Appendix J

Comprehensive Water and Wastewater Cost of Service Study

The City of Sierra Madre

Comprehensive Water and Wastewater Cost of Service Study

Report / December 24, 2018

RAFTELIS
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December 24, 2018

Mr. Jose Reynoso
Utilities Services Director
232 W. Sierra Madre Blvd.
Sierra Madre, CA 91024

Subject: Comprehensive Water and Wastewater Cost of Service Study Report

Dear Mr. Reynoso,

Raftelis Financial Consultants, Inc. (Raftelis) is pleased to provide this Comprehensive Water and Wastewater Cost of Service Study Report (Report) for the City of Sierra Madre (City). This Study includes a comprehensive review of the City's financial plan, usage trends, accounts, customer types, available water supplies, capital improvement plan, and reserves to establish equitable rates that provide sufficient revenue over a five-year planning period. The recommended rate structures and resulting rates were derived based on the cost of service principles and are proportionate and in compliance with Proposition 218.

The major objectives of the study include the following:

- Develop financial plans for the water and wastewater utilities to ensure financial sufficiency, meet operation and maintenance (O&M) costs, and ensure sufficient funding for capital replacement and refurbishment (R&R) needs.
- Develop sound and sufficient reserve fund targets.
- Review current rate structures for the water and wastewater utilities and determine if any adjustments to the rates are required to more closely reflect costs incurred and adequately recover the utility's revenue requirements over the planning period.

The Report summarizes the key findings and recommendations related to the development of the financial plans for the Water and Wastewater utilities and the development of updated rates.

Sincerely,
RAFTELIS FINANCIAL CONSULTANTS, INC.

Habib Isaac
Senior Manager

Franklin Gonzalez
Associate Consultant

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

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1. EXECUTIVE SUMMARY

1.1 BACKGROUND

In 2017, the City of Sierra Madre (City) engaged Raftelis to conduct a Comprehensive Water and Wastewater Cost of Service Study (Study) to update the City's financial plans and rates for the City's utilities over the next five years. Sierra Madre is located in the foothills of the San Gabriel Valley below the southern edge of the Angeles National Forest. The City provides water which serves approximately 3,900 customer accounts and conveys wastewater generated by approximately 4,550 units.

1.1.1 Objectives of the Study

The major objectives of the study include the following:

- Develop financial plans for the water and wastewater utilities to ensure financial sufficiency, meet operation and maintenance (O&M) costs, ensure sufficient funding for capital replacement and refurbishment (R&R) needs, and enhance the financial health of the enterprises.
- Develop sound and sufficient reserve fund targets.
- Review current rate structures for the water and wastewater utilities and determine any adjustments to the rates to closely reflect costs incurred and adequately recover each utility's revenue requirements over the planning period.

1.2 CURRENT RATES

1.2.1 Water Rates

The City's water utility serves approximately 3,900 customers, as shown in Table 1-1.

Table 1-1: Water Utility Meter Count

Meter Size	Number of Meters
5/8"	1,222
3/4"	1,684
1	631
1 ½"	227
2"	100
3"	8
4"	1
Total	**3,873**

The current water rate structure consists of four main components:

1. Bi-monthly Water Service Charge that varies by meter size.
2. Water Consumption Charge that varies by tier allotment (hcf[1]) for Residential Customers.
3. Uniform Water Consumption Charge for Non-Residential Customers ($/hcf).
4. Bi-monthly Private Fire Service Charge that varies by size of line.

[1] One unit of water is equal to 748 gallons or 100 cubic feet (1 hcf)

The following tables summarize the current rate structure of the City. Table 1-2 provides a summary of the bi-monthly charges by meter size and a discount rate schedule for eligible customers. Table 1-3 summarizes the current variable unit charges by customer class and by tier as well as the tier widths. As shown, the City's current variable rate structure is comprised of four inclining tiers for Residential Customers and a uniform rate for Non-residential customers. Table 1-4 details the bi-monthly Private Fire Line charges by connection size.

Table 1-2: Current Bi-Monthly Water Charges

Meter Size	FYE 2018 Water Service Charge ($ / Bi-Month)	FYE 2018 Low Income Discount ($ / Bi-Month)
5/8"	$79.68	$51.79
3/4"	$79.68	$51.79
1"	$107.00	$69.55
1 1/2"	$152.54	$99.15
2"	$207.18	$134.67
3"	$334.68	$217.54
4"	$516.83	$335.94

Table 1-3: Current Variable Usage Charge

Customer Class / Tiers	Tier Width (hcf)	FYE 2018 Water Usage Charge ($/hcf)
Residential		
Tier 1	(0-11)	$2.69
Tier 2	(12-33)	$3.47
Tier 3	(34-66)	$4.08
Tier 4	(>66)	$5.55
Non-Residential		
Uniform	N/A	$3.89

Table 1-4: Current Fire Line Service Charge

Connection Size	FYE 2018 Rate ($/Bi-Month)
2"	$6.29
4"	$38.95

1.2.2 Wastewater Rates

Currently, the City conveys wastewater for approximately 4,550 units, as seen in Table 1-5.

Table 1-5: Wastewater Utility Unit Count

Customer Class	Number of Units[1]
Residential	4,414
Commercial	94
Institutional	40
Total	**4,548**

[1] Wastewater customers are being charged on a per dwelling unit basis, rather than per account. Therefore, one account may have multiple dwelling units.

The current wastewater rates structure consists of a bi-monthly base charge for all customers and flow rates for non-residential customers. The following table (Table 1-6) summarizes the current wastewater rate structure of the City.

Table 1-6: Current Wastewater Rate Structure

Customer Class	FYE 2018 Charges
Fixed Charge	
Residential	$32.24
Non-Residential	$19.53
Usage Rate (per HCF)	
Commercial	$0.72
Institutional	$0.43

1.3 FINANCIAL HEALTH AND RECOMMENDATIONS

As part of the financial plan development, Raftelis first reviewed the City's projected revenue requirements over a 10-year planning horizon to determine the financial health of the City's utility over the short-term and long-term to determine if the current rates could support the utility's revenue needs.

1.3.1 Water Utility Financial Health (Maintain $5.2M in Revenue)

For Fiscal Year 2017-18 (FYE 2018) the City's total beginning reserve balance for the water utility is approximately $747,740. As part of Best Management Practices of utilities, it is recommended that a utility have at least 60 to 90 days of operating reserves as well as sufficient funds available to ensure the utility's capital plan can move forward as scheduled without any delays due to insufficient funds on hand.

The water utility is projected to generate total rate revenue of $5,203,094 in FYE 2018 at current rates, which includes penalty charges (adopted pursuant to the City's Municipal Code and applied to the water fund), and $5,274,094 in total revenue, when accounting for non-operating revenue of $71,000. The City is currently meeting its operating costs and has positive net income to go towards necessary capital projects; however, the City's annual planned capital projects are over $300k and there are additional asset repair & replacement

required above and beyond what is currently planned. By ensuring base rate revenue is maintained at approximately $5.2M for Fiscal Year 2018-19, the City would only need modest cost of living adjustments for subsequent years (based on percentage change in the consumer price index (CPI)for Los Angeles-Orange-Riverside). Without any revenue adjustments in subsequent years, the City will not be able to fund operations and maintenance (O&M) and debt expenses beginning in FYE 2023, as shown in Figure 1-1, and would be in technical default of its bond covenants, which require 120% debt coverage. In addition to O&M and debt expenses, the City also needs to reinvest back into its utility system to ensure the continued delivery of safe and clean water. Figure 1-2 identifies the City's capital plan, where 1 years' worth of capital based on 5-Year Average of Capital Improvement Plan is approximately $300K and is inflated each year by 3%.

Figure 1-3 illustrates the total reserves balances for each fiscal year after operating and capital is funded. As shown in the figure, the City will have negative reserve balances starting in FYE 2023.

Figure 1-1: Water Utility Operating Financial Plan (Maintain Revenue of $5.2M)

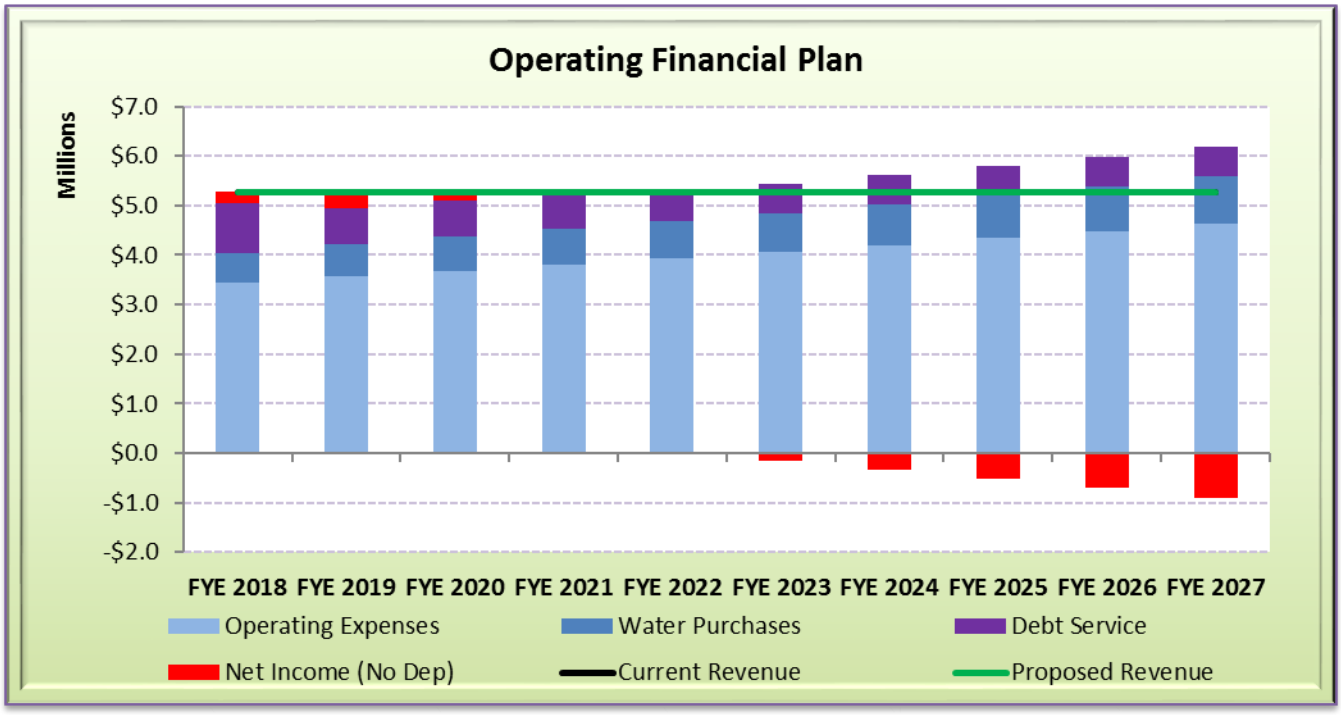


Figure 1-2: Baseline Water Capital Improvement Plan and Funding Source

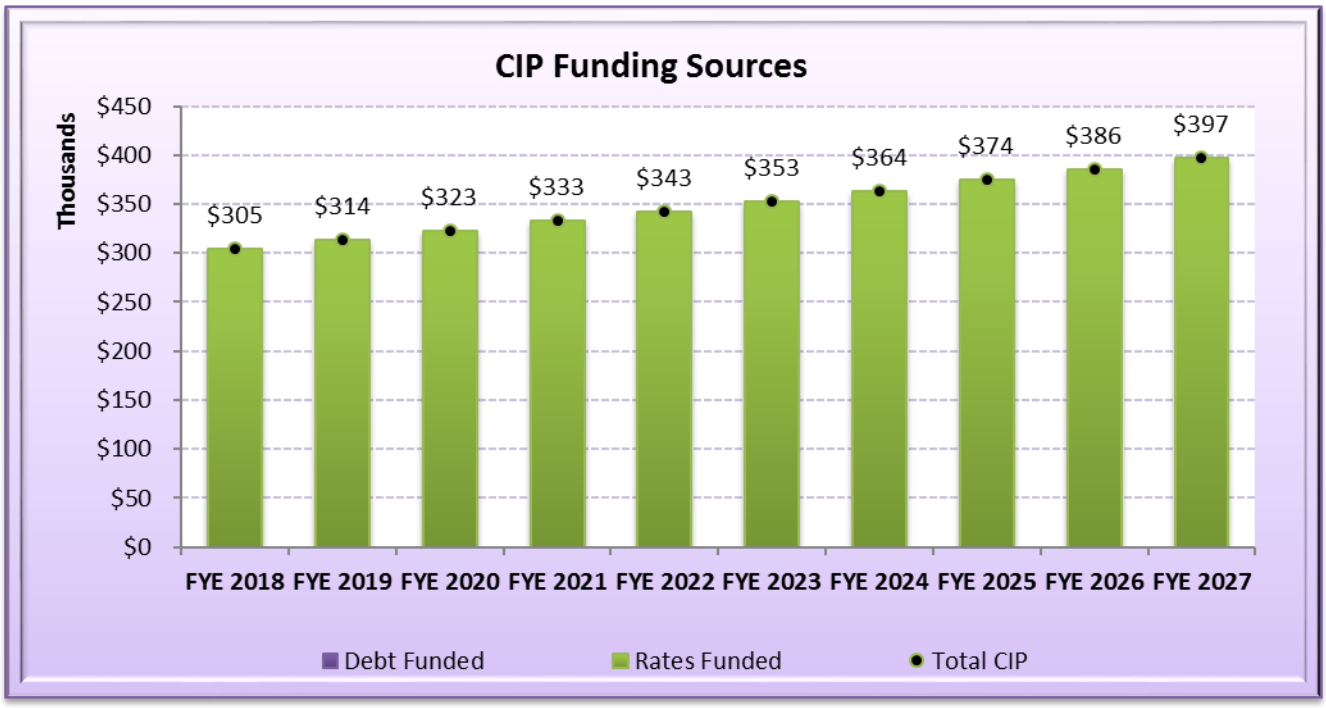
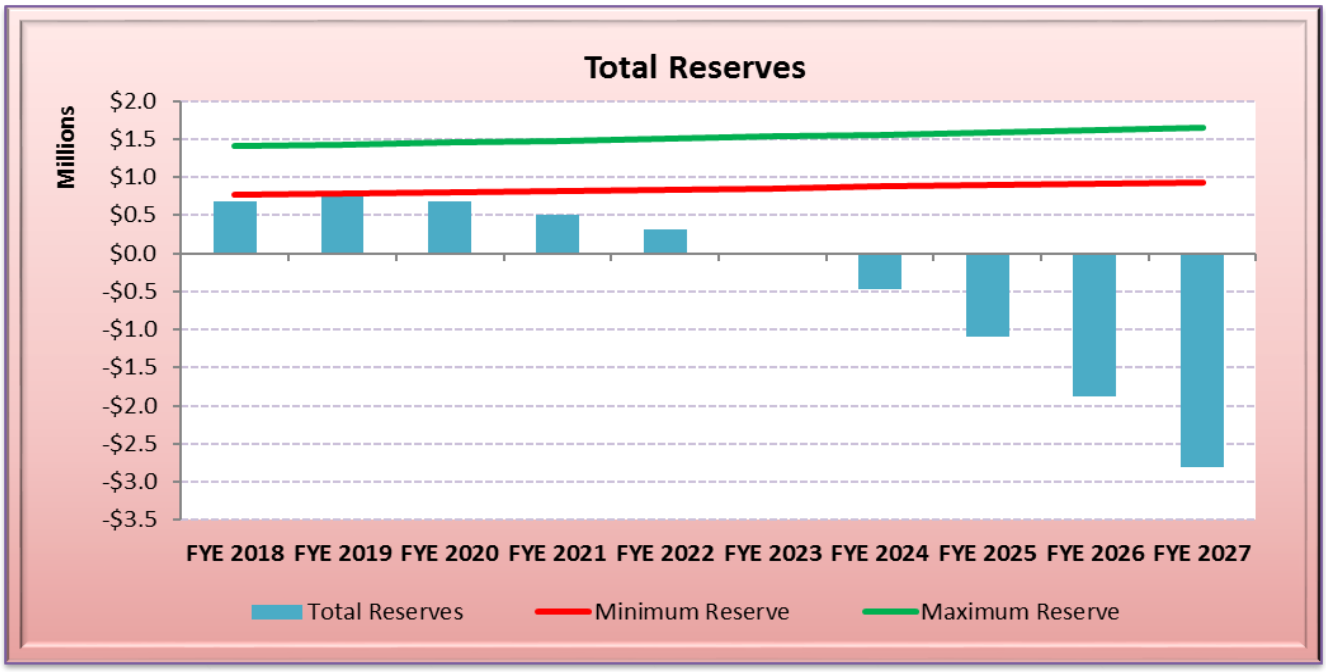


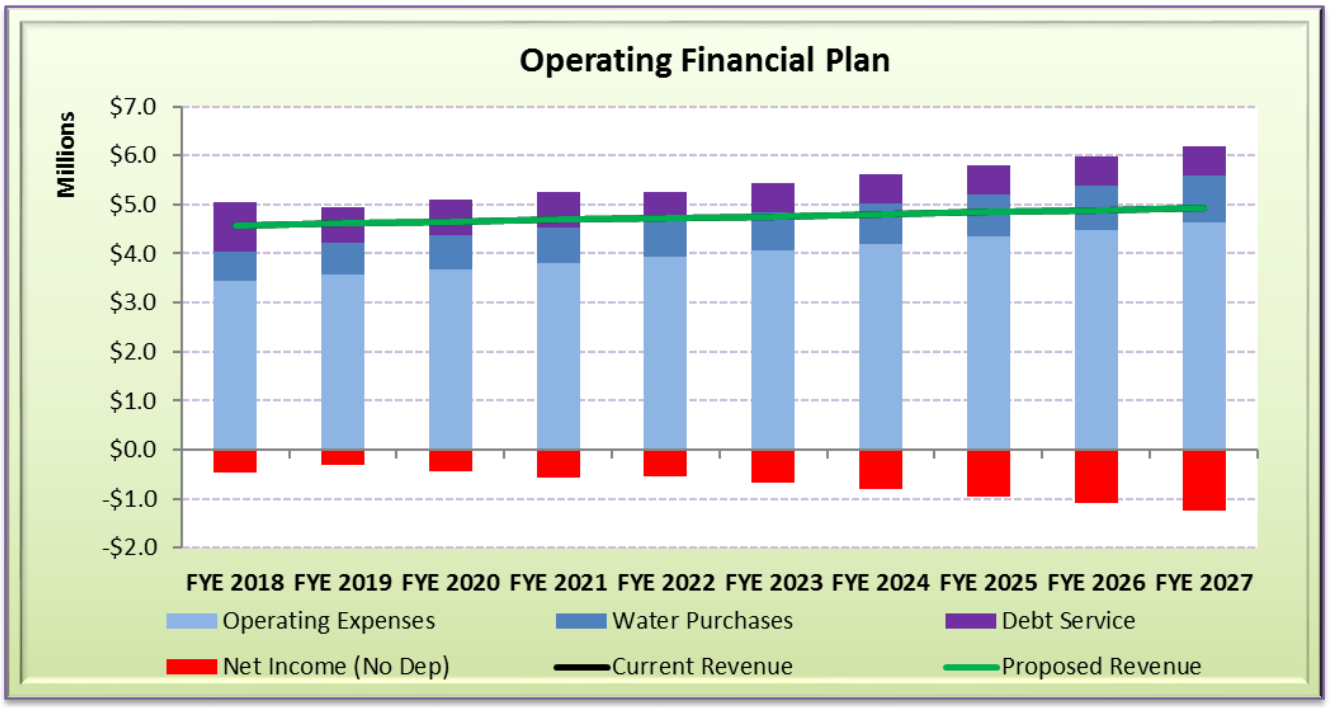
Figure 1-3: Water Utility Total Reserves



1.3.2 Water Utility Financial Health (Base Rates Only)

As identified in Section 1.3.1, the City is currently charging penalties for customers who failed to conserve water when the state imposed a mandate requiring the City to conserve 30% of total water production; additionally, the Watermaster's determination that the City's adjudicated ground water pumping rights would be reduced from 1,764 acre feet to 940 acre feet until the aquifer returned to a level exceeding 500' MSL, resulted in greater reliance on expensive imported water to meet customer usage—including customers who failed to conserve as required. As part of this Study, the primary objective was to ensure base rates of the Water Enterprise generates sufficient revenue to provide service to water customers which adequately meets the demands, including importation of water, infrastructure replacement and maintenance, and water production. As such, Raftelis reviewed the City's Financial outlook, taking into account the reduction in water usage when compared to pre-drought conditions and the steep increase in water imports due to the reduction of adjudicated pumping rights, the water utility would only generate approximately $4.5M in FYE 2018. At this level of utility revenues currently collected by existing rates, the City would not be able to fund the total cost of operations and maintenance (O&M) and would not fulfill its debt obligations through the study period, as illustrated in Figure 1-4 . In addition, there would be no on-going funding for the City's capital improvement plan.

Figure 1-4: Current Water Operating Financial Plan (Base Rates Only)



Therefore, a new infrastructure fixed charge is recommended in addition to the fixed and variable charges in the previous rate study. As such, with the inclusion of an infrastructure fixed charge and the proposed financial plan would meet and/or maintain the following criteria:

- Maintain base revenue at $5.2 million in FYE 2019 by establishing an infrastructure fixed charge.
- Cover increases in imported water through pass-through charges.

- Ensure positive net operating cash income each Fiscal Year (FY) of the planning period with cost of living indexing.
- Fully fund planned capital projects and fund a portion of deferred maintenance.
- Establish and maintain the following reserves by the end of the Study Period (FYE 2019 – 2023):
    - Water Operating Fund – minimum of 60 days of operating expenses.
    - Water Replacement Fund – 1 years' worth of capital based on 5-Year Average of Capital Improvement Plan.

After recent discussions with City Staff, City Council decided to increase funding for capital infrastructure in FYE 2019. Therefore, the infrastructure fixed charge will recover additional revenue to reinvest in the water system that would increase the total revenue requirement for FYE 2019 up to $5.7M. In addition, Raftelis recommends to index subsequent water rate increases based on the consumer price index (CPI) beginning in FYE 2020 to ensure the utility is keeping up with cost of inflation in the out years. Overall, the recommended financial plan for the water system aims to strike a balance between maintaining a strong financial position and minimizing rate increases to its customers through a multi-year measured approach. Under the recommended plan, the City will maintain a positive net income and will build healthy reserves over the five-year study period.

To determine the appropriate rate structure for meeting the City's revenue requirements, Raftelis reviewed the current rate structure and consumption data, worked closely with City staff, and, where possible, incorporated feedback on policies and objectives. As such, Raftelis recommends the following adjustments to the current structure:

- Move from a 4-tiered rate structure for Residential accounts to a 2-tiered rate structure with modifications to the Tier 1 and Tier 2 allotments (also referred to as tier widths) to directly correlate with the amount of groundwater available to the City.
- Tier 1 would correspond to the amount of groundwater available on a per account basis. The result provided 14 hcf per account, which is the Tier 1 allotment for Single Family Residential. Tier 2 would be for any usage over the 14 hcf and would reflect the cost of using imported water.
- Maintain a uniform structure for specific non-residential customers and multi-family accounts, but the uniform rate would still account for the fair share amount of groundwater for these accounts with the remaining demand covered by imported water.

The recommended variable rate structure is set forth in Table 1-7. The recommended Bi-Monthly Service Charge is shown in Table 1-8, the recommended Infrastructure Fixed Charge is detailed in Table 1-9, and the recommended Variable Service Charge can be seen in Table 1-10.

Table 1-7: Current and Recommended Variable Rate Structure

Customer Class / Tiers	Current Tier Width (hcf)	Recommended Tier Width (hcf)
Single Family[1]		
Tier 1	(0-11)	(0-14)
Tier 2	(12-33)	(>14)
Tier 3	(34-66)	N/A
Tier 4	(>66)	N/A
Multi Family	Same as Residential	Uniform
Non-Residential	Uniform	Uniform

[1] Single Family accounts consist of single unit housing and duplexes (two units).

Table 1-8: FYE 2019 Recommended Bi-Monthly Service Charges[2]

Meter Size	FYE 2019 Recommended Bi-Monthly Service Charge
3/4" or less	$79.57
1"	$97.22
1 1/2"	$140.92
2"	$193.58
3"	$360.52
4"	$606.17

Table 1-9: FYE 2019 Recommended Infrastructure Fixed Charge ($/Bi-Month)[3]

Meter Size	FYE 2019 Recommended Infrastructure Charge
3/4" or less	$38.07
1"	$63.58
1 1/2"	$126.77
2"	$202.91
3"	$444.28
4"	$799.47

[2] Rates for subsequent years after FYE 2019 shall adjust based on the percentage change in CPI.
[3] Rates for subsequent years after FYE 2019 shall adjust based on the percentage change in CPI.

Table 1-10: FYE 2019 Recommended Variable Charge ($/hcf)[4]

Customer Class	FYE 2019 Recommended Variable Charge
Single Family	
Tier 1	$2.70
Tier 2	$4.23
Multi-Family	$3.73
Non-Residential	$3.71
Irrigation	$3.81
Institutional	$4.10

1.3.3 Wastewater Utility Financial Health

In FYE 2018, the City's total beginning reserve balance for the wastewater utility is approximately $333,177. These reserves have been built up over time and will be used to fund the necessary upcoming capital projects totaling approximately $130,000 during the next 5 years. Based on the City's revenue requirements, reserve policies, capital planning schedule, and current revenues, the existing wastewater rates will:

- Result in negative net operating cash for FYE 2018 and for each subsequent fiscal year.
- Fully fund capital projects through PAYGO for FYE 2018 and for each subsequent fiscal year (with depreciation value transfer to reserves).
- The existing rates are not sufficient to fund the following reserve funds beyond FYE 2022:
  - Wastewater Operating Fund – minimum of 60 days of operating expenses
  - Wastewater Replacement Fund – target of 5-Year Average of Asset Management Plan

Without revenue adjustments, the Wastewater Utility will fully deplete reserves by FYE 2021 and will no longer be able to fund capital projects. Figure 1-5 illustrates the current operating financial plan with current revenues depicted by the green horizontal trend line and expenses symbolized by the blue and purple stacked graph bars.

Figure 1-6 identifies the City's capital plan, and
Figure 1-7 details the total reserves balance for each fiscal year.

[4] Rates for subsequent years after FYE 2019 shall adjust based on the percentage change in CPI.

Figure 1-5: Current Wastewater Operating Financial Plan

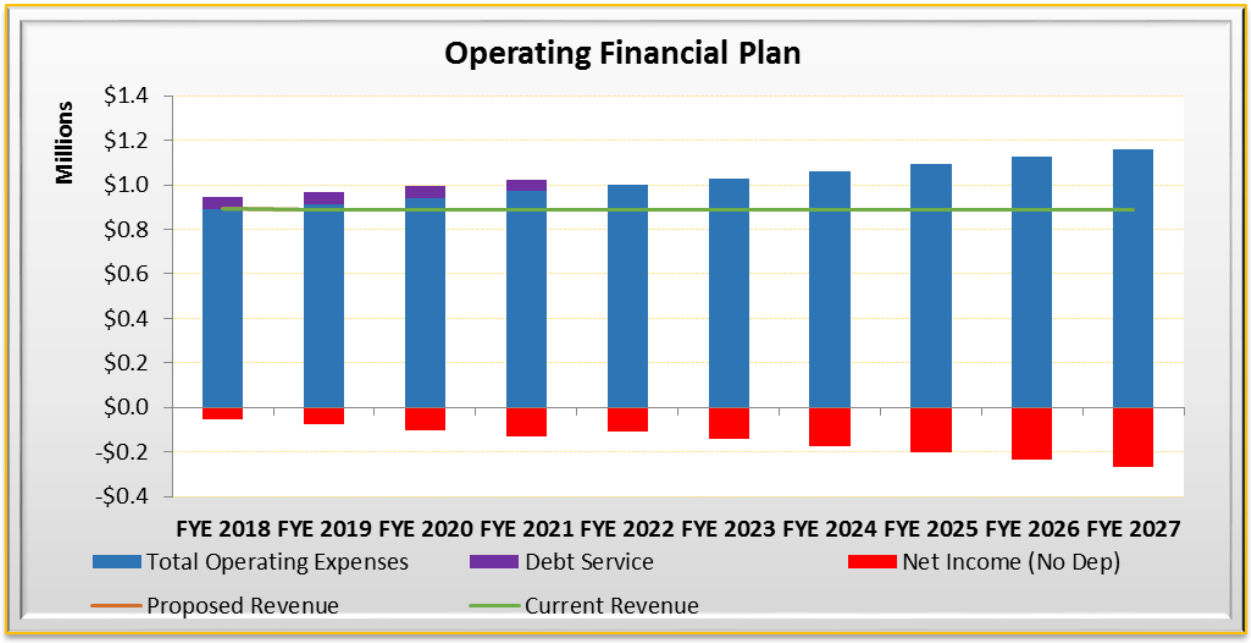


Figure 1-6: Wastewater Capital Improvement Plan

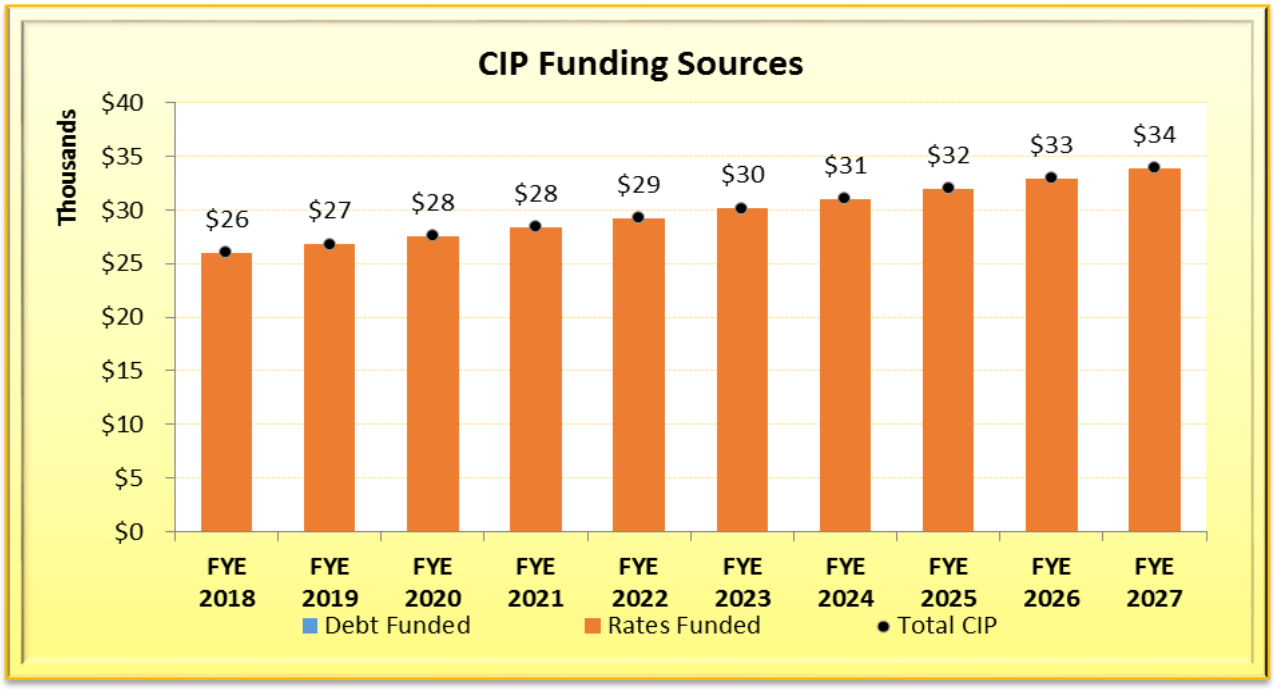
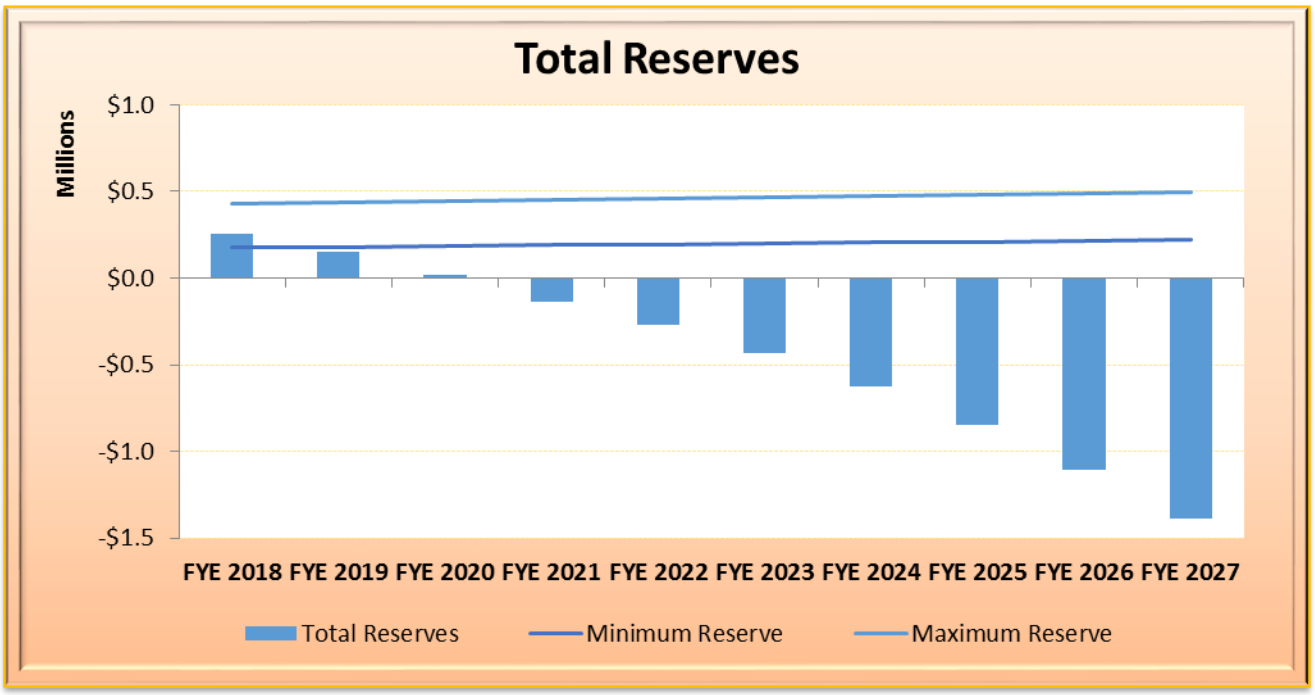


Figure 1-7: Current Wastewater Total Reserve Balance



Under the recommended financial plan, Raftelis recommends a 10% revenue adjustment in FYE 2019, and 3% annual revenue adjustments for FYE 2020 through FYE 2023. In addition, it is projected that the City may need 2% revenue adjustments in subsequent years outside the Study Period. To determine the appropriate rate structure for meeting the City's revenue requirements, Raftelis reviewed the current rate structure and flow data, worked closely with City staff, and, where possible, incorporated feedback on policies and objectives. As such, Raftelis recommends retaining the current wastewater rate structure, but updated with most recent flow information of the City's customers.

The recommended rate structure is set forth in Table 1-11. As shown in Table 1-11, the residential bi-monthly charge includes a flow charge for all residential customers. The recommended Bi-Monthly Fixed Charges and Variable Charges are shown in Table 1-12 and Table 1-13, respectively.

Table 1-11: Recommended Wastewater Rate Structure

Customer Class	Number of Bills	Accounts	Flow Charge	Proposed FYE 2019 Fixed Charge ($/Bi-Month)
Residential	26,484	$28.70	$6.66	**$35.36**
Non-Residential				
Commercial	564	$28.70	-	**$28.70**
Institutional	240	$28.70	-	**$28.70**

Table 1-12: FYE 2019-FYE 2023 Recommended Bi-Monthly Fixed Charges

Customer Class	FYE 2019 Recommended Fixed Charge	FYE 2020 Recommended Fixed Charge	FYE 2021 Recommended Fixed Charge	FYE 2022 Recommended Fixed Charge	FYE 2023 Recommended Fixed Charge
Residential	$35.36	$36.42	$37.51	$38.64	$39.80
Non-Residential					
Commercial	$28.70	$29.56	$30.45	$31.36	$32.30
Institutional	$28.70	$29.56	$30.45	$31.36	$32.30

Table 1-13: FYE 2019-FYE 2023 Recommended Variable Charges ($/ccf)

Customer Class	FYE 2019 Recommended Variable Charge	FYE 2020 Recommended Variable Charge	FYE 2021 Recommended Variable Charge	FYE 2022 Recommended Variable Charge	FYE 2023 Recommended Variable Charge
Non-Residential					
Commercial	$0.65	$0.67	$0.69	$0.71	$0.73
Institutional	$0.65	$0.67	$0.69	$0.71	$0.73

2. INTRODUCTION

2.1 STUDY APPROACH

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

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

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

After the asset values and operating costs are properly categorized by function, these functionalized costs are allocated first to cost causation components, and then distributed to the various customer classes (e.g., single family residential, multi-family residential, commercial, and irrigation) by determining the characteristics of those classes and the contribution of each to cost causation components such as customer costs, supply costs, peaking costs, and delivery costs.

Rate design is the final element of the rate-making procedure and uses the revenue requirement and cost of service analysis to determine rates for each customer class that reflect the cost of providing service to those customers. Rates utilize "rate components" that build-up to the total commodity rates, and fixed charge rates, for the various customer classes. In the case of tiered rates, the rate components allocate the cost of service within each customer class, effectively treating each tier as a sub-class and determining the cost to serve each tier.

2.2 LEGAL REQUIREMENTS

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

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

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

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

2.2.2 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 City, there are four major steps discussed below and previously addressed in Section 2.1.

1. **Calculate Revenue Requirement**
   The rate-making process starts by determining the test year (rate setting year) revenue requirement, which for this study is FYE 2019. The revenue requirement should sufficiently fund the utility's O&M, debt service, capital expenses, and reserves.

2. **Cost of Service Analysis (COS)**
   The annual cost of providing service is distributed among customer classes commensurate with their service requirements. A COS analysis involves the following:
   a) Functionalize costs. Examples of functions are supply, treatment, transmission, distribution, storage, meter servicing, and customer billing and collection

b) Allocate functionalized costs to cost causation components. Cost causation components include, but are not limited to, supply, base[5], maximum day, maximum hour[6], fire protection, meter capacity, and customer service
c) Distribute the cost causation components. Distribute cost components, using unit costs, to customer classes in proportion to their demands on the system. This is described in the M1 Manual

A COS analysis for water considers both the average quantity of water consumed (base costs) and the peak rate at which it is consumed (peaking or capacity costs as identified by maximum day and maximum hour demands).[7] Peaking costs are costs that are incurred during peak times of consumption. There are additional costs associated with designing, constructing, and operating and maintaining facilities large enough to meet peak demands. These peak demand costs need to be allocated to those imposing such costs on the utility. In other words, not all customer classes share the same responsibility for peaking related costs. In addition, the proposed redesign rate structure, herein, also accounts for the limited amount of groundwater available to the City and the amount of imported water the City purchases to cover the overall water demand of City customers.

3. Rate Design and Calculations

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

4. Rate Adoption

Rate adoption is the last step of the rate-making process to comply with Proposition 218. Raftelis documents the rate study results in this Study Report to serve as the City's administrative record and a public education tool about the recommended changes, the rationale and justifications behind the changes, and their anticipated financial impacts.

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

3. KEY ASSUMPTIONS

The Study uses the City's FYE 2018 budget as the base year and the model projects the City's revenue requirements through FYE 2027; however, the recommended water rates herein are for FYE 2018 through FYE 2022, as the City will continue to periodically review rates and take a measured approach with any potential rate adjustments. Certain cost escalation assumptions and inputs were incorporated into the Study to adequately model expected future costs of the City expenses. Furthermore, the City has an adjudicated right to extract 1,740 AF/Yr (acre-feet per year) of groundwater; however, when the groundwater level is below 500 MSL (500 feet above mean sea-level), the adjudicated pumping rights are reduced to 980 AF/Yr. Currently, the City is operating under its reduced groundwater allocation and the difference between demand and allowable extraction is made up by imported water. The City purchases water from the San Gabriel Municipal Water District. In FYE 2017, the City purchased 1,619 AF of water at a rate of $370/AF (acre-feet), which is connected directly into the City's groundwater basin and pumped out to cover the City's total water demand. The difference of total water production of 2,081 AF and 980 AF of groundwater availability results in 1,101 AF that is required to supply City demand. The amount of imported purchased water is above the amount required to serve City demand, therefore, the surplus will be used to recharge groundwater supply. For water loss, Raftelis reviewed total water production versus water sales based on data provided by the City and confirmed with the City that their water loss is approximately 23.5%. This is water loss is significantly higher than what is typically seen in the industry, which averages 10%. We recommend that the City reinvest in its water distribution system to mitigate the amount of water loss, which in turn, would allow the City to avoid imported water costs. Table 3-1 and Table 3-2 identify the assumptions based on discussions with and/or direction from City management.

Table 3-1: Inflationary Factor Assumptions

Inflationary Factors	FYE 2019	FYE 2020	FYE 2021	FYE 2022	FYE 2023
General	3.0%	3.0%	3.0%	3.0%	3.0%
Salary	3.0%	3.0%	3.0%	3.0%	3.0%
Benefits	3.0%	3.0%	3.0%	3.0%	3.0%
Capital	3.0%	3.0%	3.0%	3.0%	3.0%
Energy	5.0%	5.0%	5.0%	5.0%	5.0%
Water loss	23.5%	23.5%	23.5%	23.5%	23.5%
Consumer Price Index (CPI[1])	2.0%	2.0%	2.0%	2.0%	2.0%

[1] For financial plan forecasting, a CPI index of 2% was assumed to reflect increases of water rates. Actual increases will be based on the actual percentages in the CPI index.

Table 3-2: Growth, Water Supplies, Demand, and Revenue Assumptions

Line #	Categories	FYE 2019	FYE 2020	FYE 2021	FYE 2022	FYE 2023
	Account Growth[1]					
1	All Customer Classes	0%	0%	0%	0%	0%
2	Total Water Production (AF)	2,081	2,081	2,081	2,081	2,081
	Groundwater Supply					
3	Groundwater Supply (AF)	980	980	980	980	980
4	Groundwater less Water Loss (AF)	749.70	749.70	749.70	749.70	749.70
5	Groundwater less Water Loss (ccf)	326,569	326,569	326,569	326,569	326,569
	Imported Water Supply					
6	Purchased Imported Water (AF)	1,619	1,619	1,619	1,619	1,619
7	Imported Water to Serve Demand (AF)	1,101	1,101	1,101	1,101	1,101
8	Imported Water to Serve Demand less water loss (AF)	842.27	842.27	842.27	842.27	842.27
9	Imported Water for Recharge (AF)	518	518	518	518	518
	Water Sales					
10	Total Usage (ccf)	692,280	692,280	692,280	692,280	692,280
11	Water Demand Factor[2]	100%	100%	100%	100%	100%
	Revenues Factors					
12	Non-Operating Revenues	0%	0%	0%	0%	0%
13	Reserve Interest Rate	1%	1%	1%	1%	1%

[1] For financial planning purposes, account growth was conservatively set at 0% which means that the City is not relying on growth to help fund ongoing operating and maintenance costs.
[2] Demand factors can be used to project changes in water usage and flow patterns. For the purposes of this Study, no changes were made to either the water or flow patterns.

4. WATER RATE STUDY

4.1 WATER UTILITY – FINANCIAL PLAN

This section describes the development of the water utility financial plan, the results of which were used to determine the revenue adjustments needed to meet ongoing expenses and provide fiscal sustainability to the City. Establishing a utility's revenue requirement is a key step in the rate setting process. The review involves analysis of projected annual operating revenues under the current rates, O&M expenses, capital expenditures, transfers between funds, and reserve requirements. This section of the report provides a discussion of the projected revenues, O&M and capital expenditures, the capital improvement financing plan, and overall revenue requirements required to ensure the fiscal sustainability of the Water Utility.

4.1.1 Revenue from Current Rates

The current water rate structure consists of three main components:

1. Bi-Monthly Fixed Charge that varies by meter size (Table 4-1 summarizes the projected revenue).
2. Bi-Monthly Low Discount Fixed Charge that varies by meter size (Table 4-2 summarizes the projected revenue).
3. City Usage Charge that varies by customer class and water usage (Table 4-3 summarizes the projected city usage revenue).

In addition to these components, the City also charges a fire protection charge to those customers with private fire lines. Private fire line customers are charged a bi-monthly fixed charge that varies by connection size (Table 4-4 summarizes the connections by size, the current monthly Private Fire Line charges, and the projected private fire protection revenue).

Table 4-1: Projected Annual Water Service Charge Revenue (Full-Rate)

Meter size	# of Meters[1] [A]	Current Bi-Monthly Water Service Charges [B]	Projected Annual Water Service Charge Revenue[2] (A x B x 6)
3/4" or less	2,853	$79.68	$1,363,962
1"	624	$107.00	$400,608
1 1/2"	227	$152.54	$207,759
2"	100	$207.18	$124,308
3"	8	$334.68	$16,065
4"	1	$516.83	$3,101
Annual Water Service Revenue	**3,813**		**$2,115,803**

[1] Includes all customer classes except exempt meters.
[2] Revenue was rounded to the nearest dollar.

Table 4-2: Projected Annual Low-Income Discount Fixed Charge Revenue

Meter Size	# of Meters[1] [A]	Current Bi-Monthly Discount Fixed Charges [B]	Projected Annual Discount Fixed Charge Revenue[2] (A x B x 6)
3/4" or less	53	$51.79	$16,469
1"	7	$69.55	$2,921
Annual Discount Fixed Revenue	**60**		**$19,390**

[1] Includes only exempt meters.

[2] Revenues were rounded to the nearest dollar.

Table 4-3: Projected City Usage Charge Revenue

Customer Classes	Current Tiers (width)	Projected Annual Usage [A]	Current City Distribution Rate [B]	Projected City Usage Charge Revenue[1] (A x B)
Residential				
Tier 1	(0-11)	271,186	$2.69	$729,490
Tier 2	(12-33)	212,409	$3.47	$737,059
Tier 3	(34-66)	92,735	$4.08	$378,359
Tier 4	(>66)	41,656	$5.55	$231,191
Non-Residential				
Uniform	N/A	74,294	$3.89	$289,004
City Distribution Revenue		**692,280**		**$2,365,103**

[1]Revenues were rounded to the nearest dollar.

Table 4-4: Projected Annual Fire Line Charge Revenue

Connection Size	Projected Number of Connections [A]	Current Fire Line Service Charge [B]	Projected Fire Line Revenue[1] (A x B x 6)
2"	6	$6.29	$226
4"	11	$38.95	$2,571
Fire Line Charge Revenue	**17**		**$2,797**

[1]Revenues were rounded to the nearest dollar.

Using account growth, water demand factors, and other revenue assumptions from Table 3-2, Raftelis projected the revenues for the water utility[8]. Table 4-5 summarizes the rate revenue as well as other revenues. As shown in the table, since Raftelis assumed zero growth and no increase in water demand, the rates and rate

[8] Although only the Study Period is shown here, Raftelis projected the revenues through FYE 2027.

revenue remained constant during the Study Period. The projected water sales by customer class and tier remained constant and was based on the total FYE 2018 usage.

Table 4-5: Projected Water Revenues

Line #	Revenue	FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022
	Water Utility Revenues					
1	Fixed Revenue	$2,135,194	$2,135,194	$2,135,194	$2,135,194	$2,135,194
2	Fire Revenue	$2,797	$2,797	$2,797	$2,797	$2,797
3	Variable Revenue	$2,365,103	$2,365,103	$2,365,103	$2,365,103	$2,365,103
4	Penalty Charges	$700,000	$700,000	$700,000	$700,000	$700,000
5	**Subtotal Rate Revenue**	**$5,203,094**	**$5,203,094**	**$5,203,094**	**$5,203,094**	**$5,203,094**
6	Other Revenues	$71,000	$71,000	$71,000	$71,000	$71,000
7	**Total Revenues**	**$5,274,094**	**$5,274,094**	**$5,274,094**	**$5,274,094**	**$5,274,094**

4.1.2 O&M Expenses

The City's FYE 2018 budget values and the assumed inflation factors (Table 3-1) for the study period were used as the basis for projecting O&M costs. Table 4-6 shows the total projected O&M expenses for FYE 2018 through FYE 2022[9]. Water purchase costs are calculated by taking the product of purchased water and the rate charged by San Gabriel Municipal Water District. Total Production is the cost of electrical energy required to pump groundwater from the basin and serve City customers. Also, as shown in the table (Line 10), the water utility currently has outstanding debt obligation.

Table 4-6: Projected O&M Expenses

Line #	O&M Categories	FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022
1	**Water Purchase Charge**	$599,030	$647,600	$647,600	$647,600	$647,600
	Expenditures					
2	Total Personnel Services	$827,900	$852,737	$878,319	$904,669	$931,809
3	Total Purchased Services	$280,100	$288,503	$297,158	$306,073	$315,255
4	Total Purchased Materials	$291,500	$300,245	$309,252	$318,530	$328,086
5	Total Cost Allocations	$1,177,200	$1,212,516	$1,248,891	$1,286,358	$1,324,949
6	Total Utilities	$15,700	$16,485	$17,309	$18,175	$19,083
7	Total Capital Outlay – R&M	$350,000	$360,500	$371,315	$382,454	$393,928
8	Total Production	$508,300	$533,715	$560,401	$588,421	$617,842
9	**Total Operating Expenditures**	**$4,049,730**	**$4,212,301**	**$4,362,626**	**$4,518,659**	**$4,680,630**
10	**Debt Service**	**$991,533**	**$731,709**	**$731,708**	**$731,708**	**$586,021**
11	**Total Expenses**	**$5,041,263**	**$4,944,010**	**$5,094,334**	**$5,250,367**	**$5,266,651**

[9] Although only the Study Period is shown here, Raftelis projected the expenses through FYE 2027.

4.1.3 Capital Improvement Plan

The City provided the asset management plan to address future water capital improvement project (CIP) needs. Raftelis worked closely with City staff to adjust the CIP to reflect a measured multi-year approach. Based on discussions with City Staff, the 5-year average CIP costs were used as the baseline for each year of the Study Period. Raftelis indexed the capital expenditures by a 3% inflationary compounding rate from Table 3-1 to account for increased construction costs in future years.

Table 4-7 summarizes the 5-Year Average CIP (Line 1), the cumulative inflationary factor (Line 2), and the resulting total anticipated CIP costs (Line 3).

Table 4-7: Water Utility Capital Improvement Plan[10]

Line #		FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022
1	Asset Management Plan (5-Yr Average)	$304,500	$304,500	$304,500	$304,500	$304,500
2	Cumulative Inflationary Factor	100%	103%	106%	109%	113%
3	**Inflated CIP**	**$304,500**	**$313,635**	**$323,044**	**$332,735**	**$342,717**

4.1.4 Reserve Requirements

In FYE 2018, the City's projected beginning reserve balance for the water utility is approximately $747,740. Currently, the City maintains a water operating fund and water replacement fund. As part of Best Management Practices of utilities, it is recommended that a utility have at least 60-90 days of operating reserves as well as sufficient funds available to ensure that the utility's capital plan can move forward as scheduled and is not delayed due to insufficient funds on hand.

4.1.5 Current Financial Outlook (Maintaining $5.2M Revenue)

Based on the financial plan review and maintaining total revenue at $5.275M for FYE 2019, the City would only need modest cost of living adjustments for subsequent years (based on percentage change in the consumer price index for Los Angeles-Orange-Riverside) (CPI). Without any revenue adjustments, the City will not be able to fund operational and debt expenses in FYE 2023, as shown in Figure 4-1, where expenses are shown by stacked bars and the total revenues at current rates are shown by the horizontal green trend line. In addition, the City would also be in technical default of its bond covenants starting in FYE 2023, which require 120% debt coverage. Figure 4-3 illustrates the total reserves balances for each fiscal year after operating and capital in funded.

[10] There may be differences due to rounding.

Figure 4-1: Operating Financial Position at Current Rates

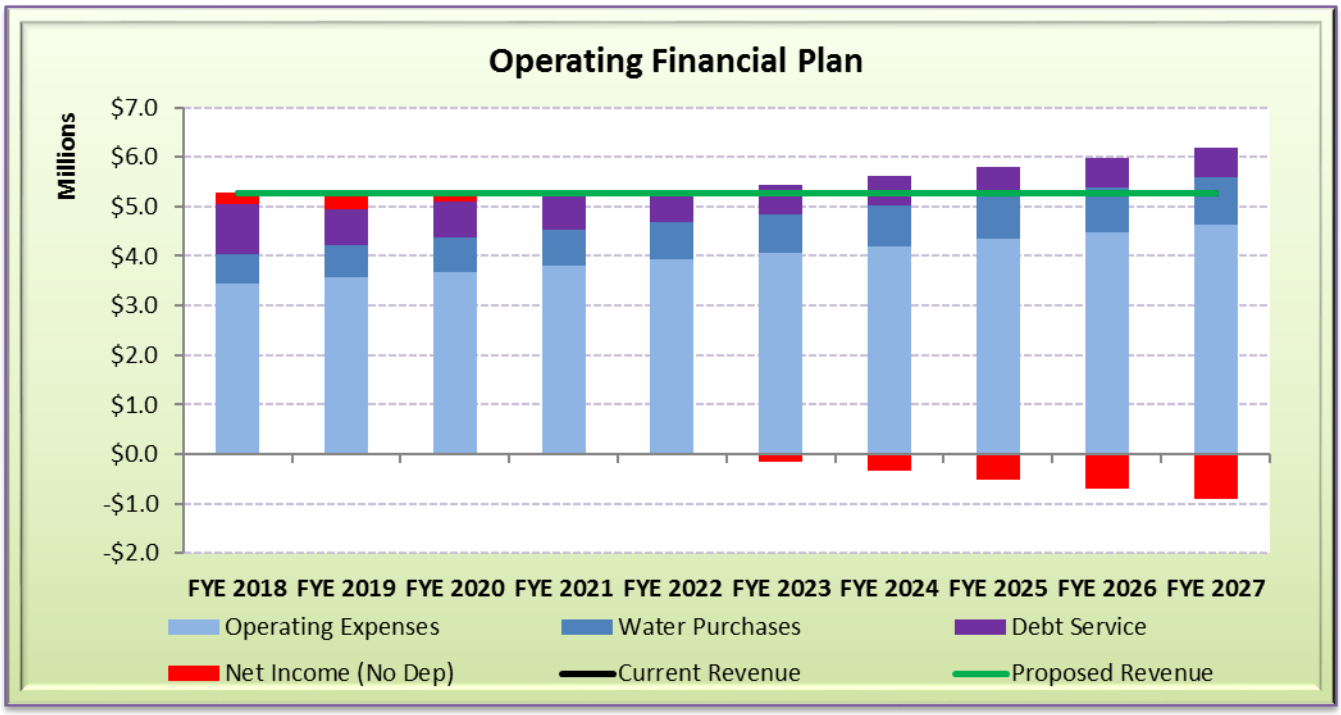


Figure 4-2: Baseline Water Capital Improvement Plan and Funding Source

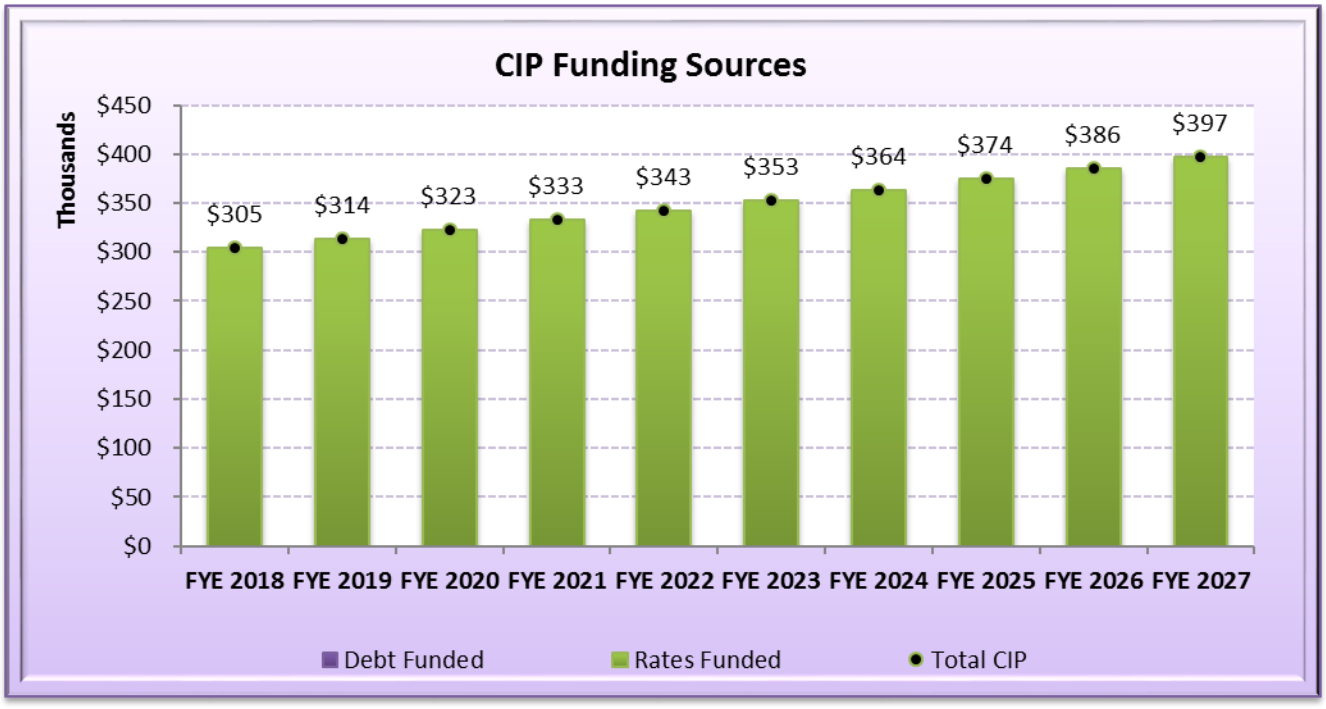
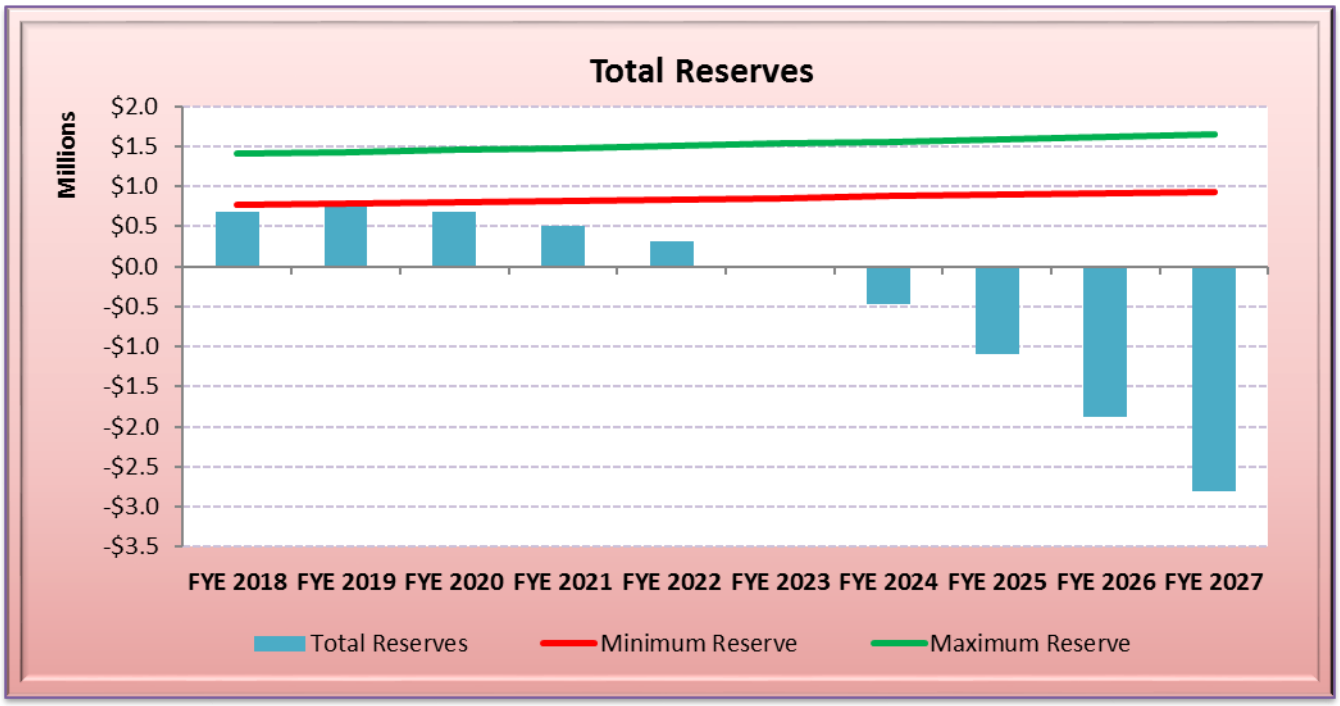


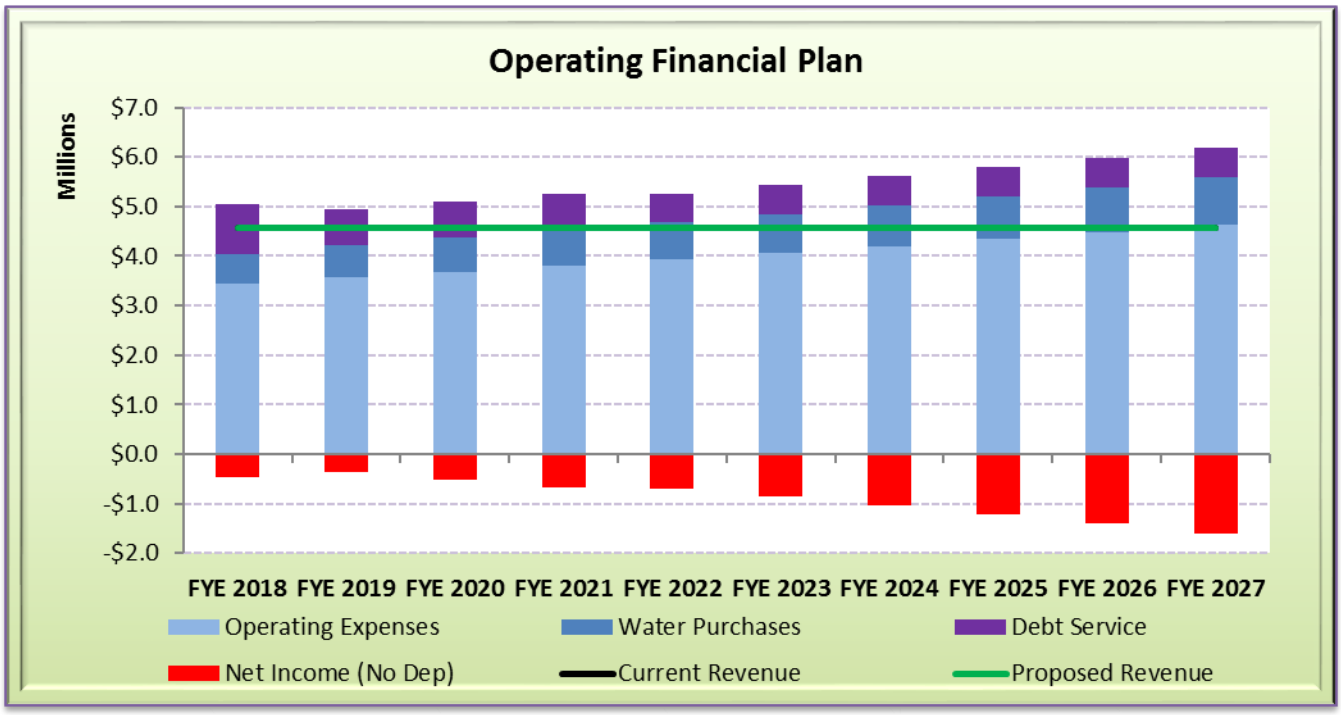
Figure 4-3: Projected Ending Water Reserves at Current Rates



4.1.6 Current Financial Outlook (Base Rates Only)

In reviewing the utility with revenue solely generated from current base rates and miscellaneous revenues, the water utility would only generate approximately $4.5M in FYE 2019 which is insufficient to meet the costs of purchasing imported water, producing and delivering water to the customers and maintain operation and maintenance costs and on-going funding for the City's capital improvement plan; the City also fails to meet its bond debt coverage during the Study Period under the existing base rates. Figure 4-4 illustrates the operating position of the water utility, where expenses are shown by stacked bars; and the total revenues at current rates are shown by the horizontal green trend line. As shown below, the City will have negative net income for all fiscal years and would be unable to fund necessary capital reinvest into its utility system to ensure the continued delivery of safe and clean water.

Figure 4-4: Operating Financial Plan at Base Rates



4.1.7 Financial Plan Recommendations

After reviewing the City's revenue requirements, reserve policies, capital planning schedule, and current revenues, and discussions with City Council regarding the level of capital reinvestment, a financial plan was developed to meet the following criteria:

- Ensure positive net operating cash income each Fiscal Year (FY) of the planning period with cost of living indexing. This will allow revenues to exceed operational and maintenance expenses for each fiscal year.
- Establish an infrastructure fixed charge that will generate approximately $1.225M in FYE 2019. With increase funding for capital infrastructure, the total revenue requirement for FYE 2019 will be equal to approximately $5.728M.
- Establish pass-through charge for future increases of imported water costs not controlled by the City.
- Meet the bond covenants for each fiscal year by meeting the required debt coverage of 120%.
- Build up reserves through the Study Period (FYE 2019 – FYE 2023) with the following targets:
  - Water Operating Fund – minimum of 60 days of operating expenses.
  - Water Replacement Fund – 1 years' worth of capital based on 5-Year Average of Capital Improvement Plan.
- For subsequent fiscal years, commencing in FYE 2020, the Financial Plan model assumes indexing rates to the price change in the CPI-index for Los Angeles – Orange – Riverside to account for cost of inflation.

With these elements, the City will be able to fund its operations and maintenance costs, meet the debt coverage each fiscal year, and fund necessary capital during the Study Period.

4.1.7.1 Recommended Reserves

Raftelis recommends maintaining the following reserves:

Water Operating Reserve – The operating reserve is used primarily to meet ongoing cash flow requirements. Raftelis recommends establishing an operating reserve target of 60-days of O&M expenses. A 60-day reserve ensures working capital to support the operation, maintenance, and administration of the utility. Maintaining this level of reserves also provides liquid funds for the continued ongoing operations of the utility in the event of unforeseen costs or interruption with the utility or the billing system.

Water Replacement Reserve – The replacement reserve is used primarily to meet the City's capital improvement requirements. The City's revised capital improvement plan—over the five-year period—is approximately $1.6M. The ideal target for the capital reserve should be to have a reserve sufficient to fund a year's worth of capital costs, which would ensure that the City can continue to reinvest in the water system and that necessary capital improvements are not delayed or deferred due to cash flow concerns. Raftelis recommends establishing a capital reserve based on one years' worth of the average 5-year asset management plan, which is approximately $300K.

4.1.7.2 Pass-Through Provision

The City relies on imported water from the San Gabriel Valley Municipal Water District (SGVMWD) to cover a majority of the City's total water usage. The proposed financial plan projected increases in the cost of imported water that the City purchases; however, the proposed rates only include the current costs of purchased water because Raftelis recommends that the City include authorization for automatic pass-through adjustments to the rates for any increase in imported water cost above the rate known today (a Pass-Through). Authorizing automatic Pass-Through adjustments mitigates the risk of unknown rate increases by the SGVMWD as the City's water seller. Automatic Pass-Through adjustments in the rates are allowed through the provisions of Government Code Section 53756 and provide the following benefits to the City:

- Clear transparency between costs that are controlled by the City versus uncontrolled costs from outside agencies.
- Provides increased revenue stability.
- Tracks increases in costs to the City from SGVMWD and recovers the incremental increase through a direct rate adjustment.
    - Any incremental increase in cost due to increase in the current rate charged for purchased water would be spread over all units of water purchased.
    - The "Pass-Through" adjustments would increase as SGVMWD imported water rates increase and would also apply to increases in electric charges from Southern California Edison.

4.1.7.3 Infrastructure Charge

In addition to the recommendations mentioned above, Raftelis recommends implementing an Infrastructure Charge beginning in FYE 2019. The purpose of the Infrastructure Charge is to provide funding for debt and ongoing capital costs. The new rates will apply to all customers in the water system, and the charge will vary by each customer's meter size.

Table 4-8 summarizes the recommended financial plan (see Appendix A – Exhibit A for a detailed financial plan). Figure 4-5 illustrates the operating position of the City where expenses, inclusive of reserve funding, are shown by stacked bars and total revenues at both current rates and recommended rates are shown by the horizontal trend lines. Figure 4-6 summarizes the projected CIP and its funding sources (100% PAYGO). Figure 4-7 displays the ending total reserve balance for the water utility, inclusive of operating and capital funds. With the increase of infrastructure funding in FYE 2019, total reserves will build-up throughout the Study Period. The horizontal trends line indicates the minimum and target reserve balances and the bars indicate

ending reserve balance. No new debt is recommended to be issued as part of the recommended five-year financial plan.

Table 4-8: Recommended Water Financial Plan

Line #	Category	FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022
	Revenues					
1	Rate Revenue	$5,203,094	$5,203,094	$5,203,094	$5,203,094	$5,203,094
2	Other Misc. Revenues [1]	$71,000	$71,000	$71,000	$71,000	$71,000
3	Proposed Additional Rate Revenue[2]	$0	$437,789	$639,915	$756,775	$875,973
4	Total Pass-Through Revenue	$0	$48,570	$80,950	$114,949	$150,648
5	**Total Revenues**	**$5,274,094**	**$5,760,452**	**$5,994,959**	**$6,145,818**	**$6,300,714**
	Less: Expenditures					
6	Water Purchases	$599,030	$647,600	$647,600	$647,600	$647,600
7	Total Operating Expenditures	$3,450,700	$3,564,701	$3,682,646	$3,804,680	$3,930,952
8	Total Debt Service	$991,533	$731,709	$731,708	$731,708	$586,021
9	**Total Expenditures**	**$5,041,263**	**$4,944,010**	**$5,094,334**	**$5,250,367**	**$5,266,651**
10	**Net Cashflow** *(Line 5 – Line 9)*	**$232,831**	**$816,442**	**$900,625**	**$895,451**	**$1,034,063**
11	Total Depreciation	$727,000	$748,810	$771,274	$794,413	$818,245
12	**Net Cashflow w/ Depreciation**	**($494,169)**	**$67,632**	**$129,350**	**$101,039**	**$215,819**
13	**Operating Reserve**					
14	Beginning Balance	$747,740	$453,950	$473,931	$490,024	$506,670
15	Net Cashflow (Line 10)	$232,831	$816,442	$900,625	$895,451	$1,034,063
16	Transfers In/Out - Capital Improvement Reserve	-$526,621	-$801,077	-$889,328	-$883,765	-$1,021,949
17	**Ending Balance**	**$453,950**	**$469,315**	**$485,229**	**$501,711**	**$518,785**
18	*Interest Income*	*$0*	*$4,616*	*$4,796*	*$4,959*	*$5,127*
	Capital Improvement Reserve					
19	**Beginning Balance**	$0	$222,121	$714,221	$1,290,478	$1,857,168
	Plus:					
20	Transfer In/Out - from Operating Reserve (Line 16)	$526,621	$801,077	$889,328	$883,765	$1,021,949
21	New Debt Issue	$0	$0	$0	$0	$0
	Less:					
22	Capital Projects	($304,500)	($313,635)	($323,044)	($332,735)	($342,717)
23	**Ending Balance**	**$222,121**	**$709,563**	**$1,280,505**	**$1,841,508**	**$2,536,399**
24	*Interest*	*$0*	*$4,658*	*$9,974*	*$15,660*	*$21,968*
25	*Total Reserves – Ending Balance*	*$676,071*	*$1,178,878*	*$1,765,733*	*$2,343,219*	*$3,055,183*
26	*Reserve Target[3]*	*$1,407,925*	*$1,430,973*	*$1,454,843*	*$1,479,567*	*$1,505,177*

[1] Other Revenues are based on the City's FYE 17-18 Budget and include transfers, fees, late charges, and other service charges.
[2] For forecasting, CPI adjustments are assumed to be 2%, but the actual adjustment will be based on the percentage change in CPI for Los Angeles-Orange-Riverside area.
[3] Reserve target is based on 90 days of operating plus one year of depreciation.

Figure 4-5: Operating Financial Position at Recommended Rates

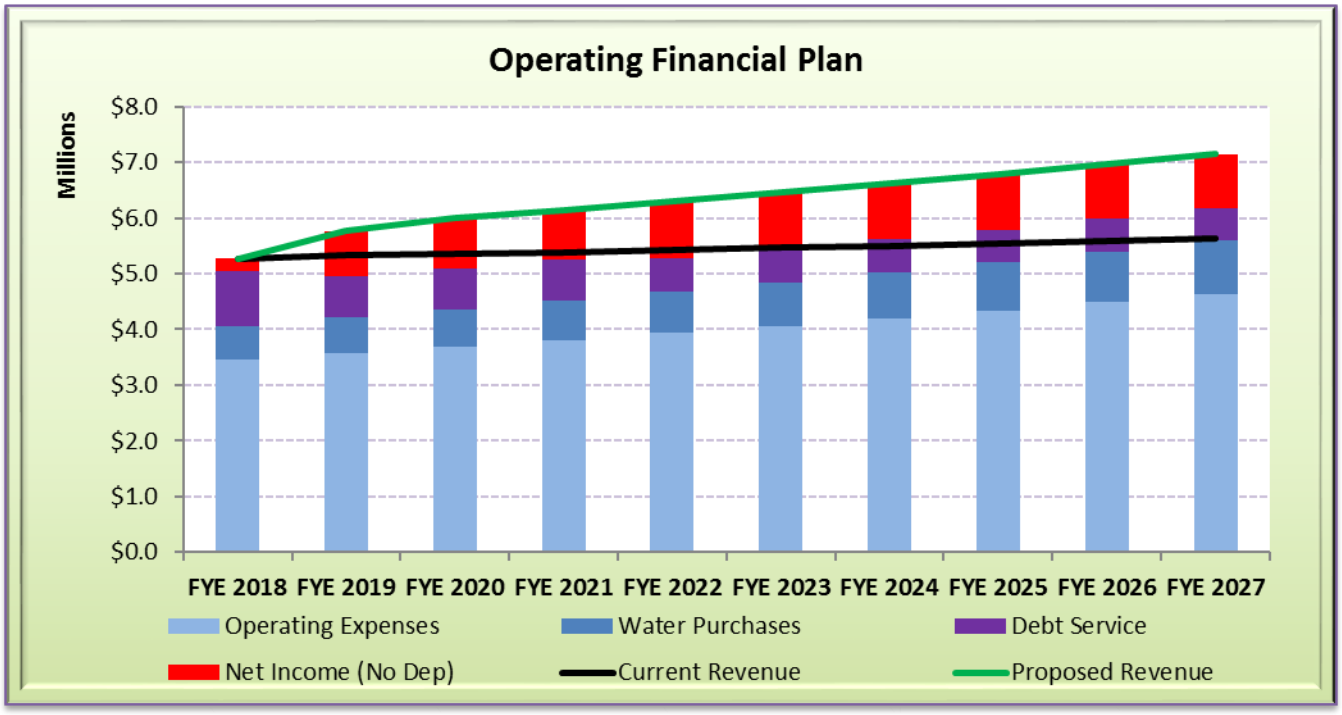


Figure 4-6: Recommended Water Capital Improvement Plan and Funding Source

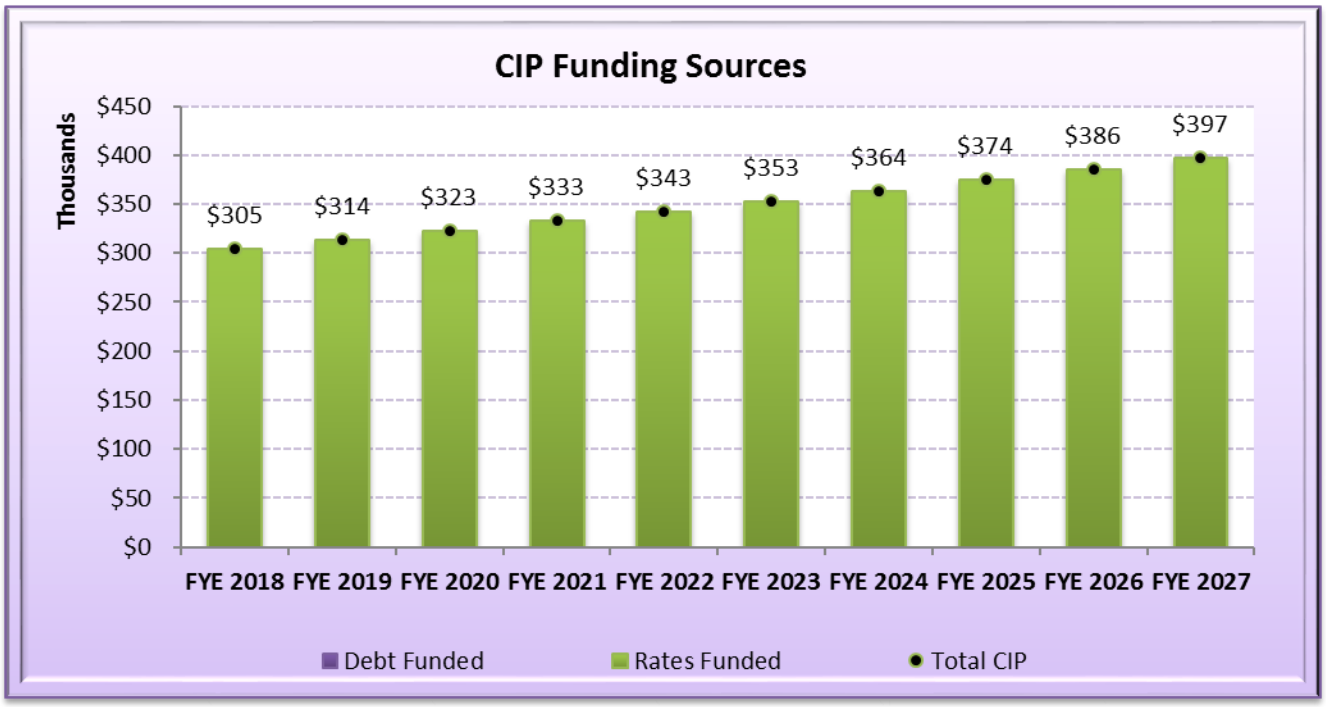
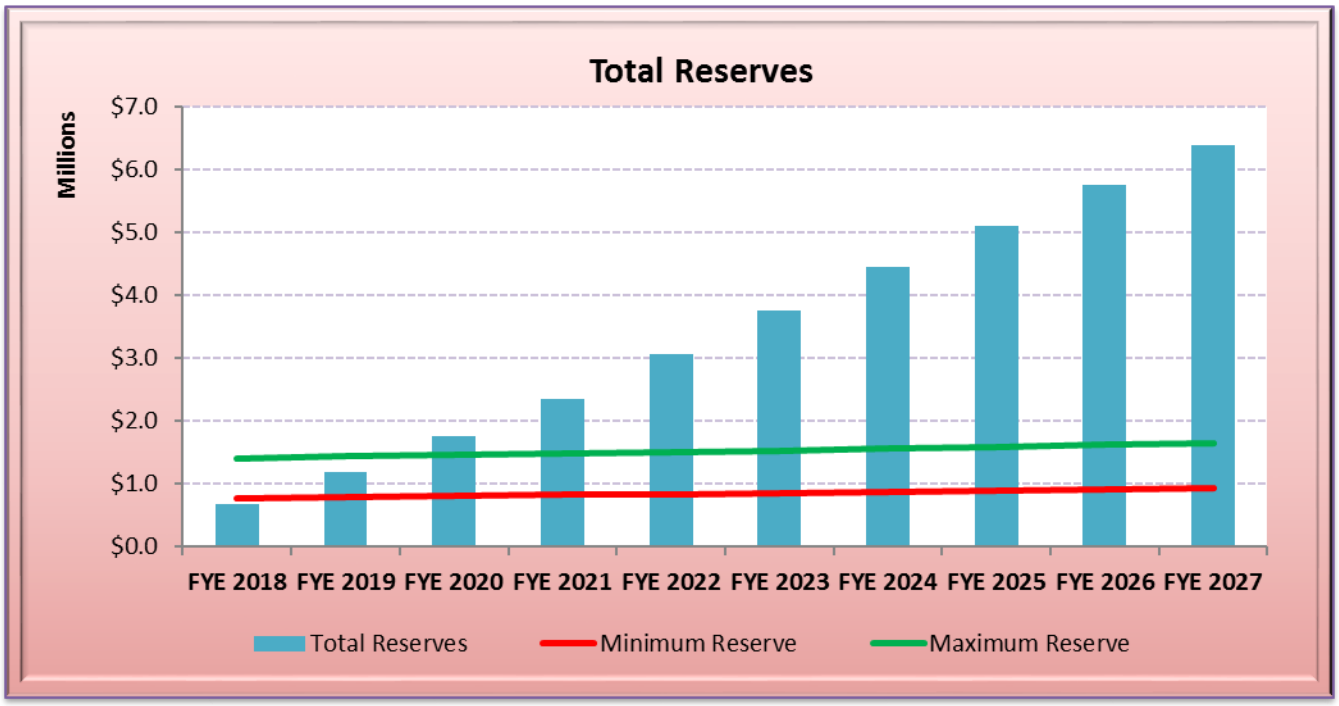


Figure 4-7: Projected Ending Water Reserves at Proposed Rates



Total reserves reflect an increase in available funding from the Infrastructure Fixed Charge and additional capital projects will be identified above what is currently planned to address deferred maintenance. As these additional projects are incorporated into the capital improvement plan, reserves will be used and the ending balance will be updated, accordingly.

4.2 WATER UTILITY – COST OF SERVICE STUDY

4.2.1 Proportionality

Demonstrating proportionality when calculating rates is a critical component of ensuring compliance with Proposition 218. For costs that are recovered through the City's recommended fixed meter charge, the Study spreads the costs either over all accounts or by meter size, depending on the type of expense. As such, customer classes and usage are not considered nor necessary for calculating each customer's fixed charge. Conversely, costs that were determined as variable are allocated among customer classes based on their demand on the system and water supply. As stated in the Manual M1, the AWWA Rates and Charges Subcommittee agree with Proposition 218 that "the costs of water rates and charges should be recovered from classes of customers in proportion to the cost of serving those customers." The City's revenue requirements are, by definition, the cost of providing service. This cost is then used as the basis to develop unit costs for the water components and to allocate costs to the various customer classes in proportion to the water services rendered.

Individual customer demands vary depending on the nature of the utility use at the location where service is provided. For example, water service demand for a family residing in a typical single-family home is different than the water service demand for an irrigation customer, primarily due to peak use behavior which drives the need for and costs of sizing infrastructure to meet this demand. The concept of proportionality requires that cost allocations consider both the average quantity of water consumed (base) and the peak rate at which it is consumed (peaking). Use of peaking is consistent with the cost of providing service because a water system is designed to meet peak demands and the additional costs associated with designing, constructing and

maintaining facilities required to meet these peak demands need to be allocated to those customers whose usage requires the need to size facilities to meet peak demand.

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

Generally speaking, customers place the following demands on the City's water system and water supply:

- The system capacity[11] (for treatment, storage, and distribution) that must be maintained to provide reliable service to all customers at all times.
- The level of water efficiency as a collective group.
- The number of customers requiring customer services such as bill processing, customer service support, and other administrative services.

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

4.2.2 Cost of Service Process

A cost of service analysis distributes a utility's revenue requirements (costs) to each customer class. Figure 4-8 provides a general overview of a cost-of-service analysis. Each step shown below will be described in greater detail in the next section.

Figure 4-8: Cost of Service Process

4.2.3 Cost of Service Analysis

4.2.3.1 Step 1 – Determine Revenue Requirement

In this Study, water rates are calculated for FYE 2019 (known as the Test Year), by calculating water purchase costs and by using the City's FYE 2018 budget and inflationary factors. Test Year revenue requirements are used in the cost allocation process. Subsequent years' revenue adjustments are incremental and the rates for

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

future years are based on indexed rate increases and are applied across-the-board. The City should review the cost of service analysis at least once every five years to ensure that the rates are consistent with the costs of providing service.

The revenue requirement determination is based upon the premise that the utility must generate annual revenues to meet Supply, O&M expenses, any debt service needs, reserve levels, and capital investment needs.

4.2.3.2 Step 2 – Functionalize O&M Costs

A cost of service analysis distributes a utility's revenue requirements (costs) to each customer class. After determining a utility's revenue requirement, the total cost of water service is analyzed by system functions to proportionately distribute costs in relation to how that cost is generally incurred. The water utility costs were categorized into the following **functions**:

- **Groundwater Supply** – Fixed costs incurred to use available groundwater.
- **Water Purchases** – variable costs incurred to import water from the San Gabriel Municipal Water District.
- **Groundwater Recharge** – variable costs incurred to replenish groundwater basin.
- **Operations & Maintenance (O&M) Expenses**
  - **Total Personnel Services** – Salaries and benefits of the staff dedicated to the water utility.
  - **Total Purchased Services** – Contract and professional services.
  - **Total Purchased Materials** – office supplies, maintenance of water supplies, and tools.
  - **Total Cost Allocations** – Indirect costs related to bank service fees, administrative costs, facilities, technology, personnel admin, self-insurance, vehicle maintenance, fuel, property insurance, and fiscal agent service costs.
  - **Total Utilities** – Utilities, gas, and energy related to water services.
  - **Capital Outlay (Repair and Maintenance)** – costs related to capital/improving projects.
  - **Infrastructure** – depreciation expense and additional planned capital costs.
- **Debt Service** – Principle and Interest costs related to existing/outstanding debt.

Table 4-9 summarizes the functionalized costs prior to any offset adjustments.

Table 4-9: Functionalized Expenses

Line #	Functionalized Expenses	FYE 2019 Functionalized Expenses
1	Energy	$533,715
2	Water Purchases	$647,600
3	Total Personnel Services	$852,737
4	Total Purchased Services	$288,503
5	Total Purchased Materials	$300,245
6	Total Cost Allocations	$1,212,516
7	Total Utilities	$16,485
8	Capital Outlay – R&M	$360,500
9	Infrastructure	$748,810
10	Debt Service	$731,709
11	**Total O&M Expenses**	**$ 5,692,820**

4.2.3.3 Step 3 – Allocate Functionalized Costs to Cost Components

The functionalization of costs allows Raftelis to better allocate the costs based on how they are incurred. This is commonly referred to as **cost causation**. Essentially, cost causation means that the City incurs a cost of providing service because of the demands or burdens the customer places on the system and water resources. Raftelis used the Base-Extra Capacity method to allocate the functionalized costs to various rate components (cost causation components), as described in the M1 Manual. The City's costs were allocated to the following cost causation components:

1. **Customer Service** includes customer related costs such as billing, collecting, customer accounting, and customer call center. These costs are incurred at the same level regardless of the type of land use or the total amount of water that the utility delivers.
2. **Meter Capacity** includes maintenance and capital costs associated with serving meters. These costs are assigned based on the meter size or equivalent meter capacity.
3. **Infrastructure** includes depreciation expense and additional planned capital.
4. **Groundwater Supply** represents the costs to pump available groundwater to all City customers to meet demands.
5. **Imported Supply** represents the cost of importing water from the San Gabriel Valley Metropolitan Water District and delivered by the MWD.
6. **Groundwater Recharge** represents the cost of replenish groundwater supply for all City customers.
7. **Fire Protection** represents the costs incurred as a result of sizing the distribution infrastructure in order to be able to serve fire protection infrastructure.
8. **Base/Delivery** are those operating and capital costs of the water system associated with serving customers at a constant, or average, rate of use. These costs tend to vary with the total quantity of water used.
9. **Peaking Costs** or Extra Capacity Costs represent those costs incurred to meet customer peak demands for water in excess of average day usage. Total extra capacity costs are subdivided into costs associated with maximum day and maximum hour demands. The maximum 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 (Max Day). Various facilities are designed to meet customer peaking needs. For example, reservoirs are designed to meet Max Day requirements and have to be designed larger than they would be if the same amount of water were being used at a constant rate throughout the year. The cost associated with constructing a reservoir is based on system wide peaking factors. For example, if the Max Day factor is 2.0, then certain system facilities must be designed larger than what would be required if the system only needed to accommodate average daily demand. In this case, half of the cost would be allocated to Base (or average day demand) and the other half allocated to Max Day. The calculation of the Max Hour and Max Day demands is explained below.

Allocating costs into these components allows us to distribute these cost components to the various customer classes based on their respective base, extra capacity, and customer requirements for service. To allocate costs to delivery and peaking cost components, system peaking factors are used. The base demand is assigned a value of 1.0 signifying no peaking demands. The Max Day and Max Hour factors shown in Table 4-10 were based on historical data and discussions with City staff. The peaking factors were calculated based on system-wide max months and average months of recent consumption data provided by the City. A max day peaking factor of 1.37 means that the system delivers approximately 1.37 times the average daily demand during a peak day. A max hour peaking factor of 2.05 means that delivery during the max hour is approximately 1.5 times the average hour during the max day. Since certain facilities are designed to meet max hour requirements while also meeting fire flow requirements, an allocation is provided for fire flow. Based on Raftelis and City staff estimates, fire flow was assigned 8% of max day and max hour demands.

Table 4-10: System-Wide Peaking Factors

	Factor	Base	Max Day	Max Hour	Fire
Base	1.00	100.00%	0.00%	0.00%	0.00%
Max Day[1]	1.37	69.15%	22.85%	0.00%	8.00%
Max Hour[2]	2.05	46.10%	15.23%	30.67%	8.00%

[1] Max Day = 1.37 times average day
[2] Max Hour = 1.5 times the average hour during the max day

Specific Allocation

The Specific expenses consists of three functionalized categories: Water Purchases, Energy, and Infrastructure. Table 4-13 details the breakdown of these specific allocation costs. The City currently purchases more imported water than what is necessary to serve demand after groundwater is used. Therefore, the amount of purchased imported water above what is needed to serve demand (32% of purchased imported water) remains in the water basin as groundwater recharge. Table 4-11 details the calculation of purchased imported water cost percentages.

Table 4-11: Calculation of Purchased Imported Water Cost Percentages

Water Source	Amount of Water (AF)	% of Demand (Source/Total Supply)
Imported water for Recharge[1]	518	32.00%
Imported Water to Serve Demand[2]	1,101	68.00%
Total Production[3]	**1,619**	**100%**

[1] Table 3-2 Line 8
[2] Table 3-2 Line 7
[3] Table 3-2 Line 6

The City has the right to extract 980 AF of groundwater. Based on total water production of 2,081 AF, approximately 47% of demand is served by groundwater and approximately 53% of demand is served by imported water. Energy costs are allocated between groundwater and imported water based on the pro rata share of both supplies to accommodate demand. Table 4-12 details the calculation of energy cost percentages for both water supplies. Imported water is directly discharged into to the City's groundwater basin and, thereby, all units of water regardless of their source incur pumping costs to distribute into the system. Therefore, these same percentages were used to allocate energy costs between groundwater and imported water. Lastly, 100% of infrastructure costs will be allocated to the Infrastructure Cost Component.

Table 4-12: Calculation of Energy Cost Percentages per Supply

Water Source	Amount of Water (AF)	% of Demand (Source/Total Supply)
Ground Water Supply[1]	980	47.09%
Imported Water to Serve Demand[2]	1,101	52.91%
Total Production[3]	**2,081**	**100%**

[1] Table 3-2 Line 3
[2] Table 3-2 Line 7
[3] Table 3-2 Line 2

Table 4-13: Water Specific Allocation (%)

Line #	Functionalized Expenses (%)	Infrastructure	Groundwater Supply[1]	Imported Supply	Groundwater Recharge	Total
1	Water Purchases			68.00%	32.00%	**100%**
2	Energy		47.09%	52.91%		**100%**
3	Infrastructure	100%				**100%**
	Functionalized Expenses ($)					
4	Water Purchases			$440,400	$207,200	$647,600
5	Energy		$251,326	$282,389		$533,715
6	Infrastructure	$748,810				$748,810
7	**Total Specific Allocations[2]**	**$748,810**	**$251,326**	**$722,789**	**$207,200**	**$1,930,125**
8	**O&M Allocation (%)**	**38.80%**	**13.02%**	**37.45%**	**10.74%**	**100%**

[1] Instead of one general water cost component, there are three water cost components to show separate unit prices for deriving rates.
[2] There may be slight differences due to rounding.

O&M Allocation

The O&M expenses consist of six functionalized categories: Total Personnel Services, Total Purchased Services, Total Purchased Materials, Total Cost Allocations, Total Utilities, and Total Capital Outlay – R&M. Raftelis reviewed the budget details related to the Operating Expenses to determine the most appropriate method for allocating the functional costs to cost causation components. Total Personnel Services was allocated 33% evenly to customer service, meter capacity, and base/delivery cost components. Total Purchased Services were allocated based on max hour percentages from Table 4-10. Total Purchased Materials was allocated 50% to Customer Service and 50% to Meter Capacity. The Cost Allocation functionalized expense was allocated 80% to customer service and 20% to base. Total Utilities were 100% allocated to the Customer Service cost component as these costs are related to billing of customer accounts and Total Capital Outlay – R&M was 100% allocated to Meter Capacity.

Using the relationship between Base, Max Day, Max Hour, and Fire, Raftelis allocated the O&M costs. Table 4-14 summarizes the percent allocations for the City O&M Expenses, the costs (prior to offsets and adjustments) allocated to the cost components, and the resulting O&M Allocation (%). The O&M Allocation (%) will be used to allocate the Operating Requirement, including any revenue offsets or adjustments, from the revenue requirements (Table 4-16).

Table 4-14: Water O&M Allocation (%)

Line #	Functionalized Expenses (%)	Customer Service	Meter Capacity	Fire	Base	Max Day	Max Hour	Total
1	Total Personnel Services	33.33%	33.33%		33.33%			**100%**
2	Total Purchased Services[1]			8.00%	46.10%	15.23%	30.67%	**100%**
3	Total Purchased Materials	50.00%	50.00%					**100%**
4	Total Cost Allocations	80.00%			20.00%			**100%**
5	Total Utilities	100.00%						**100%**
6	Total Capital Outlay – R&M		100.00%					**100%**
	Functionalized Expenses ($)							
7	Total Personnel Services	$284,246	$284,246		$284,246			**$852,737**
8	Total Purchased Services			$23,080	$132,996	$43,952	$88,474	**$288,503**
9	Total Purchased Materials	$150,123	$150,123					**$300,245**
10	Total Cost Allocations	$970,013			$242,503			**$1,212,516**
11	Total Utilities	$16,485						**$16,485**
12	Total Capital Outlay		$360,500					**$360,500**
13	Total O&M Allocations[2]	**$1,420,866**	**$794,868**	**$23,080**	**$659,745**	**$43,952**	**$88,474**	**$3,030,986**
14	**O&M Allocation (%)**	**46.88%**	**26.22%**	**0.76%**	**21.77%**	**1.45%**	**2.92%**	**100%**

[1] Total Purchased Services allocated based on Max Hour Peaking in Table 4-10.

[2] There may be slight differences due to rounding.

Capital Allocation

Table 4-15 summarizes the percent allocations for the capital assets, the original cost asset values by asset category as provided within the City's detailed asset listing[12] allocated to the cost components, and the resulting Capital Allocation (%). The Capital Allocation (%) will be used to allocate debt service (since it will be used to cover capital costs), including any revenue offsets or adjustments, from the revenue requirements (Table 4-16).

[12] Detailed Asset listing is on file with the City.

Table 4-15: Capital Allocation (%)

Line #	Functionalized Expenses (%)	Fire	Base	Max Day	Max Hour	General	Total
1	Equipment					100.00%	**100%**
2	Fire	100.00%					**100%**
3	Pump[1]	8.00%	46.10%	15.23%	30.67%		**100%**
4	Groundwater Supply		100.00%				**100%**
5	Storage[2]	8.00%	69.15%	22.85%			**100%**
6	Transmission and Distribution[3]	8.00%	46.10%	15.23%	30.67%		**100%**
7	Land					100.00%	**100%**
8	Buildings					100.00%	**100%**
	Functionalized Expenses ($)						
9	Equipment					$62,053	$62,053
10	Fire	$383,552					$383,552
11	Pump	$318,297	$1,834,133	$606,143	$1,220,138		$3,978,712
12	Groundwater Supply		$4,209,927				$4,209,927
13	Storage	$1,398,224	$12,085,549	$3,994,027			$17,477,800
14	Transmission and Distribution	$628,499	$3,621,623	$1,196,872	$2,409,248		$7,856,243
15	Land					$3,938,669	$3,938,669
16	Buildings					$315,374	$315,374
17	**Total Assets[4]**	**$2,728,573**	**$21,751,233**	**$5,797,042**	**$3,629,386**	**$4,316,095**	**$38,222,330**
18	**Capital Allocation**	**7.14%**	**56.91%**	**15.17%**	**9.50%**	**11.29%**	**100%**
19	**Debt[5]**	$52,234	$416,395	$110,976	$69,479	$82,625	**$731,709**

[1, 3] Asset allocations based on Max Hour Peaking in Table 4-10.
[2]Asset allocation based on Max Day Peaking in Table 4-10.
[4]There may be slight differences due to rounding.
[5]Total cost of service requirement for debt was allocated to each cost component based on the capital allocation percentages from Line 17.

Deductions are made to account for the required net cashflows (found in Table 4-8 – Line 12) [13] and any mid-year adjustment[14]. FYE 2019 cost of service to be recovered from the City's water customers is shown in Table 4-16.

[13] For the purposes of this Study, capital investments are funded through the Water Replacement Reserve. Meeting the minimum replacement reserve target ensures the capital projects can be funded each year of the Study Period.
[14] The proposed rates are expected to be in effect at the beginning of each Fiscal Year (July 1); therefore, a mid-year adjustment does not apply.

Table 4-16: Water Revenue Requirements

Line #	Revenue Requirements	Specific Allocation	Operating	Infrastructure	Debt	Total
1	Groundwater Supply	$251,326				$251,326
2	Water Purchases	$722,789				$722,789
3	Groundwater Recharge	$207,200				$207,200
4	Total Personnel Services		$852,737			$852,737
5	Total Purchased Services		$288,503			$288,503
6	Total Purchased Materials		$300,245			$300,245
7	Total Cost Allocations		$1,212,516			$1,212,516
8	Total Utilities		$16,485			$16,485
9	Capital Repair – R&M		$104,500	$256,000		$360,500
10	Infrastructure (Depr. + Planned)			$748,810		$748,810
11	Debt Service				$731,709	$731,709
12	**Total Revenue Requirements**	**$1,181,315**	**$2,774,986**	**$1,004,810**	**$731,709**	**$ 5,692,820**
	Less: Revenue Offsets					
13	Transfer In		$14,000			$14,000
14	Notices, Fees, Late Charges		$28,000			$28,000
15	Late Penalties		$24,000			$24,000
16	Other Charges for Services		$5,000			$5,000
17	Local Grants		$0			$0
18	Variable Pass-Through	$48,570				$48,570
19	**Total Revenue Offsets**	**$48,570**	**$71,000**	**$ -**	**$ -**	**$119,570**
	Less: Adjustments					
20	Adjustment for Cash Balance		$65,000	-$132,632		-$67,632
21	Adjustment for Mid-Year Increase			-$87,558		-$87,558
22	**Total Adjustments**	**$ -**	**$65,000**	**-$220,190**	**$ -**	**-$155,190**
23	**Revenue Requirements from Rates**	**$1,132,745**	**$2,638,986**	**$1,225,000[15]**	**$731,709**	**$5,728,440**

Table 4-17 shows the revenue requirements allocated to each of the cost causation components. Specific revenue requirements were allocated based on the Specific Allocation % from Table 4-13, Operating revenue requirements were allocated based on the O&M Allocation % from Table 4-14, and Capital revenue requirements were allocated based on the Capital Allocation % from Table 4-15. The revenue requirement for

[15] After discussion with City Council, direction was given to increase infrastructure funding by approximately $525K by increasing the Infrastructure Fixed Charge to $1.225M for FYE 2019.

General costs were reallocated to Meter Capacity to ensure minimal rate change in the proposed service charge for FYE 2019.

Table 4-17: Water Allocation of Costs to Cost Components

Revenue Requirements	Customer Service	Meter Capacity	Infrastructure	GW Supply	Imported Supply	GW Recharge	Fire	Base	Max Day	Max Hour	General	FYE 2019
Groundwater Supply				$251,326								**$251,326**
Imported Water[1]					$674,219							**$674,219**
Groundwater Recharge						$207,200						**$207,200**
Operation	$1,237,104	$692,067					$20,095	$574,420	$38,268	$77,032		**$2,638,986**
Infrastructure			$1,225,000									**$1,225,000**
Debt							$52,234	$416,395	$110,976	$69,479	$82,625	**$731,709**
Cost of Service Requirement[2]	**$1,237,104**	**$692,067**	**$1,225,000**	**$251,326**	**$674,219**	**$207,200**	**$72,330**	**$990,814**	**$149,244**	**$146,511**	**$82,625**	**$5,728,440**
Reallocation of General		$82,625									-$82,625	
Cost of Service Requirement	**$1,237,104**	**$774,692**	**$1,225,000**	**$251,326**	**$674,219**	**$207,200**	**$72,330**	**$990,814**	**$149,244**	**$146,511**	**$0**	**$5,728,440**

[1] Based on water purchases less pass-through revenue offset.
[2]There may be slight differences due to rounding.

Table 4-18 summarizes the derivation of the allocation percentage for the Private Fire Protection. Raftelis calculated the Private Fire Equivalent Units (or connections) and compared it to System-Wide Fire Equivalents. The demand factor for each fire line size was calculated by using the Hazen-William equation, which calculates the total flow capacity of a pipe, given its size (diameter). The diameter for each meter size is raised to the 2.63 power to determine its hydraulic capacity, per the Hazen-Williams equation. The demand factor was then multiplied by the number of connections for each respective size to determine the fire demand equivalents. 460 fire equivalent connection were private compared to 49,979 being public. This resulted in 1% allocation to System-wide and 99% to Private Fire Protection.

Table 4-18: Private Fire Protection Allocation

Hydrants/Lines [A]	Demand Factor (A^2.63) [B]	# of Connections [C]	Fire Demand Equivalents[1] (B x C) [D]	Percent Allocation (D ÷ 50,439) [E]	Requirement (E x $72,330)[3] [F]
Private Fire Lines					
2"	6.19	6	38		
4"	38.32	11	422		
Subtotal Private Equivalent Connections			**460**	1.00%	$723
Public Fire Hydrants[2]	111.31	449	49,979	99.00%	$71,606
			50,439	**100%**	**$72,330**

[1] Rounded up to the nearest equivalent.
[2] Based on historical data, assuming no new fire connections have occurred.
[3] There may be slight differences due to rounding.

Before the net revenue requirements from Table 4-17 can be allocated to customer class and tiers, Raftelis first needs to define the rate structure; therefore, Step 4 will be discussed in Section 4.2.4.4.

4.2.4 Rate Design

A key component of the Study includes evaluating the current rate structures and determining the most appropriate structures to model moving forward. The following subsections discuss the recommended rate structures, customer classes, and tier definitions for the water utility. Similar to the City's current rate structure, the recommended rates will include a Bi-monthly Service Charge, a Bi-monthly Infrastructure Charge, and a City Variable Usage Charge.

Tiered rates, when properly designed and differentiated by customer class as this Study does, allow a water utility to send consistent price incentives for conservation to customers. Due to the heightened interest in water conservation, tiered rates have seen widespread use, especially in the State of California. The recommended variable rate structures vary by customer class and have been discussed below.

4.2.4.1 Residential Water Rate Structure and Tiered Allotments

Residential customers are currently charged a volumetric use rate on an inclining 4-tier rate structure, where price per unit increases with each tier. Raftelis recommends moving to a 2-tiered rate structure for single-family[16] customers that provides a straight-forward connection between available water supplies and tiered allotments. The City has the rights to extract 980 AF per year from the groundwater basin. However, due to water loss, the amount of available groundwater to serve customers is approximately 750 AF per year. As part of the water rate design restructuring, the net amount of available groundwater is apportioned evenly to all accounts, with duplexes counting as an additional single-family account. Doing so resulted in each account receiving a fair share amount of groundwater equal to 14 ccf per account by billing period. Therefore, the tiers for Single-Family Residential will account for the amount of available groundwater for setting the Tier 1 allotment. For all other customer classes, the 14 ccf per account per billing period is accounted for as part of the uniform rate structure by calculating a blended rate.

[16] Single-family customers include single units and duplexes

For single-family residential accounts, Tier 1 is based on the amount of groundwater allocated to the number of residential accounts. Through this method, the Tier 1 allotment is 14 ccf and is deigned to recover costs associated with delivering groundwater water for all residential accounts. Tier 2 would capture any usage above 14 ccf, which would be fulfilled through imported water supplies. The current and recommended tier widths are shown in Table 4-19.

Table 4-19: Residential Tier Adjustments

Customer Class / Tiers	Current Tier Width (ccf)	Recommended Tier Width (ccf)
Single Family Residential		
Tier 1	(0-11)	(0-14)
Tier 2	(12-33)	(>14)
Tier 3	(34-66)	N/A
Tier 4	(+66)	N/A

4.2.4.2 Non-Residential and Multi-Family Water Rate Structure

Raftelis recommends a uniform rate for Multi-Family and Commercial or Non-Residential accounts. For this Study, Multi-Family accounts are those with more than two residential units. Because the number of units vary between multi-family complexes and each complex has a master metered to serve the total units, a uniform rate structure based on a blended rate is more equitable between complexes. The blended uniform rate would account for groundwater available per account and the amount of imported water needed to cover the remaining demand. Commercial uses and related water needs are not as homogeneous as residential accounts. Consequently, developing a tiered rate structure that can be applied to all commercial types and uses and their corresponding water needs would not be practical. As an example, the water usage needs of a Starbucks versus a restaurant versus a bookstore are substantially different and a "one-size fits all" tiered rate would unduly penalize certain commercial enterprises that use a high volume of water, even though the business may be extremely efficient with its water use. Therefore, a uniform rate for non-residential customers is a more equitable approach. Although implementing uniform rates is recommended, it is important to note that the customer class is still paying its proportionate share of the costs of providing the service based on the demand and burdens the class places on the system and is not being subsidized by another customer class. A uniform rate provides the most appropriate and equitable rate structure between accounts within this customer class.

4.2.4.3 Usage Under Recommended Tiers

The recommended tier structure increases the width of Tier 1 for single-family customers, leading to more usage in the first tier (assuming the same level of usage). For example, a residential customer using 30 units under the current structure would be billed 11 units at the Tier 1 rate and 19 units at the Tier 2 rate. Under the recommended tier structure, the same customer using 30 units would be billed 14 units at the Tier 1 rate and 16 units at the Tier 2 rate. Performing this same analysis for all accounts yields the tier totals found in Table 4-20. Note that the total usage of 692,280 ccf is the same regardless of tier structure – only the usage distribution in each residential tier is affected.

Table 4-20: Usage by Customer Class and Tier

Customer Classes	Current Tier Structure	Projected Tier Structure
Single Family Residential[1]		
Tier 1	271,186	237,004
Tier 2	212,409	301,594
Tier 3	92,735	-
Tier 4	41,656	-
Multi-Family	-	79,388
Non-Residential	52,739	52,739
Irrigation	12,483	12,483
Institutional	9,072	9,072
Total Water Usage	**692,280**	**692,280**

[1] Usage of multi-family customers under current tiered structure is captured under single family residential because both customer classes are charged the same tiered rates.

4.2.4.4 Step 4 – Distribute Cost Components to Customer Classes and Tiers

To allocate costs to different customer classes, unit costs of service need to be developed for each cost causation component. The unit costs of service are developed by dividing the total annual costs allocated to each parameter by the total annual service units of the respective component. The annual units of service for each cost component from Table 4-17 are derived below and have been rounded up to the nearest whole penny.

Customer Service Component

These costs are incurred at the same level regardless of the type of land use or the total amount of water that the utility delivers; therefore, the Customer Service component is based on the number of bills and does not fluctuate with increases in meter size. The number of bills can be determined by multiplying the number of accounts, 3,873, times the number of billing periods, 6, in a year. The total Customer Service revenue requirement from Table 4-17 of $1,237,104 is divided by the number of bills to determine the unit cost of service shown in Table 4-21.

Table 4-21: Customer Service Component - Unit Rate

Customer Service Component	
Customer Service Revenue Requirements[1]	$1,237,104
÷ # of Bills (3,873 x 6)	23,238
Bi-Monthly Unit Rate[2]	**$53.24**

[1]Customer Service Component from Table 4-17.

[2]Customer Service rate was rounded up to the nearest penny.

Meter Capacity Component

The Meter Capacity Component includes costs related to a portion of personnel and materials, capital outlay, and the public portion for fire protection (hydrants). Raftelis allocated these cost components based on meter

size. To create parity across the various meter sizes, each meter size is assigned a factor relative to a 3/4" meter, which is given a value of 1. Larger meters have the potential to demand more capacity, or said differently, exert more peaking characteristics compared to smaller meters. The potential capacity demand (peaking) is proportional to the potential flow through each meter size. For the purposes of this study, the safe maximum operating capacity by meter type, as identified in the AWWA M1 Manual, 6th Edition, Table B-1, was used as a basis for calculating the equivalent meter ratio. As shown in Table 4-22, the safe maximum operating capacity for each meter was divided by the base meters safe operating capacity (20 gpm) to determine the equivalent meter ratio. The ratios represent the potential flow through each meter size compared to the flow through a 3/4" meter. Multiplying the number of meters by the AWWA Ratio results in the Equivalent Meter Units (EMUs).

Table 4-22: Equivalent Meter Units

Meter Size	AWWA Capacity [A] (gpm)	Capacity Ratio[1] [B] (A ÷ 30)	Number of Accounts [C]	Equivalent Meter Units [D] (B x C)	Annual EMUs [E] (D x 6)[2]
3/4" or less	30	30/30 = 1.00	2,906	2,906	17,436
1"	50	50/30 = 1.67	631	1,054	6,323
1 1/2"	100	100/30 = 3.33	227	756	4,535
2"	160	160/30 = 5.33	100	533	3,198
3"	350	350/30 = 11.67	8	93	560
4"	630	630/30 = 21.00	1	21	126
			3,873	**5,363**	**32,178**

[1]Capacity ratios were around to the nearest tenth.
[2]There may be slight differences due to rounding.

Based on these ratios and taking into consideration the number of billing periods, the total annual equivalent meters equals 32,178 (see Table 4-22). Table 4-23 shows the Meter Capacity costs and Fire Protection costs from Table 4-17 allocated over the total annual equivalent meters.

Table 4-23: Meter Capacity Component – Unit Rate

Meter Capacity Component	
Meter Capacity Revenue Requirement	$774,692
+ Fire Protection Requirement	$72,330
Total Meter Requirements[1]	**$847,022**
÷ Annual Equivalent Units	32,178
Bi-Monthly Unit Rate[2]	**$26.33**

[1] Meter Capacity + Fire Protection revenue requirement from Table 4-17.
[2]Bi-monthly meter capacity rate was rounded up to the nearest penny.

Infrastructure Component

The Infrastructure revenue requirement of $1,225,000 from Table 4-17 was allocated to Infrastructure over the annual equivalent meters of 32,178.

Table 4-24 summarizes the determination of the unit rate for the Infrastructure Component.

Table 4-24: Infrastructure Component – Unit Rate

Infrastructure Component	
Infrastructure Requirement[1]	$1,225,000
÷ Annual Meter Equivalents	32,178
Bi-Monthly Infrastructure Rate[2]	**$38.07**

[1]Infrastructure revenue requirement from Table 4-17.
[2]Bi-monthly infrastructure rate was rounded up to the nearest penny.

Groundwater Supply Component

The Groundwater Supply component is the cost required to pump water from the basin and deliver to customers**.** The revenue requirement of $251,326 was divided by 326,569 ccf to develop a rate for all units of groundwater currently available for customers. Table 4-25 summarizes the determination of the unit rate for the Groundwater Supply Component.

Table 4-25: Groundwater Supply Component – Unit Rate

Groundwater Supply Component	
GW Supply Revenue Requirement[1]	$251,326
÷ GW Allotment less Water Loss[2]	326,569
Unit Rate (per ccf)[3]	**$0.77**

[1] Groundwater Supply revenue requirement from Table 4-16, Line 1
[2] Groundwater Allotment less water loss from Table 3-2 Line 5
[3] Groundwater Supply rate was rounded up to the nearest penny.

Imported Supply Component

The City incurs purchased water costs at a uniform rate; therefore, the Imported Supply cost is based on the total units of potable water produced less available groundwater allotment (see Table 4-20). $674,219 was divided by the imported amount purchased equal to 365,711 ccf for a unit rate of $1.85 per ccf. Table 4-26 summarizes the determination of the unit rate for the Imported Supply Component.

Table 4-26: Imported Supply Component – Unit Rate

Imported Supply Component	
Imported Supply Revenue Requirements[1]	$674,219
÷ Total Usage less GW allotment (ccf)[2]	365,711
Unit Rate (per ccf)[3]	**$1.85**

[1]Imported Supply revenue requirement from Table 4-16, Line 2 less Line 18
[2]From Table 3-2 Line 10 less Line 5
[3]Imported Supply unit rate was rounded to the nearest penny.

Groundwater Recharge

The Groundwater Recharge Component recovers the cost of additional purchased imported water, above demand, to replenish the groundwater basin. Doing so will provide the City with a more reliable water source by increasing the elevation of the groundwater in the basin to over 500 MSL. The amount of required imported water (1,101 AF) was derived by subtracting groundwater availability of 980 AF from total water production of 2,081 AF. The City purchased 1,619 AF of water from SGVMWD, which is more than the requirement to

supply City demand. The remaining 518 AF of imported water will be used to recharge groundwater supply. The cost of groundwater recharge was calculated by multiplying 518 AF by the rate of imported water of $400/AF. Therefore, the cost to recharge groundwater equals $207,200. This cost was divided by total water sales of 692,280 ccf from Table 4-20. Because groundwater recharge generates water reliability to all customers and potential access to additional groundwater availability, all units of water are charged the cost associated with groundwater recharge. Table 4-27 summarizes the calculation of the unit rate for the Groundwater Recharge Component.

Table 4-27: Groundwater Recharge Component

Line #	GW Recharge Calculation	
1	Total Water Production[1]	2,081 AF
2	Less Groundwater Availability[2]	-980 AF
3	**Required Imported Water[3]**	**1,101 AF**
4	Purchased Imported Water[4]	1,619 AF
5	**Groundwater Recharge [Line 4 – Line 3]**	**518 AF**
6	Imported Water Cost	$400/AF
7	GW Recharge Cost [Line 5 x Line 6]	$207,200
8	**÷ Total Water Usage (ccf)[5]**	692,280
9	**Unit Rate (per ccf) [Line 7 ÷ Line 8][6]**	**$0.30**

[1, 2, 3, 4, 5]Water Supply information from Table 3-2.

[6]Groundwater Recharge unit rate was rounded to the nearest penny.

Base/Delivery Component

Delivery costs are those operating and capital costs of the water system associated with delivering water to all customers at a constant average rate of use. Therefore, delivery costs are spread over all units of water, irrespective of customer class or tiers, to calculate a uniform rate.

Table 4-28 summarizes the determination of the unit rate for the Base/Delivery Component.

Table 4-28: Base/Delivery Component – Unit Rate

Base/Delivery Component	
Base Revenue Requirements[1]	$990,814
÷ Total Projected Water Sales (ccf)[2]	692,280
Unit Rate (per ccf)[3]	**$1.44**

[1]Base/Delivery revenue requirement from Table 4-17

[2]Total water sales/usage from Table 3-2. Line 9

[3]Base/Delivery unit rate was rounded to the nearest penny.

Peaking Component

Extra capacity or peaking costs represent those costs incurred to meet customer peak demands for water in excess of a baseline usage. Total extra capacity costs are apportioned between maximum day and maximum hour demands based on the type of expense. The maximum day demand is the maximum amount of water used in a single day in a year. The maximum hour demand is the maximum usage in an hour on the maximum

usage day. Different facilities are designed to meet different peaking characteristics. Therefore, extra capacity costs include capital improvements and power related costs, and have been apportioned between base, maximum day, and maximum hour. Costs allocated to base are part of the delivery costs as defined above. The Peaking Revenue Requirements, $295,755, were determined by adding the Max Day Requirements of $149,244 and the Max Hour Requirements of $146,511.

Costs associated with peaking are apportioned to each defined customer class or tier based on its total demand (total water used, weighted by a peaking factor). Peaking was calculated for each customer class/tier based on City consumption data, which ensures that accounts within each customer class and tier will only recover the costs allocated to their respective customer class/tier in proportion to the cost of providing service. Table 4-29 provides the peak factor for each customer class or tier by taking the max month usage compared to the average month usage. Table 4-30 shows the peaking costs allocated to each customer class as well as the derivation of the unit rate. The peaking cost allocated to each customer class/tier is derived by weighting the peaking factor based on the total amount of water usage that is generating the peaking factor (product of Usage and Peaking Factor). The result is the weighted peaking factor and peak costs are apportioned based on the percentage of peak (Table 4-30).

Table 4-29: Class Peaking Factors

Customer Class	Max Month Usage [A]	Average Month Usage [B]	Peaking Factor[1] [A ÷ B]
Single-Family Residential	125,466	89,766	**1.40**
Multi-Family	14,796	13,231	**1.12**
Non-Residential	11,667	8,790	**1.33**
Irrigation	3,228	2,081	**1.56**
Institutional	2,578	1,512	**1.71**

[1]Peaking factors for each customer class were rounded up to the nearest tenth.

Table 4-30: Peaking Costs Allocated to Classes

Customer Class	Projected Usage (ccf) [A]	Peaking Factor [B]	Weighted Peaking Factor [C] (A x B)	% Allocation [D]	Revenue Requirements [E] ($295,755 × D)[1]	Unit Rate [F][2] (E ÷ A)
Single-Family Residential	538,598	1.40	754,037	79.53%	$235,214	Further Allocated
Multi-Family	79,388	1.12	88,915	9.38%	$27,742	**$0.35**
Non-Residential	52,739	1.33	70,143	7.40%	$21,886	**$0.42**
Irrigation	12,483	1.56	19,473	2.05%	$6,063	**$0.49**
Institutional	9,072	1.71	15,513	1.64%	$4,850	**$0.54**
Totals	**692,280**		**948,081**	**100%**	**$295,755**	

[1]There may be slight differences due to rounding.
[2]Unit rates were rounded up to the nearest penny.

4.2.5 Recommended Water Rates

4.2.5.1 Fixed Charges

Currently, the City's fixed monthly water charges generate approximately 48% of total rate revenues. The new rate structure will recover approximately 58% of rate revenues on the fixed bi-monthly charges. Recovering a greater portion of the costs over the fixed component will enhance revenue stability. Table 4-31 summarizes the Bi-Monthly Service Charges by meter size based on the unit rates developed in the Rate Design section. The Customer Service Component does not vary based on meter size whereas Meter Capacity increases as the size of the meter increases. The Meter Capacity rate is determined by multiplying the unit costs of $26.33 (Table 4-23) by the appropriate capacity ratios.

Table 4-31: FYE 2019 Recommended Meter Service Charge ($/Bi-Month)

Meter Size	Capacity Ratio	Customer Service [A]	Meter Capacity [B]	FYE 2019 Recommended Service Charge [C] (A+B)	Current Rates	Difference
3/4" or less	1.00	$53.24	$26.33	**$79.57**	$79.68	-$0.11
1"	1.67	$53.24	$43.98	**$97.22**	$107.00	-$9.78
1 1/2"	3.33	$53.24	$87.68	**$140.92**	$152.54	-$11.62
2"	5.33	$53.24	$140.34	**$193.58**	$207.18	-$13.60
3"	11.67	$53.24	$307.28	**$360.52**	$334.68	$25.84
4"	21.00	$53.24	$552.93	**$606.17**	$516.83	$89.34

In addition, the infrastructure cost will be charged to all customers as a fixed charge. Recovering a greater portion of the infrastructure cost over the fixed component will allow the City to cover capital costs. Table 4-32 details the Bi-monthly Infrastructure Charge based on meter capacity.

Table 4-32: FYE 2019 Recommended Infrastructure Charge ($/Bi-Month)

Meter Size	Capacity Ratio	FYE 2019 Recommended Infrastructure Charge
3/4" or less	1.00	**$38.07**
1"	1.67	**$63.58**
1 1/2"	3.33	**$126.77**
2"	5.33	**$202.91**
3"	11.67	**$444.28**
4"	21.00	**$799.47**

4.2.5.2 Variable Rates

Similar to how costs may be apportioned to different groups of customers based on usage characteristics to show proportionality, maximum day and maximum hour costs were apportioned between tiers based on the

unique usage characteristics of Single-Family Residential customers within each tier. As part of our consumption analysis, Raftelis analyzed the water usage of each Single-Family Residential account for a 12-month period and grouped customers based on which tier they fell within ("Tiered Customer Class"). Doing so allowed Raftelis to group "like customers" together based on water usage and to allocate costs to each tier. As such, the cost peaking costs allocated to the Single-Family Residential customer class is further allocated between the 2 defined tiers proportionately. Table 4-33 details the derivation of the unit rates for Tier 1 and Tier 2. The peaking cost allocated to each tier is derived by weighting the peaking factor based on the total amount of water usage that is generating the peaking factor (product of Projected Usage and Peaking Factor). The percentage allocation is based on the proportionate share of weighted usage, which is then used to calculate the share of revenue requirements for both tiers. The unit rate is then derived by dividing the revenue requirements by the projected usage for each tier.

Table 4-33: Peaking Factor for Single-Family Residential Tiers

Customer Class	Projected Usage (ccf) [A]	Peaking Factor [B]	Weighted Peaking Factor [C] (A x B)	% Allocation [D]	Revenue Requirements [E]	Unit Rate[1] [F] (E ÷ A)
Single Family Residential					**$235,214**	
Tier 1	237,004	1.00	237,004	19%	$44,691	**$0.19**
Tier 2	301,594	3.36	1,013,356	81%	$190,523	**$0.64**

[1]Unit rates were rounded to the nearest penny.

The components of the variable rate are added together to produce rates for each customer class and tier. Residential customers in Tier 1 are not charged with the imported supply rate as their usage is made up by groundwater allotment. Table 4-34 shows each City component rates and the final recommended FYE 2019 City Usage rates.

Table 4-34: Recommended FYE 2019 City Usage Rates ($/ccf)

Customer Classes	GW Supply	Imported Supply	GW Recharge	Base Component	Peaking Component	Recommended FYE 2019 Variable Charge	Current Charge	Difference
Single Family Residential								
Tier 1	$0.77	$0.00	$0.30	$1.44	$0.19	**$2.70**	$2.69	$0.01
Tier 2	-	$1.85	$0.30	$1.44	$0.64	**$4.23**	$3.47	$0.76
Multi-Family[1]	$0.77	$1.85	$0.30	$1.44	$0.35	**$3.73**		
Non-Residential[2]	$0.77	$1.85	$0.30	$1.44	$0.42	**$3.71**	$3.89	-$0.18
Irrigation[3]	$0.77	$1.85	$0.30	$1.44	$0.49	**$3.81**	$3.89	-$0.08
Institutional[4]	$0.77	$1.85	$0.30	$1.44	$0.54	**$4.10**	$3.89	$0.21

[1] Multi-family is a blended rate based where approximately 20% of total usage is supplied by groundwater.
[2] Non-Residential is a blended rate based where approximately 27% of total usage is supplied by groundwater.
[3] Irrigation is a blended rate based where approximately 25% of total usage is supplied by groundwater.
[4] Institutional is a blended rate based where approximately 3% of total usage is supplied by groundwater.

For subsequent years, starting in FY 2019-20, both fixed and variable rates will be adjusted based on percentage change in the CPI for Los Angeles – Orange County - Riverside.

5. WASTEWATER RATE STUDY

5.1 WASTEWATER UTILITY – FINANCIAL PLAN

This section describes the development of the wastewater utility financial plan, the results of which were used to determine the revenue adjustments needed to meet ongoing expenses and provide fiscal sustainability to the City. Establishing a utility's revenue requirement is a key step in the rate setting process. The review involves analysis of projected annual operating revenues under the current rates, O&M expenses, capital expenditures, transfers between funds, and reserve requirements. This section of the report provides a discussion of the projected revenues, O&M and capital expenditures, the capital improvement financing plan, and overall revenue requirements required to ensure the fiscal sustainability of the Wastewater Utility.

5.1.1 Revenue from Current Rates

The current wastewater rate structure consists of a bi-monthly base charge per dwelling unit for all customers, and rates per unit of flow for non-residential customers. The following tables summarize the current wastewater rate structure of the City. Table 5-1 summarizes the projected number of dwelling units, bi-monthly base charges, and the projected revenues. Table 5-2 summarizes the wastewater flows by customer class, existing flow rates, and the projected revenues.

Table 5-1: Current Wastewater Bi-Monthly Base Charge

Customer Class	# of Units [A]	FYE 2018 Base Charge ($/Bi-Month) [B]	Projected Base Revenue[1] [C] (A x B x 6)
Residential	4,414	$32.24	$853,844
Commercial	94	$19.53	$11,015
Institutional	40	$19.53	$4,687
Annual Wastewater Base Revenue	**4,548**		**$869,546**

[1] Revenue was rounded to the nearest dollar.

Table 5-2: Current Wastewater Variable Charge

Customer Class	Projected Flow [A]	FYE 2018 Flow Rates ($/ccf) [B]	Projected Flow Revenue[1] [C] (A x B)
Non-Residential			
Commercial	15,954	$0.72	$11,487
Institutional	16,614	$0.43	$7,144
Annual Wastewater Flow Revenue			**$18,631**

[1] Revenue was rounded to the nearest dollar.

Using account growth, flow factors, and other revenue assumptions from Table 3-2, Raftelis projected the revenues for the wastewater utility[17]. Table 5-3 summarizes the rate revenue as well as other revenues. As shown in the table, since Raftelis assumed zero growth and no increase in wastewater demand, the rates and rate revenue remained constant during the Study Period. The projected wastewater flow by customer class remained constant and was based on the total FYE 2018 data.

Table 5-3: Projected Wastewater Revenues

Line #	Wastewater Utility Revenues	FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022
1	Rate Revenues	$888,177	$888,177	$888,177	$888,177	$888,177
2	Other Misc. Revenues	$3,400	$400	$589	$400	$400
3	**Total Revenues**	**$891,577**	**$888,577**	**$888,766**	**$888,577**	**$888,577**

5.1.2 O&M Expenses

The City's FYE 2018 budget values and the assumed inflation factors (Table 3-1) for the study period were used as the basis for projecting O&M costs beyond FYE 2019. Table 5-4 shows the total projected O&M expenses for FYE 2018 through FYE 2022[18]. As shown in the table (Line 6), the wastewater utility does currently have outstanding debt.

Table 5-4: Projected Wastewater O&M Expenses

Line #	Expenditures	FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022
1	Total Personnel Services	$511,200	$526,536	$542,332	$558,602	$575,360
2	Total Purchased Services	$58,700	$60,461	$62,275	$64,143	$66,067
3	Total Purchased Materials	$14,100	$14,523	$14,959	$15,407	$15,870
4	Total Cost Allocations	$304,400	$313,532	$322,938	$332,626	$342,605
6	Debt Service	$57,202	$50,702	$50,702	$50,702	$0
7	**Total Operating Expenses**	**$945,602**	**$965,754**	**$993,206**	**$1,021,480**	**$999,902**
8	**Reserve Direct Transfer (Depreciation)**	$207,000	$213,210	$219,606	$226,194	$232,980

5.1.3 Capital Improvement Plan

The City provided the asset management plan to address future wastewater capital improvement project (CIP) needs. Raftelis worked closely with City staff to adjust the CIP to reflect a measured multi-year approach. Based on discussions with City Staff, the 5-year average CIP costs were used as the baseline for each year of the Study Period. Raftelis indexed the capital expenditures by a 3% inflationary compounding rate from Table 3-1 to account for increased construction costs in future years. Table 5-5 summarizes the 5-Year Average CIP (Line 1), the cumulative inflationary factor (Line 2), and the resulting total anticipated CIP costs (Line 3).

[17] Although only the Study Period is shown here, Raftelis projected the revenues through FYE 2027.
[18] Although only the Study Period is shown here, Raftelis projected the expenses through FYE 2027.

Table 5-5: Wastewater Utility Capital Improvement Plan[19]

Line #	Category	FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022
1	Asset Management Plan (5-Yr Average)	$26,000	$26,000	$26,000	$26,000	$26,000
2	Cumulative Inflationary Factor	100%	103%	106%	109%	113%
3	**Inflated CIP**	**$26,000**	**$26,780**	**$27,583**	**$28,411**	**$29,263**

5.1.4 Reserve Requirements

In FYE 2018, the City's projected beginning reserve balance for the wastewater utility is approximately $333,177. Currently, the City maintains a wastewater operating fund and wastewater replacement fund. As part of Best Management Practices of utilities, it is recommended that a utility have at least 60-90 days of operating reserves as well as sufficient funds available to ensure that the utility's capital plan can move forward as scheduled and is not delayed due to insufficient funds on hand.

5.1.5 Financial Outlook at Current Rates

Revenues generated from current rates, and miscellaneous revenues are approximately $888K in FYE 2019, which does not exceed current operational expenses. Without any revenue adjustments in the subsequent years, the City will not be able to fund operational and debt expenses, as shown in Figure 5-1. The figure illustrates the operating position of the wastewater utility, where expenses are shown by stacked bars and the total revenues at current rates are shown by the horizontal green trend line. In addition, the City would fail to meet the required 120% debt coverage. The City also needs to reinvest back into its utility system to ensure the continued collection of wastewater. Furthermore, the City's annual planned capital projected is over $26K and there are additional asset repair & replacement required above and beyond what is currently planned. Figure 5-2 summarizes the baseline CIP and its funding sources by fiscal year (currently 100% PAYGO). Based on the financial plan review, the City would need revenue adjustments for subsequent years. Figure 5-3 illustrates the total reserves balances for each fiscal year after operating and capital in funded.

[19] There may be differences due to rounding.

Figure 5-1: Wastewater Operating Financial Position at Current Rates

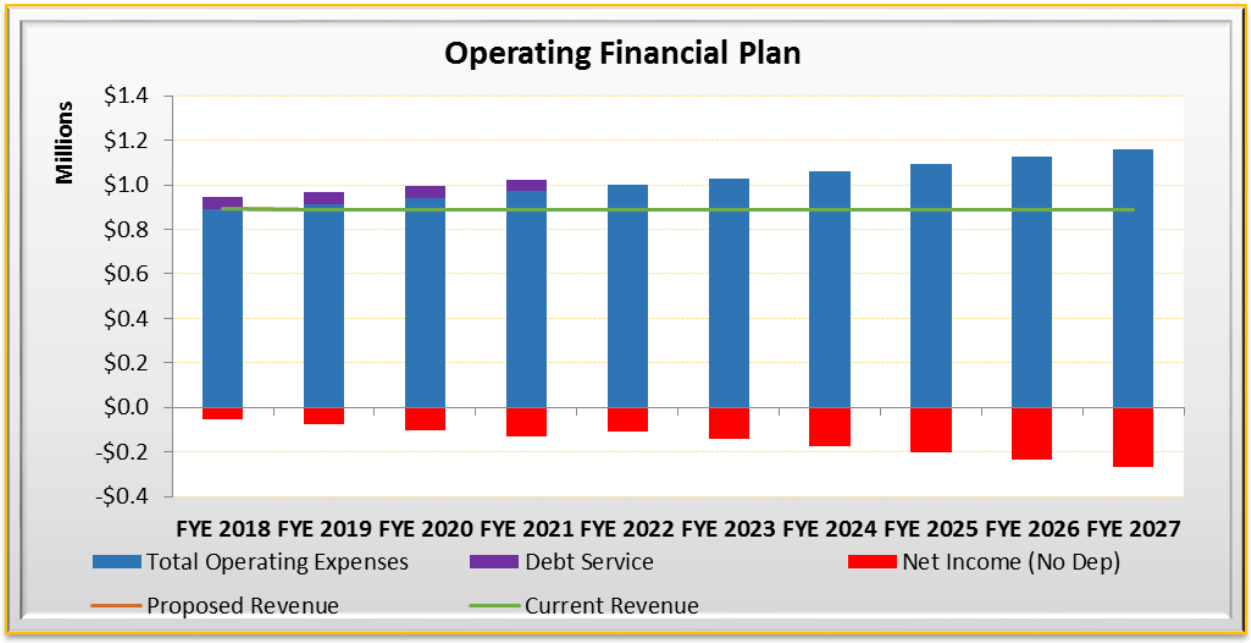


Figure 5-2: Baseline Wastewater Capital Improvement Plan and Funding Source

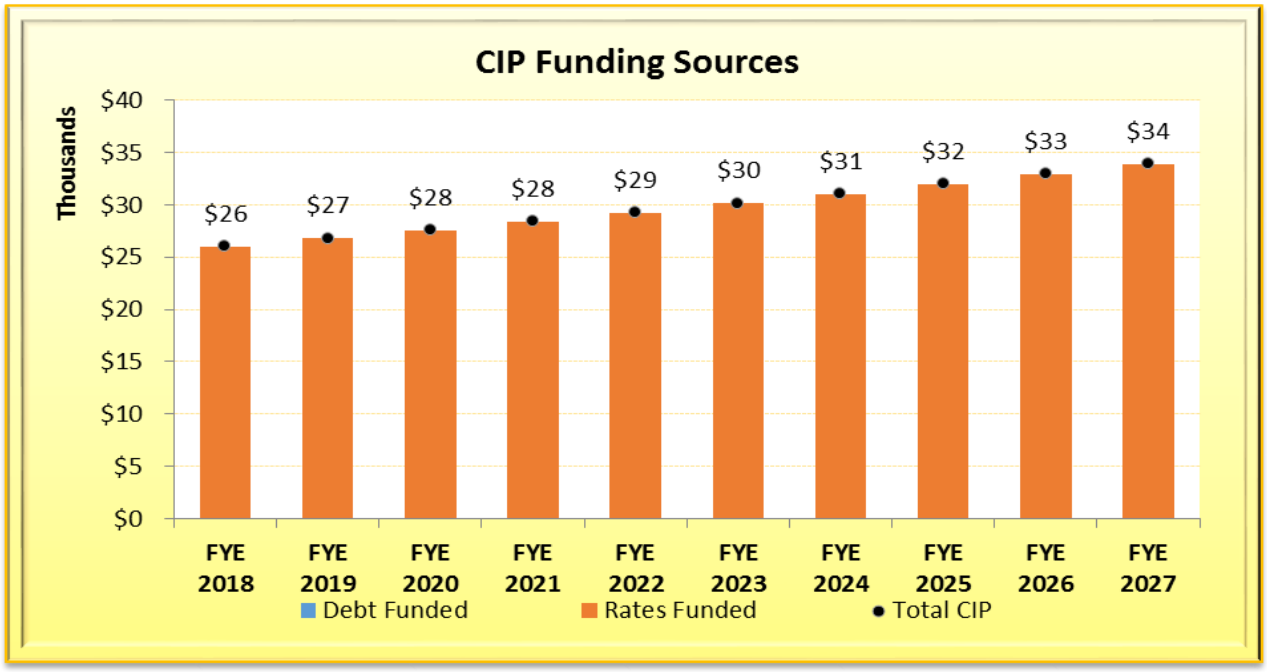
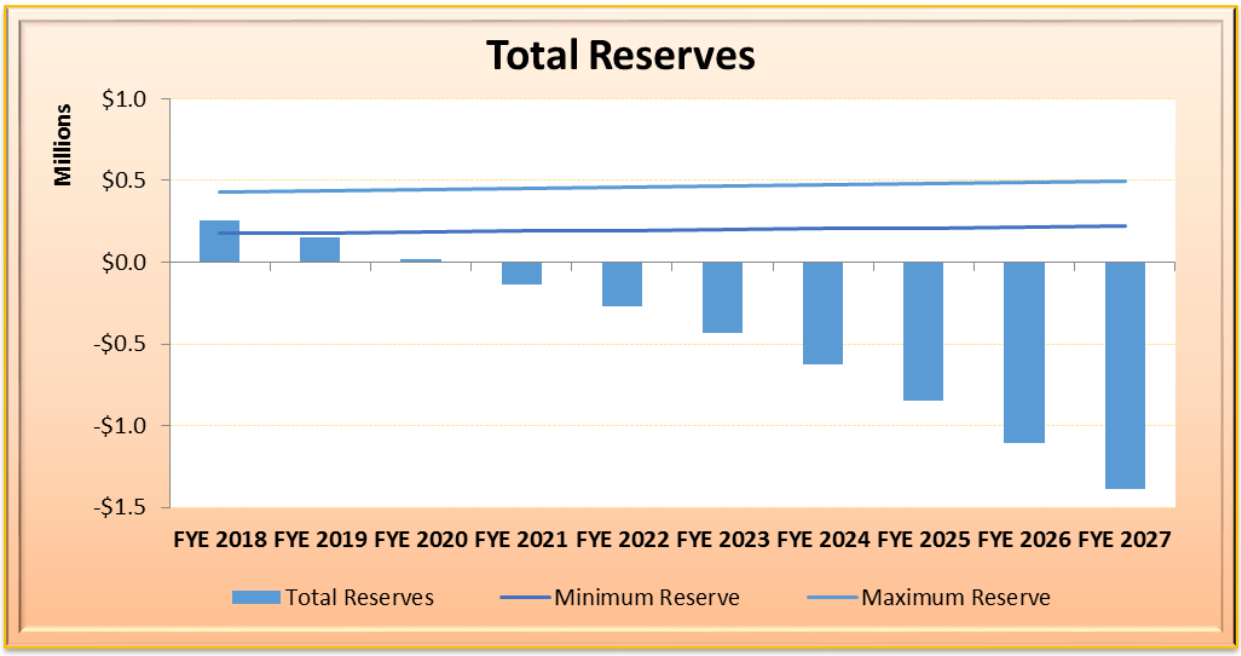


Figure 5-3: Projected Ending Wastewater Reserves at Current Rates



5.1.6 Financial Plan Recommendations

After reviewing the City's revenue requirements, reserve policies, capital planning schedule, and current revenues, a financial plan was developed to meet the following criteria:

- Ensure positive net operating cash income each Fiscal Year (FY) of the planning period. This will allow revenues to exceed operational and maintenance expenses beginning in FYE 2022.
- Fully fund capital projects and deferred maintenance through Pay-As-You-Go (PAYGO)
- Establish and maintain the following reserves by the end of the Study Period (FYE 2019 – FYE 2023):
  - Wastewater Operating Fund – minimum of 60 days of operating expenses.
  - Repair & Replacement Fund – 1 years' worth of capital based on 5-Year Average of Capital Improvement Plan.
- Raftelis recommends that the City implements additional revenue adjustments commencing in FYE 2019 of 10% and adjustments in FYE 2020 through FYE 2023 of 3% each year to recover the City's wastewater revenue requirements, including capital costs and reserve funding. In subsequent years outside of the five-year planning period (FYE 2023 and beyond), it is anticipated that the City would need 2% revenue adjustments each year to fully fund reserves by FYE 2027 as shown in Figure 5-6.

5.1.6.1 Recommended Reserves

Raftelis recommends establishing the same reserves recommended for the water utility:

Wastewater Operating Reserve – The operating reserve is used primarily to meet ongoing cash flow requirements. Raftelis recommends establishing an operating reserve target of at least 60-days of O&M expenses with an ideal target of 90-days of O&M. A 60-day reserve ensures working capital to support the operation, maintenance, and administration of the utility. Maintaining this level of reserves also provides liquid funds for the continued ongoing operations of the utility in the event of unforeseen costs or interruption with the utility or the billing system.

Wastewater Replacement Reserve – The replacement reserve is used primarily to meet the City's capital improvement requirements. The City's revised capital improvement plan—over the five-year period—is approximately $140K. The ideal target for the capital reserve should be to have a reserve sufficient to fund a year's worth of capital costs, which would ensure that the City can continue to reinvest in the wastewater system and that necessary capital improvements are not delayed or deferred due to cash flow concerns. Raftelis recommends establishing a capital reserve based on one years' worth of the average 5-year asset management plan, which is approximately $26K.

Table 5-6 summarizes the recommended financial plan (see Appendix A – Exhibit B for a detailed financial plan)[20]. Figure 5-4 illustrates the operating position of the wastewater utility where expenses, inclusive of reserve funding, are shown by stacked bars; and total revenues at both current rates and recommended rates are shown by the horizontal trend lines. Figure 5-5 summarizes the projected CIP and its funding sources (100% PAYGO). Figure 5-6 displays the ending total reserve balance for the wastewater utility, inclusive of operating and capital funds. The horizontal trend lines indicate the target reserve balance and the bars indicate ending reserve balance. No new debt is recommended to be issued as part of the recommended five-year financial plan.

[20] May be a slight difference due to rounding.

Table 5-6: Recommended Wastewater Financial Plan

Line #	Category	FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022
	Revenues					
1	Rate Revenues	$888,177	$888,177	$888,177	$888,177	$888,177
2	Proposed Additional Rate Revenue	$0	$81,416	$118,128	$148,317	$179,412
3	Other Revenues[1]	$3,400	$400	$400	$400	$400
4	**Total Revenues**	**$891,577**	**$969,993**	**$1,006,705**	**$1,036,894**	**$1,067,989**
5	**Less: Expenditures**					
6	Total Personnel Services	$511,200	$526,536	$542,332	$558,602	$575,360
7	Total Purchased Services	$58,700	$60,461	$62,275	$64,143	$66,067
8	Total Purchased Materials	$14,100	$14,523	$14,959	$15,407	$15,870
9	Total Cost Allocations	$304,400	$313,532	$322,938	$332,626	$342,605
10	Total Debt Service	$57,202	$50,702	$50,702	$50,702	$0
11	**Total Expenditures**	**$945,602**	**$965,754**	**$993,206**	**$1,021,480**	**$999,902**
12	**Net Cashflow** *(Line 4 – Line 11)*	**($54,024)**	**$4,240**	**$13,500**	**$15,414**	**$68,087**
13	**Reserve Direct Transfer (Depreciation)**	**$207,000**	**$213,210**	**$219,606**	**$226,194**	**$232,980**
14	**Net Cashflow w/Depreciation** *(Line 12 – Line 13)*	**($261,024)**	**($208,970)**	**($206,107)**	**($210,781)**	**($164,894)**
15	**Operating Reserve**					
16	Beginning Balance	$333,177	$72,153	($136,818)	($342,924)	($553,705)
17	Net Cashflow	($261,024)	($208,970)	($206,107)	($210,781)	($164,894)
18	Transfers In/Out - Capital Improvement Reserve	$0	$0	$0	$0	$0
19	**Ending Balance**	**$72,153**	**($136,818)**	**($342,924)**	**($553,705)**	**($718,599)**
20	*Interest Income*	*$0*	*$0*	*$0*	*$0*	*$0*
21	**Capital Improvement Reserve**					
22	**Beginning Balance**	$0	$181,000	$370,172	$566,857	$771,298
	Plus:					
23	Transfer In/(Out) - from Operating Reserve	$207,000	$213,210	$219,606	$226,194	$232,980
24	New Debt Issue	$0	$0	$0	$0	$0
	Less:					
25	Capital Projects	($26,000)	($26,780)	($27,583)	($28,411)	($29,263)
26	**Ending Balance**	**$181,000**	**$367,430**	**$562,195**	**$764,640**	**$975,015**
27	*Interest*	*$0*	*$2,742*	*$4,662*	*$6,657*	*$8,732*
28	*Total Reserves – Ending Balance*	*$253,153*	*$230,612*	*$219,271*	*$210,935*	*$256,416*
29	*Reserve Target* [2]	*$429,100*	*$435,763*	*$442,626*	*$449,695*	*$456,976*

1. Other Revenues are based on the City's FYE 17-18 Budget and include license fee, permits, and investment earnings.

2. Reserve target is based on 90 days of operating plus one year of depreciation.

Figure 5-4: Operating Financial Position at Recommended Rates

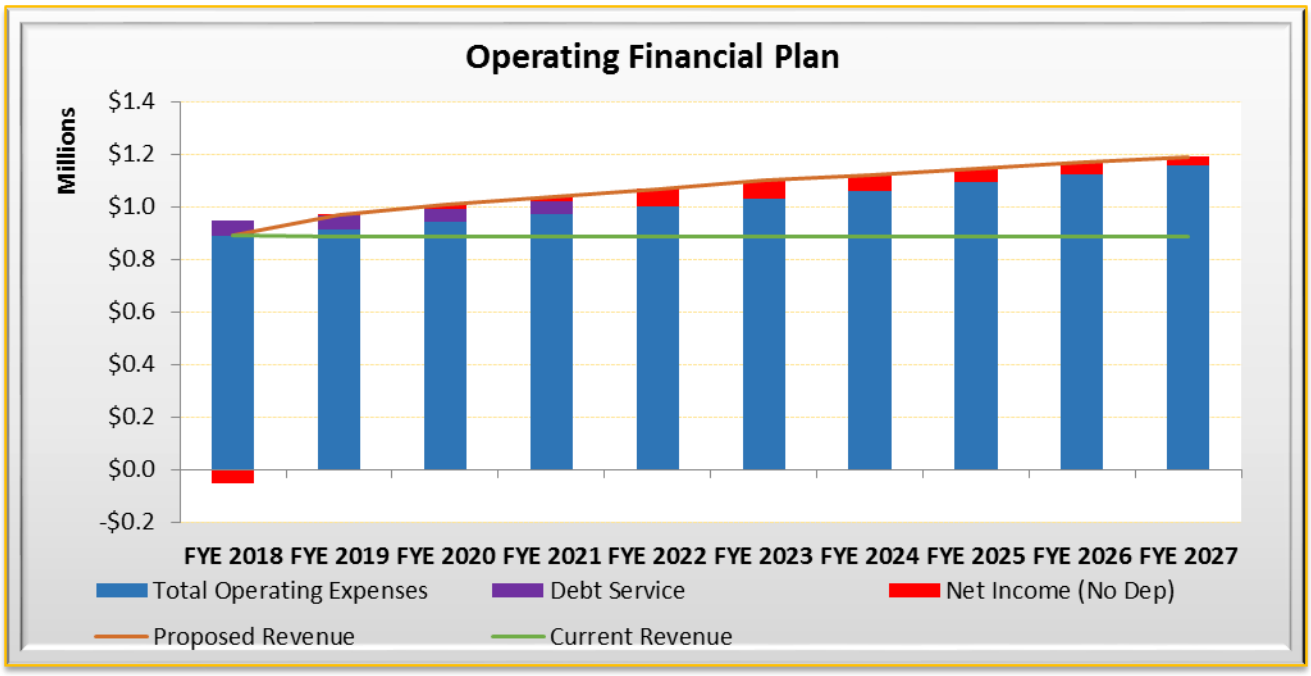


Figure 5-5: Recommended Wastewater Capital Improvement Plan and Funding Source

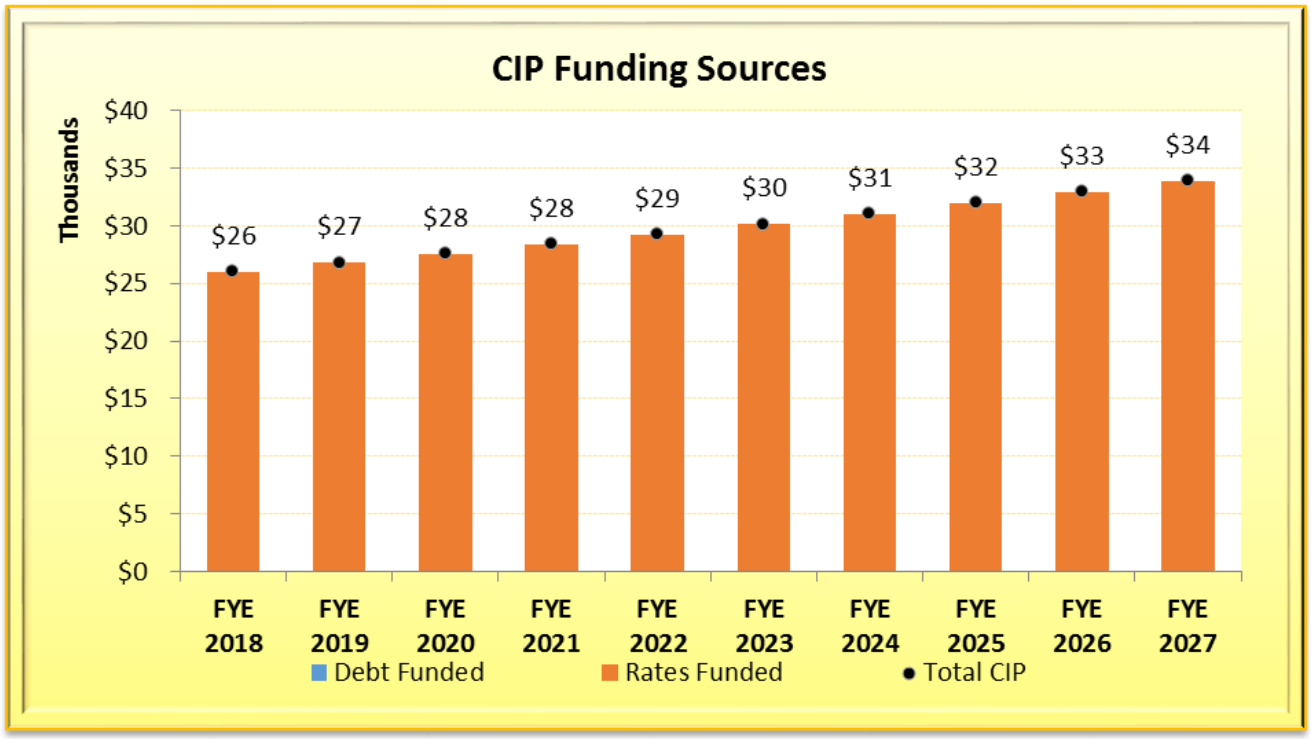
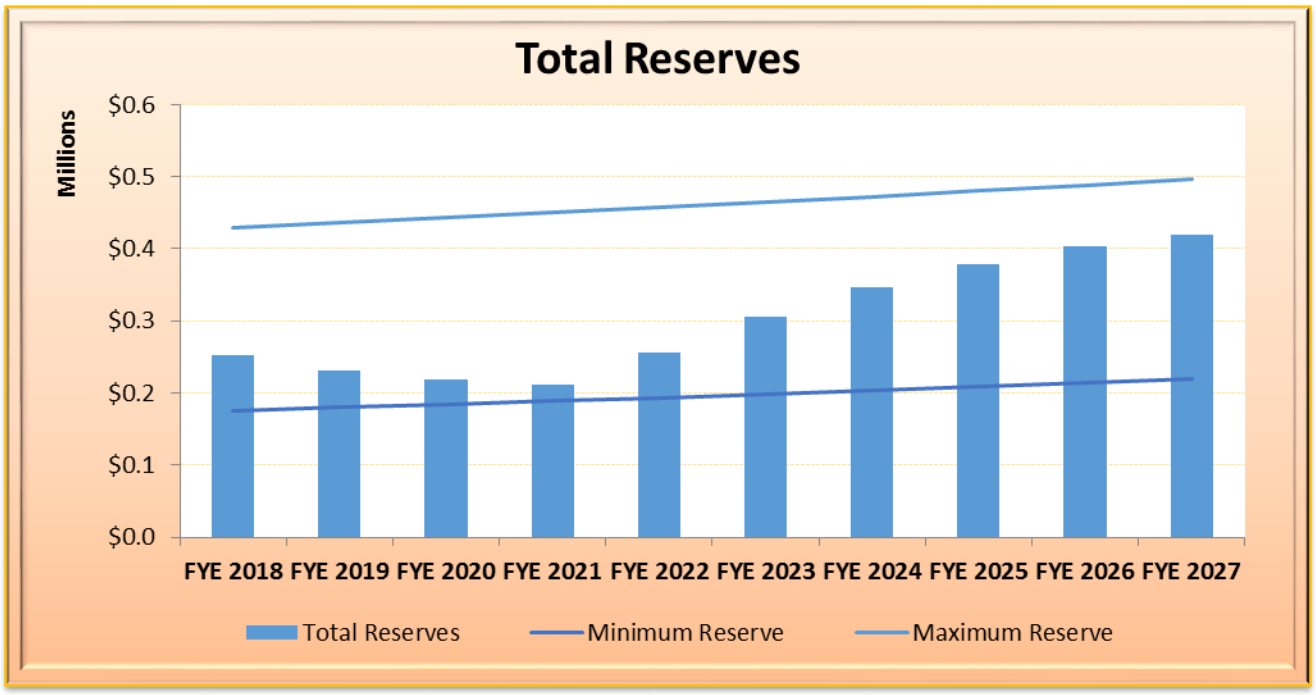


Figure 5-6: Projected Ending Wastewater Reserves at Projected Rates



5.2 WASTEWATER UTILITY – COST OF SERVICE STUDY

5.2.1 Cost of Service Process

This section of the Report discusses the allocation of O&M expenses to the appropriate parameters consistent with industry standards, the determination of unit costs, and calculation of costs by customer class for the Wastewater Utility. The total cost of wastewater service is analyzed by system function in order to equitably distribute costs of service to the various classes of customers. For this analysis, wastewater utility costs of service are developed consistent with the guidelines for allocating costs detailed in the Water Environment Federation (WEF) Manual of Practice No. 27, Financing and Charges for Wastewater Systems, 2004. Figure 5-7 provides a general overview of a cost-of-service analysis. Each step shown below will be described in greater detail in the next section.

Figure 5-7: Wastewater Cost of Service Process

5.2.2 Cost of Service Analysis

5.2.2.1 Step 1 – Determine Revenue Requirements

In this Study, wastewater rates are calculated for the Test Year (FYE 2019), by using the City's FYE 2018 budget and inflationary factors. Test Year revenue requirements are used in the cost allocation process. Subsequent year's revenue adjustments are incremental and the proposed rates are based on FYE 2019 and the recommended revenue adjustments in subsequent years to ensure full cost recovery of the City's wastewater revenue requirements, including capital costs and reserve funding. The City should review the cost of service analysis at least once every five years to ensure that the rates are consistent with the costs of providing service.

5.2.2.2 Step 2 – Functionalize O&M Costs

A cost of service analysis distributes a utility's revenue requirements (costs) to each customer class. After determining a utility's revenue requirement, the total cost of wastewater service is analyzed by system functions to proportionately distribute costs in relation to how that cost is generally incurred. The wastewater utility costs were categorized into the following **functions**:

- Operations & Maintenance (O&M) Expenses:
  - **Total Cost Allocations** – Indirect costs related to bank service fees, administrative costs, facilities, technology, personnel admin, self-insurance, vehicle maintenance, fuel, property insurance, and fiscal agent service costs.
  - **Total Purchased Services** – Contract and professional services.
  - **Total Purchased Materials** – office supplies, maintenance of water supplies, and tools.
  - **Total Personnel Services** – Salaries and benefits of the staff dedicated to the wastewater utility.
  - **Capital Outlay** – depreciation expense and additional planned capital costs.
- **Debt Service –** Principle and interest costs related to existing/outstanding debt.

Table 5-7 summarizes the functionalized costs prior to any offset adjustments.

Table 5-7: Functionalized Expenses

Functionalized Expenses	FYE 2019 Functionalized Expenses
Total Personnel Services	$526,536
Total Purchased Services	$60,461
Total Purchased Materials	$14,523
Total Cost Allocations	$313,532
Existing Debt	$50,702
Total Capital Outlay	$213,210
Total O&M Expenses	**$ 1,178,964**

5.2.2.3 Step 3 – Allocate Functionalized Costs to Cost Components

The wastewater utility is comprised of various facilities, each designed and operated to fulfill a given function. To provide adequate service to its customers at all times, the utility must be capable of collecting and conveying the total amount of wastewater generated. The separation of costs by function allows allocation of

such costs to the functional cost components. The City's costs were allocated to the following cost causation components:

1. **Accounts** includes related fixed costs, such as billing, collecting, customer accounting, and other customer related costs. These costs are incurred at the same level regardless of the type of land use, amount of flow, or the wastewater strength.
2. **Flow** (ccf) is the amount of wastewater estimated to enter the collection system.

O&M Allocation

The O&M expenses consist of five functionalized categories: Total Personnel Services, Total Purchased Services, Total Purchased Materials, Total Cost Allocations, and Total Capital Outlay. Raftelis reviewed the budget details related to the Operating Expenses to determine the most appropriate method for allocating the functional costs to cost causation components. Total Personnel Services and Total Purchased Services were 100% allocated to the Account cost component as these costs are related to billing of customer accounts. Total Purchased Materials were 100% allocated to Flow. Total Cost Allocations was allocated 50% evenly Accounts and Flow cost components, and Total Capital Outlay was 100% allocated to the Accounts cost component.

Table 5-8 summarizes the percent allocations for the City's O&M Expenses, the costs (prior to offsets and adjustments) allocated to the cost components, and the resulting O&M Allocation (%). The O&M Allocation (%) will be used to allocate the Operating Requirement, including any revenue offsets or adjustments, from the revenue requirement (Table 5-10).

Table 5-8: Wastewater O&M Allocation (%)

Functionalized Expenses	Accounts	Flow	Total
% Allocation			
Total Personnel Services	100.00%		**100%**
Total Purchased Services	100.00%		**100%**
Total Purchased Materials		100.00%	**100%**
Total Cost Allocations	50.00%	50.00%	**100%**
Total Capital Outlay	100.00%		**100%**
$ Allocation			
Total Personnel Services	$526,536		$526,536
Total Purchased Services	$60,461		$60,461
Total Purchased Materials		$14,523	$14,523
Total Cost Allocations	$156,766	$156,766	$313,532
Total Capital Outlay	$213,210		$213,210
Total O&M Expenses	**$956,973**	**$171,289**	**$1,128,262**
O&M Allocation (%)	**84.82%**	**15.18%**	**100%**

Capital Allocation

Table 5-9 summarizes the percent allocations for the capital assets, the original cost asset values by asset category as provided within the City's detailed asset listing[21] allocated to the cost components, and the resulting Capital Allocation (%). The Capital Allocation (%) will be used to allocate debt service (since it will be used to cover capital costs), including any revenue offsets or adjustments, from the revenue requirements (Table 5-10).

Table 5-9: Wastewater Capital Allocation (%)[22]

Line #	Functionalized Assets	Accounts	Flow	Total
	Allocation (%)			
1	**Building**	100.00%		**100%**
2	**Collection**		100.00%	**100%**
3	**Equipment**	100.00%		**100%**
	Allocation ($)			
4	**Building**	$315,499		$315,499
5	**Collection**		$8,628,178	$8,628,178
6	**Equipment**	$267,840		$267,840
7	**Total Assets**	**$583,339**	**$8,628,178**	**$9,211,517**
8	**Total Capital Allocation %**	**6.33%**	**93.67%**	**100%**
9	**Debt[1]**	**$3,211**	**$47,491**	**$50,702**

[5]Total cost of service requirement for debt was allocated to each cost component based on the capital allocation percentages from Line 8.

The revenue requirement determination is similar to what was described for the water utility and is based upon the premise that utility must generate annual revenues to meet O&M expenses, any debt service needs, reserve levels, and capital investments. However, the City's wastewater enterprise's rate revenue currently does not fully recover its annual revenue requirements. The wastewater enterprise is projected to recover its annual operational costs starting in FYE 2022 and begin to build back up reserves to the recommended targets. For FYE 2019, the cost of service to be recovered from the City's wastewater customers is shown in Table 5-10, which includes deductions to account for revenue offsets, and resulting net cashflows (found in Table 5-6 – Line 14), and any mid-year adjustments[23].

[21] Detailed Asset listing is on file with the City.
[22] There may be slight differences due to rounding.
[23] The mid-year adjustment takes into account rates not being implemented at the beginning of the fiscal year.

Table 5-10: FYE 2019 Wastewater Revenue Requirements

Revenue Requirements	Operating	Capital	Total
Operating Expenses	$915,052		**$915,052**
Existing Debt		$50,702	**$50,702**
Depreciation	$213,210		**$213,210**
Total Revenue Requirements	**$1,128,262**	**$50,702**	**$1,178,964**
Less: Revenue Offsets			
TRANSFER IN	$400		$400
Total Revenue Offsets	**$400**	**$0**	**$400**
Less: Adjustments			
Adjustment for Cash Balance	$208,970		$208,970
Adjustment for Mid-Year Increase		-$7,401	-$7,401
Total Adjustments	**$208,970**	**($7,401)**	**$201,569**
Revenue Requirements from Rates	**$918,892**	**$58,103**	**$976,995**

Table 5-11 shows the revenue requirements from Table 5-10 allocated to each of the cost causation components. Operating revenue requirements and capital expenses were allocated based on the O&M Allocation (%) and Capital Allocation from Table 5-8, and Table 5-9 respectively.

Table 5-11: Wastewater Allocation of Costs to Cost Components

Category	Fixed: 80%	Variable: 20%	FYE 2019[1]
Revenue Requirements	**Accounts**	**Flow**	**Total**
Operating	$779,389	$139,503	$918,892
Capital	$3,680	$54,424	$58,103
Cost of Service Requirement	**$783,068**	**$193,927**	**$976,995[2]**

[1]There may be differences due to rounding.

[2]Total revenue requirement of rates from Table 5-9.

Before we can allocate the cost of service requirements from Table 5-11 to customer classes, we first must define the rate structure; therefore, Step 4 will be discussed in Section 5.2.3.2.

5.2.3 Rate Design

A key component of the Study includes evaluating the current rate structure and determining the most appropriate structures to model moving forward. To determine the appropriate rate structure for meeting the City's revenue requirements, Raftelis reviewed the current rate structure and flow data, worked closely with City staff, and, where possible, incorporated feedback on policies and objectives. As such, Raftelis recommends maintaining the same rate structure for the wastewater utility.

5.2.3.1 Flow by Customer Class

Table 5-12 shows the derivation of the projected residential flow. Using the number of residential units (column A) as provided by the City, assumed gallons per capita per day (column B), and the assumed persons per household (column C), Raftelis projected the residential flow (ccf per year).

Table 5-12: Residential Flow (ccf / Yr)

Customer Class	# of Units [A]	GPCD [B]	PPH [C]	Projected Flow (ccf) [D] (A*B*C*365) ÷ 748.05[1]
Residential	4,414	55	2.29	**271,264**

[1]1 ccf is equivalent to 748.05 gallons of water.

The remaining non-residential customer flows were estimated based on consumption data provided by City staff. Table 5-13 summarizes the projected flow for non-residential customers. Winter average flows were used to determine the projected annual flow, with a 10% discount factor to account for water usage that converts to discharge into the sewer system. Raftelis assumed a 90% return rate, as not all water will enter the sewer system for collection. Even though Raftelis is using winter average, there still may be a small portion of water usage that is used for exterior landscape.

Table 5-13: Estimated Non-Residential Flow (ccf / Yr)

Non-Residential Customers	Winter Average Flow (ccf / Yr)[1] [A]	90% Return Rate (ccf / Yr) [B] (A x 90%)
Non-Residential		
Commercial	15,954	14,359
Institutional	16,614	14,953
Total Non-Res. Flows	**32,568**	**29,311**

[1]Winter averages were determined by averaging flows of winter billing periods and annualizing them based on a bi-monthly basis.

5.2.3.2 Step 4- Distribute Cost Components to Customer Classes

To allocate costs to different customer classes, unit costs of service need to be developed for each cost causation component. The unit costs of service are developed by dividing the total annual costs allocated to each parameter by the total annual service units of the respective component. Table 5-14 summarizes the derivation of each of the annual units of service. The numbers shown in Table 5-14 are derived as follows:

- **Number of Accounts** – Residential units were provided by the City and the Non-Residential was based on the accounts detailed in the consumption database.
- **Annual Accounts** - # of Accounts times the number of billing periods (6).
- **Flow (ccf / Yr)** – Residential Flow was derived in Table 5-12 and Non-Residential Flow was derived in Table 5-13.

Table 5-14: Determination of Units of Service

Customer Class	Units	Billable Units	Flow (CCF/Yr)
Residential	4,414	26,484	271,264
Non-Residential			
Commercial	94	564	14,359
Institutional	40	240	14,953
Total	**4,548**	**27,288**	**300,576**

The annual units of service for the fixed components from Table 5-11 is shown on the next page, and the derived rates for each component have been rounded up to the nearest whole penny. The variable revenue requirements for each component have been allocated to each customer class. Residential units will see the variable rate incorporated as a component of the fixed charge based on the average usage for residential units.

Account Component

These costs are incurred at the same level regardless of the type of land use, amount of flow, or the wastewater strength; therefore, the Accounts Component is based on the number of annual accounts/bills. The number of bills can be determined by multiplying the number of units, 4,548, times the number of billing periods, 6, in a year. The total Accounts Requirement from Table 5-11 of $783,068 is divided by the number of annual accounts to determine the unit cost of service shown in Table 5-15.

Table 5-15: Account Component - Unit Rate

Account Component	
Account Revenue Requirements[1]	$783,068
÷ # of Annual Accounts (Table 5-14)	27,288
Bi-Monthly Unit Rate[2]	**$28.70**

[1]Cost of service requirement for Accounts from Table 5-11.

[2]Unit rate was rounded up to the nearest penny.

Flow Component

Raftelis allocated the Flow Requirement of $193,927 from Table 5-11 to each customer class based on their proportionate share of the projected flow as shown in Table 5-16. For example, since Residential units accounted for 90.25% of projected wastewater flow, Residential customers were allocated 90.25% of the revenue requirement for Flow.

Table 5-16: Flow Component Allocated to Classes

Customer Class	Projected Flow (HCF)	% Allocation	Allocated Requirement[1]
Residential	271,264	90.25%	$175,016
Non-Residential			
Commercial	14,359	4.78%	$9,264
Institutional	14,953	4.97%	$9,647
Total	**300,576**	**100%**	**$193,927[2]**

[1]There may be slight differences due to rounding.

[2]Total allocated revenue requirement for Flow from Table 5-11.

Next, the allocated variable revenue requirements were calculated to determine the total variable requirement by customer class. The total requirement was then divided by the total billable units to determine the variable unit rate for each customer class as shown in Table 5-17.

Table 5-17: Variable Unit Rate

Customer Classes	Flow (A)	Billable Units (B)	Unit Charge[1] (C) [A/B]
Residential	$175,016	271,264	**$0.65**
Non-Residential			
Commercial	$9,264	14,359	**$0.65**
Institutional	$9,647	14,953	**$0.65**

[1]Units were rounded up to the nearest penny.

5.2.4 Recommended Wastewater Rates

5.2.4.1 Fixed Charges

For residential units, the bi-monthly fixed charge consists of an Accounts component combined with flow charge component based on the estimated flow from such units. The flow or usage units for residential is listed in .

Table 5-18. Gallons per Day per Person were multiplied by the average number of residents to arrive at the Gallons per Day per Household. Next, the total units were multiplied by their respective Gallons per Day per Household. This total was then multiplied by 365 days in one year to arrive at the total estimated usage for each residential class in gallons. This usage was then converted to ccf and used to calculate an average usage per two months.

Table 5-18: Residential Fixed Average Usage

Customer Class	Gallons per Day per Person	Average Number of Residents[1]	Gallons per Day per Household	Average ccf per Bi-Month
Residential	55	2.29	126	10.24

[1]Average number of residents per household is based on 2015 Environmental Analysis for Sierra Madre General Plan Update Draft.

The average bi-monthly usage was then multiplied by the variable rate of $0.65 (from Table 5-17) to create the flow charge component listed in Table 5-19 for Residential customers. Non-Residential customers fixed bi-monthly charge will only consist of the Account component totaling $28.70 (from Table 5-15).

Table 5-19: Fixed Wastewater Charge by Class

Customer Class	Accounts Component [A]	Flow Charge Component[1] [B]	Recommended FYE 2019 Fixed Charge ($/Bi-Month) [D] (A + B+C)	Current Charge	Difference
Residential	$28.70	$6.66[2]	**$35.36**	$32.24	$3.12
Non- Residential	$28.70	See Variable Rate	**$28.70**	$19.53	$9.17

[1]Flow charge was rounded up to the nearest penny.

2 The Flow charge component was calculated by multiplying the 10.24 from .

Table 5-18 by $0.65 from Table 5-17.

5.2.4.2 Variable Rates

Table 5-20 details the recommended variable rate for non-residential customers. Since they do not exhibit the same wastewater patterns as residential customers, non-residential customers are charged at a uniform rate per ccf.

Table 5-20: Recommended Variable Wastewater Charge ($/Bi-Month)

Customer Class	FYE 2019 Recommended Variable Rate	Current Charge	Difference
Non-Residential			
Commercial	$0.65	$0.72	-$0.07
Institutional	$0.65	$0.43	$0.22

Applying the proposed revenue adjustments of 10% in FYE 2019 and 3% for each of the remaining years of the Study Period (FYE 2020 through FYE 2023) yields the Proposed Rates shown in Table 5-21 and Table 5-22.

Table 5-21: FYE 2019-FYE 2023 Recommended Bi-Monthly Fixed Charges

Customer Class	FYE 2019 Recommended Fixed Charge	FYE 2020 Recommended Fixed Charge	FYE 2021 Recommended Fixed Charge	FYE 2022 Recommended Fixed Charge	FYE 2023 Recommended Fixed Charge
Residential	$35.36	$36.42	$37.51	$38.64	$39.80
Non-Residential					
Commercial	$28.70	$29.56	$30.45	$31.36	$32.30
Institutional	$28.70	$29.56	$30.45	$31.36	$32.30

Table 5-22: FYE 2019-FYE 2023 Recommended Variable Charges ($/ccf)

Customer Class	FYE 2019 Recommended Variable Charge	FYE 2020 Recommended Variable Charge	FYE 2021 Recommended Variable Charge	FYE 2022 Recommended Variable Charge	FYE 2023 Recommended Variable Charge
Non-Residential					
Commercial	$0.65	$0.67	$0.69	$0.71	$0.73
Institutional	$0.65	$0.67	$0.69	$0.71	$0.73

APPENDIX A:

Detailed Financial Plan Based on Recommended Rates

Exhibit A- Water Utility Detailed Financial Plan

Revenues

	FYE 2018 Projected	FYE 2019 Projected	FYE 2020 Projected	FYE 2021 Projected	FYE 2022 Projected	FYE 2023 Projected	FYE 2024 Projected	FYE 2025 Projected	FYE 2026 Projected	FYE 2027 Projected
Rates	**$4,503,094**	**$4,503,094**	**$4,503,094**	**$4,503,094**	**$4,503,094**	**$4,503,094**	**$4,503,094**	**$4,503,094**	**$4,503,094**	**$4,503,094**
Penalty Fees	$700,000	$700,000	$700,000	$700,000	$700,000	$700,000	$700,000	$700,000	$700,000	$700,000
Subtotal	**$5,203,094**	**$5,203,094**	**$5,203,094**	**$5,203,094**	**$5,203,094**	**$5,203,094**	**$5,203,094**	**$5,203,094**	**$5,203,094**	**$5,203,094**
Additional Revenue Required:										
Fiscal Year										
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
FYE 2018	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
FYE 2019		$437,789	$525,346	$525,346	$525,346	$525,346	$525,346	$525,346	$525,346	$525,346
FYE 2020			$114,569	$114,569	$114,569	$114,569	$114,569	$114,569	$114,569	$114,569
FYE 2021				$116,860	$116,860	$116,860	$116,860	$116,860	$116,860	$116,860
FYE 2022					$119,197	$119,197	$119,197	$119,197	$119,197	$119,197
FYE 2023						$121,581	$121,581	$121,581	$121,581	$121,581
FYE 2024							$124,013	$124,013	$124,013	$124,013
FYE 2025								$126,493	$126,493	$126,493
FYE 2026									$129,023	$129,023
FYE 2027										$131,604
Total Additional Revenue	**$0**	**$437,789**	**$639,915**	**$756,775**	**$875,973**	**$997,554**	**$1,121,567**	**$1,248,060**	**$1,377,083**	**$1,508,687**
Total Rates	**$5,203,094**	**$5,640,882**	**$5,843,009**	**$5,959,869**	**$6,079,066**	**$6,200,648**	**$6,324,661**	**$6,451,154**	**$6,580,177**	**$6,711,780**
Total Pass-Through Revenue	**$0**	**$48,570**	**$80,950**	**$114,949**	**$150,648**	**$188,132**	**$227,490**	**$268,816**	**$312,208**	**$357,770**
Other Misc. Revenue										
TRANSFER IN	$14,000	$14,000	$14,000	$14,000	$14,000	$14,000	$14,000	$14,000	$14,000	$14,000
NOTICES, FEES, LATE CHARGES	$28,000	$28,000	$28,000	$28,000	$28,000	$28,000	$28,000	$28,000	$28,000	$28,000
LATE PENALTIES FOR UTILITY BILLS	$24,000	$24,000	$24,000	$24,000	$24,000	$24,000	$24,000	$24,000	$24,000	$24,000
OTHER CHARGES FOR SERVICES	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
LOCAL GRANTS	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Other Misc. Revenue	$71,000	$71,000	$71,000	$71,000	$71,000	$71,000	$71,000	$71,000	$71,000	$71,000
TOTAL	**$5,274,094**	**$5,760,452**	**$5,994,959**	**$6,145,818**	**$6,300,714**	**$6,459,780**	**$6,623,151**	**$6,790,970**	**$6,963,385**	**$7,140,551**

Expenditures & Net Cashflow

EXPENSES										
Total Purchase Water Charge:	**$599,030**	**$647,600**	**$679,980**	**$713,979**	**$749,678**	**$787,162**	**$826,520**	**$867,846**	**$911,238**	**$956,800**
Operating Expenses										
Total Personnel Services	$827,900	$852,737	$878,319	$904,669	$931,809	$959,763	$988,556	$1,018,213	$1,048,759	$1,080,222
Total Purchased Services	$280,100	$288,503	$297,158	$306,073	$315,255	$324,713	$334,454	$344,488	$354,822	$365,467
Total Purchased Materials	$291,500	$300,245	$309,252	$318,530	$328,086	$337,928	$348,066	$358,508	$369,263	$380,341
Total Cost Allocations	$1,177,200	$1,212,516	$1,248,891	$1,286,358	$1,324,949	$1,364,697	$1,405,638	$1,447,808	$1,491,242	$1,535,979
Total Utilities	$15,700	$16,485	$17,309	$18,175	$19,083	$20,038	$21,040	$22,091	$23,196	$24,356
Total Capital Outlay - R&M	$350,000	$360,500	$371,315	$382,454	$393,928	$405,746	$417,918	$430,456	$443,370	$456,671
Total Production	$508,300	$533,715	$560,401	$588,421	$617,842	$648,734	$681,171	$715,229	$750,991	$788,540
Total Operating Expenses	**$3,450,700**	**$3,564,701**	**$3,682,646**	**$3,804,680**	**$3,930,952**	**$4,061,619**	**$4,196,843**	**$4,336,792**	**$4,481,643**	**$4,631,576**
Total Debt Service Expenses	**$991,533**	**$731,709**	**$731,708**	**$731,708**	**$586,021**	**$586,021**	**$586,021**	**$586,021**	**$586,021**	**$586,021**
TOTAL EXPENSES	**$5,041,263**	**$4,944,010**	**$5,094,334**	**$5,250,367**	**$5,266,651**	**$5,434,802**	**$5,609,384**	**$5,790,659**	**$5,978,902**	**$6,174,397**
Net Cash Flow	**$232,831**	**$816,442**	**$900,625**	**$895,451**	**$1,034,063**	**$1,024,978**	**$1,013,767**	**$1,000,310**	**$984,483**	**$966,154**
Total Depreciation	$727,000	$748,810	$771,274	$794,413	$818,245	$842,792	$868,076	$894,118	$920,942	$948,570
Net Cash Flow w/ Depreciation	**($494,169)**	**$67,632**	**$129,350**	**$101,039**	**$215,819**	**$182,185**	**$145,691**	**$106,192**	**$63,541**	**$17,584**
Reserve Direct Transfer	**$727,000**	**$748,810**	**$771,274**	**$794,413**	**$818,245**	**$842,792**	**$868,076**	**$894,118**	**$920,942**	**$948,570**
Calculated Debt Coverage Ratio	123%	212%	223%	222%	276%	275%	273%	271%	268%	265%
Required Debt Coverage Ratio	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%

Reserves

Reserve Interest Rate	0.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%

	FYE 2018 Projected	FYE 2019 Projected	FYE 2020 Projected	FYE 2021 Projected	FYE 2022 Projected	FYE 2023 Projected	FYE 2024 Projected	FYE 2025 Projected	FYE 2026 Projected	FYE 2027 Projected
Operating Reserve										
Beginning Balance	$747,740	$453,950	$473,931	$490,024	$506,670	$523,912	$541,773	$560,277	$579,449	$599,315
Net Cashflow	$232,831	$816,442	$900,625	$895,451	$1,034,063	$1,024,978	$1,013,767	$1,000,310	$984,483	$966,154
Transfers In/Out - Capital Improvem	-$526,621	-$801,077	-$889,328	-$883,765	-$1,021,949	-$1,012,418	-$1,000,745	-$986,809	-$970,482	-$951,634
Ending Balance	**$453,950**	**$469,315**	**$485,229**	**$501,711**	**$518,785**	**$536,471**	**$554,794**	**$573,779**	**$593,450**	**$613,834**
Interest Income	*$0*	*$4,616*	*$4,796*	*$4,959*	*$5,127*	*$5,302*	*$5,483*	*$5,670*	*$5,864*	*$6,066*
O&M Reserve Target (Min)	$453,950	$469,315	$485,229	$501,711	$518,785	$536,471	$554,794	$573,779	$593,450	$613,834
O&M Reserve Target (Max)	$680,925	$703,973	$727,843	$752,567	$778,177	$804,707	$832,192	$860,669	$890,175	$920,751
Capital Improvement Reserve (R&R)										
Beginning Balance	$0	$222,121	$714,221	$1,290,478	$1,857,168	$2,558,367	$3,246,667	$3,919,476	$4,574,044	$5,207,459
Plus:										
Transfer In/(Out) - from Operating R	$526,621	$801,077	$889,328	$883,765	$1,021,949	$1,012,418	$1,000,745	$986,809	$970,482	$951,634
New Debt Issue	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Less:										
Capital Projects	($304,500)	($313,635)	($323,044)	($332,735)	($342,717)	($352,999)	($363,589)	($374,497)	($385,731)	($397,303)
Ending Balance	**$222,121**	**$709,563**	**$1,280,505**	**$1,841,508**	**$2,536,399**	**$3,217,786**	**$3,883,823**	**$4,531,788**	**$5,158,795**	**$5,761,790**
Interest Income	*$0*	*$4,658*	*$9,974*	*$15,660*	*$21,968*	*$28,881*	*$35,652*	*$42,256*	*$48,664*	*$54,846*
R&R Reserve Target	$318,479	$318,479	$318,479	$318,479	$318,479	$318,479	$318,479	$318,479	$318,479	$318,479
Maximum Balance	$727,000	$727,000	$727,000	$727,000	$727,000	$727,000	$727,000	$727,000	$727,000	$727,000

Exhibit B - Wastewater Utility Detailed Financial Plan

Revenues

Projected Budget: Calculated	FYE 2018 Projected	FYE 2019 Projected	FYE 2020 Projected	FYE 2021 Projected	FYE 2022 Projected	FYE 2023 Projected	FYE 2024 Projected	FYE 2025 Projected	FYE 2026 Projected	FYE 2027 Projected
REVENUE										
Rate Revenue from Existing Rates	**$888,177**	**$888,177**	**$888,177**	**$888,177**	**$888,177**	**$888,177**	**$888,177**	**$888,177**	**$888,177**	**$888,177**
Additional Revenue Required:										
Fiscal Year										
FYE 2017	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
FYE 2018	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
FYE 2019		$81,416	$88,818	$88,818	$88,818	$88,818	$88,818	$88,818	$88,818	$88,818
FYE 2020			$29,310	$29,310	$29,310	$29,310	$29,310	$29,310	$29,310	$29,310
FYE 2021				$30,189	$30,189	$30,189	$30,189	$30,189	$30,189	$30,189
FYE 2022					$31,095	$31,095	$31,095	$31,095	$31,095	$31,095
FYE 2023						$32,028	$32,028	$32,028	$32,028	$32,028
FYE 2024							$21,992	$21,992	$21,992	$21,992
FYE 2025								$22,432	$22,432	$22,432
FYE 2026									$22,881	$22,881
FYE 2027										$23,338
Total Additional Revenue	**$0**	**$81,416**	**$118,128**	**$148,317**	**$179,412**	**$211,439**	**$233,432**	**$255,864**	**$278,745**	**$302,083**
Total Revenue from Rates	**$888,177**	**$969,593**	**$1,006,305**	**$1,036,494**	**$1,067,589**	**$1,099,616**	**$1,121,609**	**$1,144,041**	**$1,166,922**	**$1,190,260**
Other Operating Revenue										
TRANSFER IN	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400
INTEREST FROM INVESTEMENTS	$3,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Operating Revenue	**$3,400**	**$400**	**$400**	**$400**	**$400**	**$400**	**$400**	**$400**	**$400**	**$400**
TOTAL REVENUE	**$891,577**	**$969,993**	**$1,006,705**	**$1,036,894**	**$1,067,989**	**$1,100,016**	**$1,122,009**	**$1,144,441**	**$1,167,322**	**$1,190,660**

Expenditures and Net Cashflow

EXPENSES										
Operating Expenses										
Total Personnel Services	$511,200	$526,536	$542,332	$558,602	$575,360	$592,621	$610,400	$628,712	$647,573	$667,000
Total Purchased Services	$58,700	$60,461	$62,275	$64,143	$66,067	$68,049	$70,091	$72,194	$74,359	$76,590
Total Purchased Materials	$14,100	$14,523	$14,959	$15,407	$15,870	$16,346	$16,836	$17,341	$17,861	$18,397
Total Cost Allocations	$304,400	$313,532	$322,938	$332,626	$342,605	$352,883	$363,470	$374,374	$385,605	$397,173
Total Capital Outlay	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Debt Service	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Depreciation	$207,000	$213,210	$219,606	$226,194	$232,980	$239,970	$247,169	$254,584	$262,221	$270,088
Total Operating Expenses	**$1,095,400**	**$1,128,262**	**$1,162,110**	**$1,196,973**	**$1,232,882**	**$1,269,869**	**$1,307,965**	**$1,347,204**	**$1,387,620**	**$1,429,249**
Total Debt Service Expenses	**$57,202**	**$50,702**	**$50,702**	**$50,702**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
TOTAL EXPENSES	**$1,152,602**	**$1,178,964**	**$1,212,811**	**$1,247,675**	**$1,232,882**	**$1,269,869**	**$1,307,965**	**$1,347,204**	**$1,387,620**	**$1,429,249**
Net Cash Flow w/Depreciation	**($261,024)**	**($208,970)**	**($206,107)**	**($210,781)**	**($164,894)**	**($169,852)**	**($185,956)**	**($202,763)**	**($220,298)**	**($238,588)**
Reserve Direct Transfer	**$207,000**	**$213,210**	**$219,606**	**$226,194**	**$232,980**	**$239,970**	**$247,169**	**$254,584**	**$262,221**	**$270,088**
Net Cash Flow	**($54,024)**	**$4,240**	**$13,500**	**$15,414**	**$68,087**	**$70,117**	**$61,213**	**$51,821**	**$41,923**	**$31,500**

Reserves

Reserve Interest Rate	0.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%

	FYE 2018 Projected	FYE 2019 Projected	FYE 2020 Projected	FYE 2021 Projected	FYE 2022 Projected	FYE 2023 Projected	FYE 2024 Projected	FYE 2025 Projected	FYE 2026 Projected	FYE 2027 Projected
Operating Reserve										
Beginning Balance	$333,177	$72,153	($136,818)	($342,924)	($553,705)	($718,599)	($888,451)	($1,074,407)	($1,277,170)	($1,497,469)
Net Cashflow	($261,024)	($208,970)	($206,107)	($210,781)	($164,894)	($169,852)	($185,956)	($202,763)	($220,298)	($238,588)
Transfers In/Out - Capital Improvement Re	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$72,153**	**($136,818)**	**($342,924)**	**($553,705)**	**($718,599)**	**($888,451)**	**($1,074,407)**	**($1,277,170)**	**($1,497,469)**	**($1,736,057)**
Interest Income	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
O&M Reserve Target (Min)	$148,067	$152,509	$157,084	$161,796	$166,650	$171,650	$176,799	$182,103	$187,566	$193,193
O&M Reserve Target (Max)	$222,100	$228,763	$235,626	$242,695	$249,976	$257,475	$265,199	$273,155	$281,350	$289,790
Capital Improvement Reserve (R&R)										
Beginning Balance	$0	$181,000	$370,172	$566,857	$771,298	$983,747	$1,204,462	$1,433,711	$1,671,768	$1,918,917
Plus:										
Transfer In/(Out) - from Operating Reserv	$207,000	$213,210	$219,606	$226,194	$232,980	$239,970	$247,169	$254,584	$262,221	$270,088
New Debt Issue	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Less:										
Capital Projects	($26,000)	($26,780)	($27,583)	($28,411)	($29,263)	($30,141)	($31,045)	($31,977)	($32,936)	($33,924)
Ending Balance	**$181,000**	**$367,430**	**$562,195**	**$764,640**	**$975,015**	**$1,193,575**	**$1,420,585**	**$1,656,318**	**$1,901,053**	**$2,155,081**
Interest Income	*$0*	*$2,742*	*$4,662*	*$6,657*	*$8,732*	*$10,887*	*$13,125*	*$15,450*	*$17,864*	*$20,370*
R&R Reserve Target	$27,194	$27,194	$27,194	$27,194	$27,194	$27,194	$27,194	$27,194	$27,194	$27,194
Maximum Balance	$207,000	$207,000	$207,000	$207,000	$207,000	$207,000	$207,000	$207,000	$207,000	$207,000