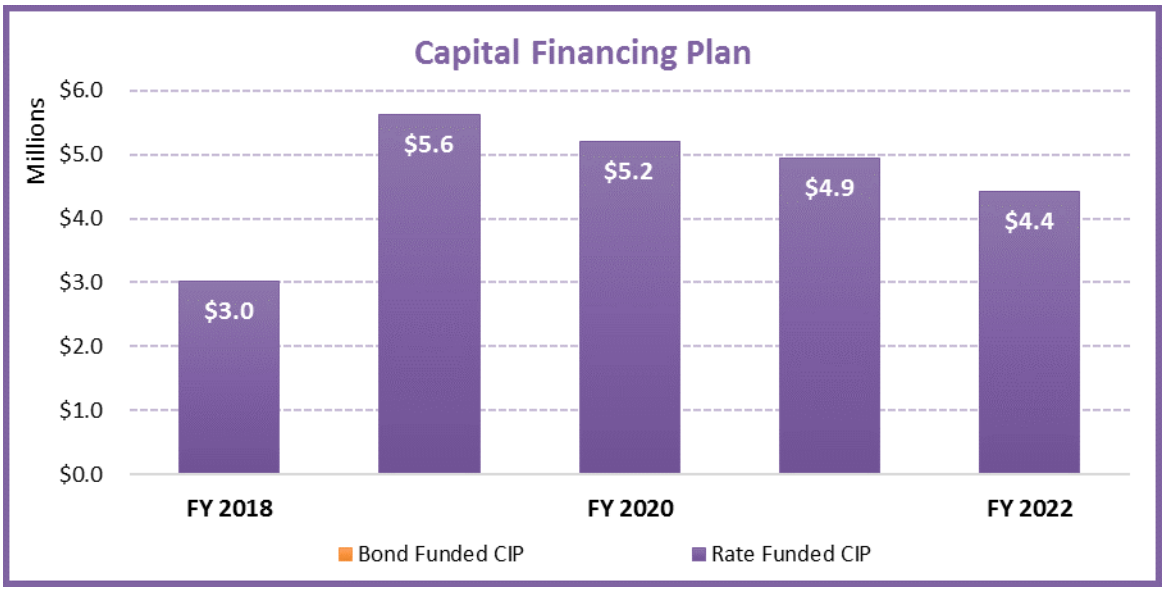

Table 1-1: Annual Revenue Increases

Effective Date	Increases
January 2018	20.0%
January 2019	3.0%
January 2020	3.0%
January 2021	3.0%
January 2022	3.0%

Figure 1-3: Projected Fund Balances

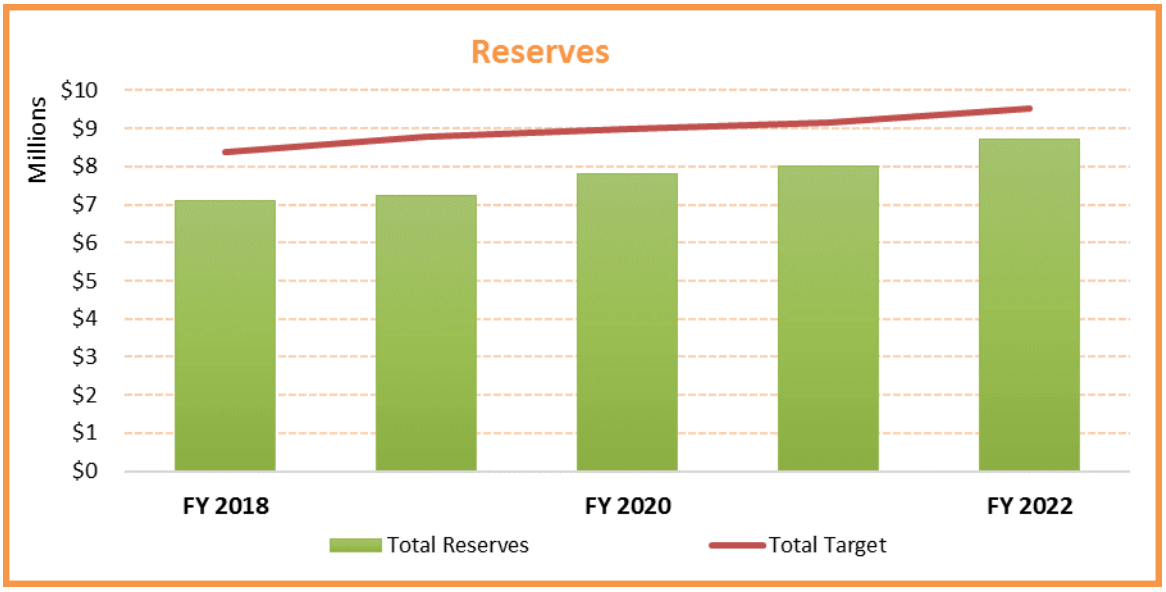

Table 1-2: Proposed Monthly Water Rates

	January 1, 2018	January 1, 2019	January 1, 2020	January 1, 2021	January 1, 2022
Monthly Readiness-to-Serve Charge					
Meter Size					
3/4"	$6.86	$6.89	$7.69	$8.53	$9.42
1"	$9.81	$9.85	$11.00	$12.21	$13.48
1 1/2"	$17.19	$17.25	$19.25	$21.36	$23.58
2"	$26.04	$26.13	$29.16	$32.35	$35.71
3"	$54.08	$54.27	$60.56	$67.18	$74.14
4"	$95.40	$95.73	$106.82	$118.49	$130.77
6"	$194.28	$194.95	$217.54	$241.31	$266.31
8"	$356.62	$357.85	$399.31	$442.93	$488.81
10"	$563.23	$565.17	$630.64	$699.53	$771.99
12"	$740.33	$742.88	$828.94	$919.49	$1,014.73
14"	$1,109.28	$1,113.10	$1,242.04	$1,377.71	$1,520.41
Monthly Pumping Service Charge					
Meter Size					
3/4"	$5.59	$5.61	$6.26	$6.95	$7.67
1"	$9.31	$9.35	$10.44	$11.59	$12.80
1 1/2"	$18.61	$18.68	$20.85	$23.13	$25.53
2"	$29.78	$29.89	$33.36	$37.01	$40.85
3"	$65.13	$65.36	$72.94	$80.91	$89.29
4"	$117.24	$117.65	$131.28	$145.62	$160.71
6"	$241.92	$242.76	$270.88	$300.47	$331.60
8"	$446.61	$448.15	$500.07	$554.70	$612.16
10"	$707.13	$709.57	$791.77	$878.26	$969.23
12"	$930.43	$933.64	$1,041.79	$1,155.59	$1,275.28
Monthly Private Fire Protection Service Charge					
Meter Size					
2"	$5.89	$5.92	$6.61	$7.34	$8.11
3"	$12.47	$12.52	$13.98	$15.51	$17.12
4"	$23.83	$23.92	$26.70	$29.62	$32.69
6"	$64.59	$64.82	$72.33	$80.24	$88.56
8"	$134.89	$135.36	$151.04	$167.54	$184.90
10"	$240.63	$241.46	$269.43	$298.87	$329.83
12"	$387.19	$388.53	$433.54	$480.90	$530.71

Table 1-2: Proposed Monthly Water Rates (cont'd)

		January 1, 2018	January 1, 2019	January 1, 2020	January 1, 2021	January 1, 2022
Commodity Rate ($/hcf)						
SFR	Monthly					
Tier 1	7	$3.01	$3.11	$3.17	$3.23	$3.29
Tier 2	12	$5.10	$5.27	$5.37	$5.47	$5.57
Tier 3	12+	$6.15	$6.36	$6.48	$6.60	$6.71
All Other Standard Customers						
Tier 1	10	$3.44	$3.55	$3.62	$3.69	$3.75
Tier 2	10+	$4.91	$5.07	$5.17	$5.26	$5.36
Low Income Senior & Disabled						
Tier 1	7	$2.63	$2.72	$2.77	$2.82	$2.88
Tier 2	12	$4.46	$4.61	$4.70	$4.78	$4.87
Tier 3	12+	$5.38	$5.57	$5.67	$5.77	$5.87
Recycled Water						
All Usage		$3.44	$3.55	$3.62	$3.68	$3.75

Table 1-3: SFR Water Monthly Rate Impacts

Usage Level	Meter Size	Monthly Usage (hcf)	Current Bill	Proposed Bill	Difference
Low	3/4"	5	$22.18	$21.91	-1%
Median	3/4"	10	$39.83	$43.23	9%
Average	3/4"	12	$47.68	$53.43	12%
High	3/4"	30	$137.04	$164.17	20%
Very High	3/4"	40	$194.10	$225.69	16%

5. APPENDIX B

Some tables shown in the main report are duplicated here in landscape format for better visibility.

Table 3-5: Detailed Capital Improvement Plan – Inflated

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Main Replacement: Crenshaw to R.B. Blvd.; Hawthorne 244th St. to Newton	$0	$0	$0	$0	$0
s/o PCH; 242nd St. s/o PCH	$0	$0	$0	$0	$0
Annual Incremental Main Replacement in N. Torrance	$520,000	$520,000	$520,000	$520,000	$520,000
Main Replacement : in Hawthorne PCH to Lomita and adjacent Residential	$0	$780,000	$780,000	$780,000	$0
streets. Crenshaw Blvd. from RB Blvd. to Artesia Blvd -phases.	$0	$0	$0	$0	$0
Systematic Main Replacement Program	$780,000	$780,000	$1,560,000	$3,380,000	$3,640,000
Annual Facility Rehabilitation and Replacement Projects (R & R)	$520,000	$260,000	$260,000	$260,000	$260,000
High Pressure Zone Improvement and Walteria Pump Station Upgrades	$0	$1,040,000	$1,040,000	$0	$0
SCADA and related System Upgrades	$0	$1,040,000	$0	$0	$0
Improvements in conjunction with Downtown Sewer Ph. II	$0	$0	$1,040,000	$0	$0
Conjunctive Use Storage Program	$910,000	$910,000	$0	$0	$0
Park Improvements related to Well Development Projects	$286,000	$286,000	$0	$0	$0
TOTAL CIP - INFLATED	**$3,016,000**	**$5,616,000**	**$5,200,000**	**$4,940,000**	**$4,420,000**

Table 3-12: Equivalent Meters

Meter Size	Capacity (gpm)	AWWA Ratio	Number of Meters	Equivalent Meters	No. of Meters High Pressure	Equivalent Meters	Fire Line Ratio	Number of Meters	Equivalent Meters
3/4"	30	1.00	21,550	21,550	1,786	1,786			
1"	50	1.67	2,682	4,470	217	361			
1 1/2"	100	3.33	1,050	3,500	18	60			
2"	160	5.33	683	3,643	9	48	0.06	31	2
3"	350	11.67	154	1,797	3	35	0.16	1	0
4"	630	21.00	75	1,575	2	42	0.34	125	43
6"	1,300	43.33	29	1,257	0	0	1.00	199	199
8"	2,400	80.00	30	2,400	0	0	2.13	186	396
10"	3,800	126.67	10	1,267	1	127	3.83	33	126
12"	5,000	166.67	0	0	0	0	6.19	1	6
14"	7,500	250.00	1	250	0	0			
TOTAL			**26,263**	**41,707**	**2,036**	**2,460**		**576**	**773**

Table 3-13: Allocation of Functionalized O&M and Capital Expenses to Cost Causation Components

O&M Allocation	Supply	Base	Max Day	Max Hour	Fire	Pumping	Meter	Customer	General	TOTAL
9881105 - Water Supply	100%									
981106 - Water Operations		38%	28%	13%	20%					
Meters							100%			
Billing								100%		
981107 - Water Resources	0%	34%	25%	20%	17%	4%	0%	0%	0%	
981108 - Water Administration								2%	98%	
981109 - Financial Obligations									100%	
981110 - WRD Goldsworth Desalter	100%									

O&M Allocation	Supply	Base	Max Day	Max Hour	Fire	Pumping	Meter	Customer	General	TOTAL
9881105 - Water Supply	$19,562,217	$0	$0	$0	$0	$0	$0	$0	$0	$19,562,217
981106 - Water Operations	$0	$1,703,779	$1,250,413	$590,838	$886,258	$0	$0	$0	$0	$4,431,289
Meters	$0	$0	$0	$0	$0	$0	$215,374	$0	$0	$215,374
Billing	$0	$0	$0	$0	$0	$0	$0	$608,955	$0	$608,955
981107 - Water Resources	$0	$162,110	$120,720	$97,091	$78,577	$16,835	$0	$0	$0	$475,333
981108 - Water Administration	$0	$0	$0	$0	$0	$0	$0	$46,982	$2,302,122	$2,349,105
981109 - Financial Obligations	$0	$0	$0	$0	$0	$0	$0	$0	$1,346,585	$1,346,585
981110 - WRD Goldsworth Desalter	$573,720	$0	$0	$0	$0	$0	$0	$0	$0	$573,720
TOTAL O&M EXPENSES	**$20,135,937**	**$1,865,890**	**$1,371,133**	**$687,930**	**$964,834**	**$16,835**	**$215,374**	**$655,937**	**$3,648,708**	**$29,562,578**
% Allocation	68%	6%	5%	2%	3%	0.1%	1%	2%	12%	100%

Capital Allocation	Supply	Delivery	Max Day	Max Hour	Fire	Pumping	Meter	Customer	General	TOTAL
Pipelines		31%	23%	27%	20%					100%
Wells		56%	44%							100%
Reservoirs		46%	34%	0%	20%					100%
Pump Stations		34%	26%			40%				100%
Treatment Stations		56%	44%							100%
Turn Outs		31%	23%	27%	20%					100%

Capital Allocation	Supply	Delivery	Max Day	Max Hour	Fire	Pumping	Meter	Customer	General	TOTAL
Pipelines	$0	$13,347,563	$9,795,851	$11,571,707	$8,678,780	$0	$0	$0	$0	$43,393,901
Wells	$0	$2,549,896	$1,992,247	$0	$0	$0	$0	$0	$0	$4,542,143
Reservoirs	$0	$1,615,306	$1,185,482	$0	$700,197	$0	$0	$0	$0	$3,500,985
Pump Stations	$0	$1,723,824	$1,346,832	$0	$0	$2,047,104	$0	$0	$0	$5,117,760
Treatment Stations	$0	$205,345	$160,437	$0	$0	$0	$0	$0	$0	$365,782
Turn Outs	$0	$270,431	$198,471	$234,451	$175,838	$0	$0	$0	$0	$879,192
TOTAL ASSETS	**$0**	**$19,712,365**	**$14,679,320**	**$11,806,158**	**$9,554,816**	**$2,047,104**	**$0**	**$0**	**$0**	**$57,799,763**
% Allocation	0%	34%	25%	20%	17%	4%	0%	0%	0%	100%

Table 3-15: Derivation of Cost Component Units

				Maximum Day Requirements			Maximum Hour Requirements		
		Annual Use (hcf)	Average Daily Use (hcf/day)	Capacity Factor	Total Capacity (hcf/day)	Extra Capacity (hcf/day)	Capacity Factor	Total Capacity (hcf/day)	Extra Capacity (hcf/day)
SFR									
Tier 1	7	1,417,014	3,882	1.09	4,232	349	1.64	6,347	2,116
Tier 2	12	536,783	1,471	1.32	1,941	471	1.98	2,912	971
Tier 3	12+	485,832	1,331	1.76	2,343	1,012	2.64	3,514	1,171
Tier 4									
All Other Standard Customers									
Tier 1	10	496,183	1,359	1.07	1,455	95	1.61	2,182	727
Tier 2	10+	2,933,595	8,037	1.24	9,966	1,929	1.86	14,949	4,983
Low Income Senior & Disabled									
Tier 1	7	19,377	53	1.09	58	5	1.64	87	29
Tier 2	12	5,631	15	1.32	20	5	1.98	31	10
Tier 3	12+	4,407	12	1.76	21	9	2.64	32	11
Tier 4									
TOTAL		**5,898,823**				**3,875**			**10,018**

Table 3-16: Revenue Offsets Allocation

Revenue Offset	Supply	Delivery	Max Day	Max Hour	Fire	Pumping	Meter	Customer	General	TOTAL
Late Charge								100%		$100,000
Water Disconnect Fees								100%		$25,000
Wholesale Water Sales	100%									$820,000
Water Start Service Fee								100%		$65,000
Fire Flow Test					100%					$4,000
Mobil Potable	100%									$2,400,000
Mobil Fixed Contribution	100%									$1,181,700
Engineering,Overhead & Inspect	0%	34%	25%	20%	17%	4%	0%	0%	0%	$100,000
Capital Received-Parts & Installation	0%	34%	25%	20%	17%	4%	0%	0%	0%	$35,000
Placeholder									100%	$0
Placeholder									100%	$0
Investment Earnings	68%	6%	5%	2%	3%	0%	1%	2%	12%	$205,000
Miscellaneous Revenue									100%	$25,000
Water Operations Revenue	68%	6%	5%	2%	3%	0%	1%	2%	12%	$0
WRD Goldsworthy Desalter	100%									$495,000
Total Revenue Offsets	**$5,036,332**	**$58,980**	**$43,794**	**$32,345**	**$33,007**	**$4,898**	**$1,493**	**$194,549**	**$50,302**	**$5,455,700**

Table 3-17: Unit Cost Calculation

	Supply	Base Delivery	Max Day	Max Hour	Fire	Pumping	Meter	Customer	General	TOTAL
Operating Expenses	$21,151,536	$1,960,000	$1,440,289	$722,627	$1,013,498	$17,684	$226,237	$689,021	$3,832,738	$31,053,629
Revenue Offset	($5,036,332)	($58,980)	($43,794)	($32,345)	($33,007)	($4,898)	($1,493)	($194,549)	($50,302)	($5,455,700)
Capital Expenses	$0	$958,680	$713,906	$574,174	$464,683	$99,558	$0	$0	$0	$2,811,000
Total Cost of Service	**$16,115,204**	**$2,859,699**	**$2,110,400**	**$1,264,455**	**$1,445,174**	**$112,344**	**$224,744**	**$494,472**	**$3,782,436**	**$28,408,929**
Allocation of General Cost		$1,270,857	$937,867	$561,927	$642,239	$49,926	$99,877	$219,745	($3,782,436)	$0
Allocation of Public Fire Protection Cost					($1,538,055)		$1,538,055			$0
Allocation of Peaking Cost to Meter			($152,413)	($91,319)			$243,732			$0
Total Adjusted Cost of Service	**$16,115,204**	**$4,130,556**	**$2,895,854**	**$1,735,063**	**$549,358**	**$162,269**	**$2,106,407**	**$714,217**	**$0**	**$28,408,929**
Unit of Service	5,898,823	5,898,823	3,875	10,018	773	2,460	41,707	322,073		
Unit	hcf	hcf	hcf/day	hcf/day	equiv meters	equiv meters	equiv meters	bills		
Unit Cost	$2.73	$0.70	$747.40	$173.20	$59.23	$5.50	$4.21	$2.22		

Table 3-18: Allocation of Cost to Customer Class

	Supply	Base Delivery	Max Day	Max Hour	Fire	Pumping	Meter	Customer	General	TOTAL
SFR										
Tier 1	$3,871,191	$992,241	$260,801	$366,360						$5,490,594
Tier 2	$1,466,457	$375,874	$351,271	$168,066						$2,361,667
Tier 3	$1,327,262	$340,196	$755,080	$202,818						$2,625,356
Tier 4	$0	$0	$0	$0						$0
All Other Standard Customers										
Tier 1	$1,355,541	$347,444	$71,029	$125,931						$1,899,945
Tier 2	$8,014,394	$2,054,203	$1,439,808	$862,838						$12,371,243
Low Income Senior & Disabled										
Tier 1	$52,937	$13,569	$6,340	$5,332						$78,178
Tier 2	$15,383	$3,943	$5,758	$2,003						$27,087
Tier 3	$12,039	$3,086	$5,768	$1,714						$22,607
Tier 4	$0	$0	$0	$0						$0
Private Fire					$549,358					$549,358
Normal Meters							$2,106,407	$714,217		$2,820,624
High Pressure Zone Meters						$162,269				$162,269
TOTAL	**$16,115,204**	**$4,130,556**	**$2,895,854**	**$1,735,063**	**$549,358**	**$162,269**	**$2,106,407**	**$714,217**	**$0**	**$28,408,929**