CITY OF REDLANDS

Water Rate Study

Final Report / March 4, 2016

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March 4, 2016

Mr. Chris Diggs
Municipal Utilities and Engineering Director
City of Redlands
35 Cajon St., Ste 15 A
Redlands, CA 92373

Subject: Water Rate Study Report

Dear Mr. Diggs:

Raftelis Financial Consultants, Inc. (RFC) is pleased to present this report on the water and wastewater rate study (Study) to the City of Redlands (City). We are confident that the results based on a cost of service analysis and Utility Advisory Committee (UAC) input, when implemented, will result in fair and equitable rates to the City's customers and comply with the requirements of Proposition 218. Please note that the study assumed that rates would be implemented in April 2016, however, the Council decided to implement in July 2016. The tables and charts in the report reflect the earlier implementation date.

The Study involved a comprehensive review of the City's financial plans, user classifications and rate structures. An important feature of this Study was the participation of the UAC representing various business and residential interests.

It was a pleasure working with you and we wish to express our thanks to you, Ms. Cindy Tryon, Ms. Cecilia Griego, and other staff members of the City for the support and cooperation extended throughout the Study. We would also like to acknowledge the participation of and input provided by the City's UAC. If you have any questions, please call me at (626) 583-1894.

Sincerely,
RAFTELIS FINANCIAL CONSULTANTS, INC.

Sudhir Pardiwala
Executive Vice President

Kevin Kostiuk
Senior Consultant

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. EXECUTIVE SUMMARY

1.1 STUDY BACKGROUND

In 2014, the City of Redlands (the City) contracted Raftelis Financial Consultants (RFC) to conduct a Water, Non-potable Water, and Sewer Rate Study (Study), including a five year financial plan, and further asked RFC to evaluate a water budget rate structure in 2015. This report presents the financial plans and rates over a five year period – however rates are reviewed and adopted in two year cycles by the City. The City implemented standard inclining tiers and the main report presents all the information related to this rate structure. The discussion and results of the water budget rates are shown in the appendix.

This Executive Summary outlines the proposed financial plan and water rates, and contains a description of the rate study process, methodology, results and recommendations for the City's rates. RFC completed the City's last rate study in 2010 and the City's last rate adjustment was effective on January 1, 2013. In accordance with the Redlands Municipal Code, the City is committed to reviewing its rates and rate structure every two years to ensure fairness and equity to its customers and the financial stability of the water and sewer enterprises. The City wishes to establish fair and equitable rates that:

- Proportionately allocate the costs of providing service in accordance with California Constitution article XIII D, section 6 (commonly referred to as Proposition 218);
- Meet the City's fiscal needs in terms of operational expenses, reserve targets, and capital investment to maintain the water system;
- Maintain affordable charges for customers; and
- Provide revenue stability and financial sufficiency in times of water supply shortage or mandatory conservation.

1.2 OBJECTIVES OF THE STUDY

The major objectives of the Study include the following:

1. Develop financial plans for the water and sewer enterprises to ensure financial sufficiency, meet operation and maintenance (O&M) costs, ensure sufficient funding of City financial reserves, and fund capital repair and replacement (R&R). In addition, the analyses contained in this Report make assumptions regarding future water usage and ensures that the City is financially prepared for a period of reduced sales;
2. Conduct a cost-of-service analysis for the water and wastewater systems;
3. Evaluate water budget based allocations and water rates;
4. Develop fair and equitable water, non-potable water, and sewer rates compliant with the requirements of Proposition 218, which adequately recover costs, provide revenue stability for recovering fixed costs, and maintain affordable service.

1.3 PROCESS

The City's rate setting process involves active participation from the City Council appointed citizen committee Utilities Advisory Committee (UAC) to provide input and guidance on the Study. The UAC met with staff and RFC in a series of public meetings, noticed according to the Brown Act requirements, to understand utility issues and to provide input and guidance in order to finalize the rate recommendations. RFC made several presentations discussing study assumptions, financial data, water budget variables and

approach, the concepts of rate making, and to promote discussion and build consensus among UAC committee members, City staff, and RFC. RFC designed water and wastewater rate models to analyze various scenarios, relating to rates and customer impacts. The revenue adjustments and rates presented in this report are a result of this process.

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

According to the M1 Manual, the first step in the 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 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, use restrictions, inflation, interest rates, wholesale contracts, capital finance needs, changes in tax laws, and other changes in operating and economic conditions.

After determining a utility's revenue requirements, the next step is determining the cost of service. Utilizing a utility's approved budget, financial reports, operating data, and capital improvement plans, a rate study generally categorizes (functionalizes) the 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 assets and costs of operating those assets are properly categorized by function, these "functionalized costs" are allocated first to cost causation components, and then to the various customer classes (e.g., single-family residential, multi-family residential, non-building, and commercial) by determining the characteristics of those classes and the contribution of each to incurred costs such as base costs, peaking costs, delivery costs, service characteristics, and demand patterns.

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 commodity rates, and fixed charge rates, for the various customer classes and meter sizes servicing customers. In the case of tiered rates, the rate components themselves allocate the cost of service within each class of customer, effectively treating each tier as a sub-class and determining the cost to serve each tier.

1.4 LEGAL REQUIREMENTS AND RATE SETTING METHODOLOGY

1.4.1 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 service are as follows:

1. A property-related charge (such as water and wastewater rates) imposed by a public agency on a parcel shall not exceed the costs required to provide the property the service.
2. Revenues derived by 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 available to the property.
5. A written notice of the proposed charge shall be mailed to the record owner of each parcel at least 45 days prior to the public hearing, when the agency considers all written protests against the charge.

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." Prop 218 requires that water rates cannot be "arbitrary and capricious," meaning that the rate-setting methodology must be sound and that there must be a nexus between the costs and the rates charged. RFC follows industry standard rate setting methodologies set forth by the AWWA M1 Manual in part to ensure this study meets Proposition 218 requirements and develops rates that do not exceed the proportionate cost of providing water services.

1.4.2 California Constitution - Article X, Section 2

Article X, Section 2 of the California Constitution (established in 1976) states the following:
"It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare."

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

Tiered Rates – Budget based water rates are a specific form of traditional inclining block rates. "Inclining" block rate structures (which are synonymous with "increasing" block rate structures and "tiered" rates) when properly designed and differentiated by customer class, often send price signals to customers. Due to conservation mandates and efficiency of water use, budget based water rates have gained increasing acceptance amongst utilities, especially in relatively water-scarce regions, like Southern California. Tiered and budget based rates meet the requirements of Proposition 218 as long as the rates reasonably reflect the proportionate cost of providing service to users in each tier.

1.4.3 Cost-Based Rate-Setting Methodology

As stated in the AWWA M1 Manual, "the costs of water rates and charges should be recovered from classes of customers in proportion to the cost of serving those customers." To develop utility rates that comply with Proposition 218 and industry standards, there are four major steps discussed below.

1) Calculate Revenue Requirement

The rate-making process starts by determining the test year (rate setting year) revenue requirement, which for this study is fiscal year ending (FYE) 2016[1]. The revenue requirement should sufficiently fund the utility's O&M, debt service, capital expenses, and reserves.

2) Cost Of Service Analysis (COS)

The annual cost of providing water service is distributed among customer classes commensurate with their service requirements. A COS analysis involves the following:

1. Functionalize costs. Examples of functions are supply, treatment, transmission, distribution, storage, meter servicing, and customer billing and collection.
2. Allocate functionalized costs to cost causation components. Cost causation components include base, maximum day, maximum hour[2], conservation, public fire protection, meter service, and customer servicing and billing costs.
3. Distribute the cost causation components. Distribute cost components, using unit costs, to customer classes in proportion to their demands on the water system. This is described in the M1 Manual published by AWWA.

A COS analysis considers both the average quantity of water consumed (base costs) and the peak rate at which it is consumed (peaking or capacity costs as identified by maximum day and maximum hour demands).[3] 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 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.

3) Rate Design and Calculations

Rates do more than simply recover operations costs. Within the legal framework and industry standards, properly designed rates should support and optimize a blend of various utility objectives, such as ensuring rates are fair and equitable to all customers 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

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[1] The City's fiscal year begins on July 1st. FYE 2016 refers to the 12 months ending June 30, 2016.

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

[3] 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.

Rate adoption is the last step of the rate-making process to comply with Proposition 218. RFC documents the rate study results in this Study Report to act as an administrative record for the City and a public education tool about the proposed changes, the rationale and justifications behind the changes, and their anticipated financial impacts in lay terms.

1.5 RESULTS AND RECOMMENDATIONS - WATER

1.5.1 Proposed Financial Plan – Water and Non-Potable Water

Table 1-1 shows the proposed revenue adjustments for the water enterprise for the next five fiscal years. The revenue adjustments for water include required revenue to fund approximately $22 million of backlogged water main replacement over 10 years. A total of nearly $76 million is planned for the water main replacement program over the next ten years. The program will be funded exclusively through rate revenue. Note that the proposed financial plan and corresponding revenue adjustments assume April 2016 and January 2017 implementation. Council has chosen to implement rate increases in July 2016 and July 2017.

Table 1-1: Revenue Adjustments by Year

Enterprise	Revenue Adjustments				
	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Water	19%	11%	10%	2%	2%

1.5.2 Factors Affecting Revenue Adjustments

The following items affect the water enterprise's revenue requirement (i.e. costs) and thus its water rates. The City's costs include Operation and Maintenance (O&M) expenses and capital expenses (including debt service).

- **Capital Funding of System Improvements:** The City's water distribution infrastructure is aging – the average age for all of the City's steel water mains is 63 years old. The proposed water rates include funding to replace a 25 mile water main backlog as well as replace pipes as they become due for replacement. Backlog pipe replacement accounts for $6.5 M over the next five years and $22 M over the next 10 years.

- **Reserve Funding:** It is good practice to establish reserves so that the water utility can provide funding for emergencies and unexpected expenditures. The City's water reserve sets aside funds for revenue shortfalls. The agreed upon target for the reserve is 37 percent of annual operations and maintenance expenditures (O&M), or approximately $6.3 million in FY 2016.

- **Mandatory Conservation:** On April 1, 2015, Governor Brown issued Executive Order B-29-15 directing the State Water Resources Control Council (SWRCB) to work with water service providers to reduce urban potable use by 25 percent statewide. The City is required to reduce usage by 36 percent; the City anticipates reduced water demand of at least 25 percent, as this is what has been achieved from June 2015 through January 2016. While the reduction of 25 percent may be temporary, the City anticipates a permanent reduction in water sales of 10 percent from behavioral changes in water use and more efficient indoor and outdoor fixtures.

The reduced sales result in lower revenues and significantly impact long term water sales revenues.

» **Previously Proposed Revenue Adjustments:** In the winter of 2015 RFC proposed increases of 7 percent in FY 2015 and 7 percent in FY 2016. These adjustments were not made and included, among other things, rate adjustments due to inflation.

The City's water utility operates in an environment where operational costs continue to increase and reinvestment in infrastructure is required as outlined within the City's Master Plan and rate model. This is not unique to the City, as many agencies throughout the state are faced with the need to update capital infrastructure necessary to continue providing reliable utility services and adhere to new regulations and mandates.

1.5.3 Proposed Rate Structure – Revised Inclining Block Rate Structure

This rate study examined two alternative rate structures: water budgets and the traditional inclining block. At the January 19, 2016, City Council meeting, Council decided to maintain the traditional inclining rate structure while revising the tier definitions (the amount of water provided in each tier). The revisions harmonize the tier definitions with available supply to achieve strict compliance with Proposition 218.

The revised rates are discussed in detail in Section 6. Table 1-2 and Table 1-3 shows the current and proposed water usage rates. The alternative water budget rate structure discussion, including methodology, definitions, and rates, is presented in the appendices of this report. Documenting this work will allow the City to revisit a water budget rate structure in subsequent years should Council choose to do so.

Table 1-2: Current and Proposed Bi-Monthly Water Usage Rates

	Prior Tier Breakpoints (HCF)[4]	New Tier Breakpoints (HCF)	Current Rate (Inside City/ Outside City)	Proposed Rate (Inside & Outside) July 2016	$ Change (from Inside City)
Building					
Tier 1	10	16	$0.87/$0.88	$1.18	$0.31
Tier 2	11-60	17-27	$1.49/$1.52	$1.45	($0.04)
Tier 3	>60	>27	$1.64/$1.67	$2.20	$0.56
Non-Building (Irrigation)					
Tier 1	60	27	$1.49/$1.52	$1.45	($0.04)
Tier 2	>60	>27	$1.64/$1.67	$2.20	$0.56

[4] *HCF = Hundred Cubic Feet*

Table 1-3: Proposed Bi-Monthly Water Usage Rates (Three Years)

	Current Tier Breakpoints (HCF)	New Tier Breakpoints (HCF)	Proposed July 2016	Proposed July 2017	Proposed July 2018
Building					
Tier 1	10	16	$1.18	$1.31	$1.46
Tier 2	11-60	17-27	$1.45	$1.61	$1.78
Tier 3	>60	>27	$2.20	$2.44	$2.69
Non-Building					
Tier 1	60	17-27	$1.45	$1.61	$1.78
Tier 2	>60	>27	$2.20	$2.44	$2.69

Table 1-4 and Table 1-5 shows the shows the current and proposed bi-monthly service charges by meter size. The charges are based upon modified AWWA hydraulic capacity ratios from the "Sizing Water Service Lines and Meters M22" ("Manual M22"). Calculation of proposed service charges is consistent with previous studies conducted by RFC.

Table 1-4: Current and Proposed Water Bi-Monthly Service Charges

Meter Size	Current Charge (Inside City)	Current Charge (Outside City)	Proposed Charge July 2016
5/8-in	$28.08	$31.23	$26.28
3/4-in	$37.48	$40.61	$35.35
1-in	$55.67	$60.67	$52.96
1 1/2-in	$99.77	$109.22	$95.65
2-in	$147.20	$161.47	$141.54
3-in	$254.17	$279.34	$245.06
4-in	$392.02	$431.35	$378.46
6-in	$722.87	$796.23	$698.62
8-in	$1,064.73	$1,173.84	$1,029.45

Table 1-5: Proposed Bi-Monthly Service Charge (Three Years)

Meter Size	Proposed Charge (July 2016)	Proposed Charge (July 2017)	Proposed Charge (July 2018)
5/8-in	$26.28	$29.17	$32.10
3/4-in	$35.35	$39.24	$43.17
1-in	$52.96	$58.78	$64.67
1 1/2-in	$95.65	$106.17	$116.79
2-in	$141.54	$157.11	$172.83
3-in	$245.06	$272.01	$299.23
4-in	$378.46	$420.09	$462.10
6-in	$698.62	$775.47	$853.02
8-in	$1,029.45	$1,142.69	$1,256.97
10-in	$2,438.16	$2,706.36	$2,977.00
12-in	$3,206.55	$3,559.27	$3,915.20

Based on a prior rate analysis, RFC determined that the historical justification for the different inside-city and outside-city rates is no longer valid. This determination is based upon inside-city (owners of the utility) customers receiving the proper return on their invested capital. Therefore, the proposed commodity and service charge rates apply to both inside and outside City customers.

1.6 RESULTS AND RECOMMENDATIONS - WASTEWATER

1.6.1 Proposed Financial Plan – Wastewater

Table 1-6 shows the proposed revenue adjustments for the wastewater enterprise for the next five fiscal years. The revenue adjustments for wastewater include required revenue to fund approximately $9.6 million in capital improvement projects.

The recommended revenue adjustments for the wastewater utility are 2.5 percent per year in 2016 – 2020. The revenue adjustments are required to meet all financial obligations of the wastewater utility. Because of the replacement and refurbishment nature of the capital improvements, the UAC opted to fund capital improvements on a pay-as-you-go basis from rates instead of debt funding. Note that the proposed financial plan and corresponding revenue adjustments assume April 2016 and January 2017 implementation. Council has chosen to implement rate increases in July of 2016, 2017, and 2018.

Table 1-6: Revenue Adjustments by Year

Enterprise	Revenue Adjustments				
	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Wastewater	2.5%	2.5%	2.5%	2.5%	2.5%

1.6.2 Factors Affecting Revenue Adjustments

A cost of service approach was used to update the wastewater service rate. The primary revenue requirements include capital projects, increased costs of operation due to inflationary effects and increased electricity costs, and debt service payments. The following elements have impacted the City's wastewater rates:

- **Power Costs:** The cogeneration facilities at the wastewater treatment plant no longer meet regulatory guidelines. Accordingly, the City's cost to purchase power has increased significantly in the past several years and will continue to be a driver in to the future.
- **Inflationary Cost Pressures for Labor and Materials:** The following escalation factors were used in the model: general, salaries, and personnel inflation of three percent; benefits inflation of five percent; supplies and materials inflation of two percent; energy/utilities inflation of three percent; capital inflation of three percent.
- **System Improvements.** Deferred costs for replacement and system improvement projects are required for reliable service.

1.6.3 Proposed Rate Structure and Rates

The current wastewater rate structure consists of a flat bi-monthly charge for residential customers and a rate based on water usage for non-residential customers, depending on the wastewater strength, and subject to a minimum. Non-residential classifications include eight categories: three classifications of low strength users, three classifications of medium strength users, and two classifications of high strength users. For this planning period, the UAC has retained the existing wastewater rate structure.

Table 1-7 summarizes the proposed rates under the recommended wastewater rate structure. Table 1-8 shows the user strength categorization for non-residential customers.

Table 1-7: Proposed Bi-Monthly Wastewater Rate Schedule

Customer Class	Current Rates	July 2016	July 2017	July 2018
Residential				
Single Family Residential	$46.48	$47.64	$48.83	$50.05
Multi-Family Residential	$34.91	$35.78	$36.68	$37.59
Non-Residential ($/hcf)				
Minimum Charge	$34.91	$35.78	$36.68	$37.59
Low Strength I	$1.90	$1.95	$2.00	$2.05
Low Strength II	$2.01	$2.06	$2.11	$2.16
Low Strength III	$2.45	$2.51	$2.57	$2.64
Medium Strength I	$2.94	$3.01	$3.09	$3.17
Medium Strength II	$3.38	$3.46	$3.55	$3.64
Medium Strength III	$3.82	$3.92	$4.01	$4.11
High Strength I	$4.27	$4.38	$4.49	$4.60
High Strength II	$4.64	$4.76	$4.87	$5.00
Large Volume User	$2.56	$2.62	$2.69	$2.76
Customer Class	**Current Rates**	**July 2016 $ /100 ADA**	**July 2017 $ / 100 ADA**	**July 2018 $ / 100 ADA**
Schools				
Elementary	$110.84	$113.61	$116.45	$119.36
Secondary/High Schools	$184.74	$189.36	$194.09	$198.94
Septage				
Minimum Charge	$11.70	$11.99	$12.29	$12.60
Septage ($/gal)	$0.10	$0.10	$0.11	$0.11

Table 1-8: Wastewater Strengths for Non-Residential Customers

Customer Class	BOD + SS (mg/L)
Low Strength I	0-200
Low Strength II	201-400
Low Strength III	401-600
Medium Strength I	601-800
Medium Strength II	801-1,000
Medium Strength III	1,001-1,200
High Strength I	1,201-1,400
High Strength II	>1,400

2. GENERAL ASSUMPTIONS

The City provided water use for FY 2014 and Operation and Maintenance budgets for FY 2015-16. Water use and expenses were projected through Fiscal Year 2024-25 to develop the long term financial plans for water and wastewater service. This report presents five year financial plans and rates for the next five years; however the City will review and adopt rates every two years[5], or as specified otherwise by City Council. The escalatory assumptions used to project expenses and future water use trends were reviewed with, or provided by, City Management. Assumptions include customer account growth rates, water conservation trends and inflationary factors shown in this section.

2.1 INFLATION

Inflationary assumptions, shown in Table 2-1 and Table 2-2, were determined with input from City Management in light of commonly used price indices. A general inflation rate of 3 percent is based on the long term change in the Consumer Price Index (CPI). Three percent salary inflation is based on the Social Security Administration's 10-year average national wage index. Benefits escalation tends to outpace general inflation and therefore an escalation of 5 percent is used. Supplies and materials track the CPI and are therefore the same as general inflation. Capital costs escalate at 3 percent based on the Engineering News Record Construction Cost Index and input from City Management. Interest rates earned on reserves are based on conservative estimates in a low interest financial environment.

Table 2-1: Water Inflationary Assumptions

KEY FACTORS	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
General		3%	3%	3%	3%
Salaries		3%	3%	3%	3%
Personnel		3%	3%	3%	3%
Benefits		5%	5%	5%	5%
Supplies & Materials		3%	3%	3%	3%
Energy/Utilities		5%	5%	5%	5%
Capital		3%	3%	3%	3%
Other Revenues	0.25%	0.25%	0.25%	0.25%	0.25%
Interest on Reserves	0.75%	1.00%	1.0%	1.0%	1.0%

Table 2-2: Wastewater Inflationary Assumptions

KEY FACTORS	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
General		3%	3%	3%	3%
Salaries		3%	3%	3%	3%
Personnel		3%	3%	3%	3%
Benefits		5%	5%	5%	5%
Supplies & Materials		3%	3%	3%	3%
Energy/Utilities		3%	3%	3%	3%
Capital		3%	3%	3%	3%
Other Revenues	0.25%	0.25%	0.25%	0.25%	0.25%
Interest on Reserves	0.75%	1.00%	1.0%	1.0%	1.0%

[5] *Financial plan tables in this report show a five year period, starting with FY 2016 through FY 2020.*

2.2 PROJECTED WATER DEMAND AND ACCOUNT GROWTH

Water demand has a significant impact on rates and has to be carefully evaluated. To estimate future normal water demand, two primary factors are used – account growth and water demanded relative to fiscal year (FY) 2014, our baseline consumption year within the model. Given that the City is not expecting a high level of growth, it is estimated that the total number of residential accounts, including both single family residential (SFR) and multi-family residential (MFR), will grow by 0.5 percent in FYE 2016 and 1.0 percent thereafter. Non-residential accounts are considered built out and no growth is assumed. Table 2-3 shows the estimated account growth rates used in study projections.

Table 2-3: Account Growth and Water Demand Assumptions

Account Growth	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Inside City					
SFR	0.5%	1.0%	1.0%	1.0%	1.0%
MFR	0.5%	1.0%	1.0%	1.0%	1.0%
Non-Residential	0%	0%	0%	0%	0%
Outside City					
SFR	0.5%	1.0%	1.0%	1.0%	1.0%
MFR	0.5%	1.0%	1.0%	1.0%	1.0%
Non-Residential	0%	0%	0%	0%	0%

Table 2-4 shows the estimated reduction in water use due to conservation efforts by the City and long term, passive efficiency gains from appliance and fixture replacement. In consideration of current drought conditions and the City's assigned mandatory water usage cutback of 36 percent from the State Water Resources Control Council (SWRCB), total water demand is projected to decrease by 25 percent in FYE 2016 versus FYE 2015. A 10 percent rebound in demand is assumed in FYE 2017 and an additional 5 percent in FYE 2018. This results in approximately a 10 percent permanent reduction from FYE 2014/2015 baseline (-25 + 10 + 5 = -10). For FY 2019 and beyond usage is expected to decrease modestly from long term efficiency gains including replacements or toilets and appliances, outdoor additions of irrigation controllers and reduced irrigable area, as well as price sensitivity. The City expects to meet its 20 percent reduction target by 2020 as mandated by the State.

Table 2-4: Estimated Reduction in Water Demand

Water Demand Factor	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Inside City					
SFR	-25%	10%	5%	-2%	-2%
MFR	-25%	10%	5%	-2%	-2%
Non-Residential	-25%	10%	5%	-2%	-2%
Outside City					
SFR	-25%	10%	5%	-2%	-2%
MFR	-25%	10%	5%	-2%	-2%
Non-Residential	-25%	10%	5%	-2%	-2%

3. WATER ENTERPRISE – FINANCIAL PLAN

This section describes the water enterprise, the City's customer account and water use data, and corresponding financial plan. To develop the financial plan, RFC projects annual expenses and revenues, models reserve balances and transfers between funds, capital expenditures and calculated debt service coverage ratios to estimate the amount of additional rate revenue needed per year. This section of the report provides a discussion of O&M expenses, the capital improvement plan, water reserve funding, projected revenue under existing rates and the revenue adjustments required to ensure the fiscal sustainability and solvency of the water enterprise.

3.1 REVENUE REQUIREMENT

A utility's revenue requirement is the amount of revenue needed to operate, maintain and ensure fiscal solvency of the utility for one year. The revenue requirement includes operation and maintenance (O&M) expenses, rate funded capital expenditures, debt service payments, and reserve requirements (funding for reserves). Sub-sections 3.2 through 3.6 discuss the revenue requirement including O&M expenses, debt service requirements, the capital improvement plan (expenses), and reserve funding over the 5-year planning period.

3.1.1 Revenues from Current Rates

The current rates, last updated January 1, 2013, were originally developed in the 2012 Rate Study. The City's water charges have two components – a fixed component (bi-monthly service charge) and a volumetric component (water use sales). The bi-monthly fixed charge increases with meter size as larger meter sizes consume more water on average, and tend to have higher rates of peaking; therefore, the costs to provide service to these customers is higher. A typical single family home has a 3/4" meter which has a bi-monthly base charge of $37.48; non-residential customers have various meter sizes, which are based on their water needs. Current service charges are shown in Table 3-1. Similarly, fire protection service charges are shown in Table 3-2.

Table 3-1: Current Bi-Monthly Base Service Charges

Meter Size	FYE 2016
5/8"	$28.08
3/4"	$37.48
1"	$55.67
1 1/2"	$99.77
2"	$147.20
3"	$254.17
4"	$392.02
6"	$722.87
8"	$1,064.73

Table 3-2: Current Bi-Monthly Fire Protection Charges

Meter Size	FYE 2016
2"	$54.96
3"	$54.96
4"	$54.96
6"	$72.15
8"	$97.73
10"	$149.53
12”	$198.77

The commodity, or volumetric, component of a customer’s water charge is the number of units consumed (measured in increments of one hundred cubic feet, or “HCF”) multiplied by rates that vary by customer class and tier. The current tier widths along with corresponding inside and outside City rate are shown in Table 3-3 below.

Table 3-3: Current Bi-Monthly Commodity Rates

Tier	Tier Width (HCF)	Inside City ($ /HCF)	Outside City ($/HCF)
Building			
Tier 1	0-10	$0.87	$0.88
Tier 2	11-60	$1.49	$1.52
Tier 3	60+	$1.64	$1.67
Non-Building			
Tier 1	0-60	$1.49	$1.52
Tier 2	60+	$1.64	$1.67

Table 3-4 shows the estimated and projected number of water accounts by meter size. The table includes 485 fire service lines and 86 non-potable accounts that receive reclaimed water. Approximately 91% of meters are 1 inch or smaller.

Table 3-4: Water Accounts by Meter Size

Meter Size	FY 2016 (Estimated)	FY 2017 (Projected)	FY 2018 (Projected)	FY 2019 (Projected)	FY 2020 (Projected)
5/8"	175	176	178	180	181
3/4"	8,181	8,260	8,339	8,419	8,500
1"	11,250	11,357	11,466	11,576	11,687
1 1/2"	695	698	702	706	709
2"	663	664	665	666	667
3"	61	61	62	62	62
4"	174	174	174	174	174
6"	168	168	169	169	169
8"	156	156	156	156	156
10”	53	53	53	53	53
12”	1	1	1	1	1
Total Accounts	**21,576**	**21,769**	**21,964**	**22,161**	**22,360**

Table 3-5 identifies the number of accounts by customer class. Approximately 90% of accounts are residential.

Table 3-5: Water Accounts by Customer Class

Subordinate Class	FY 2016 (Estimated)	FY 2017 (Projected)	FY 2018 (Projected)	FY 2019 (Projected)	FY 2020 (Projected)
SFR	18,404	18,588	18,773	18,961	19,151
MFR	910	919	928	937	946
Non-Residential	1,154	1,154	1,154	1,154	1,154
School	52	52	52	52	52
Municipal	28	28	28	28	28
Non-Building	458	458	458	458	458
Fire Service	485	485	485	485	485
Non-Potable	86	86	86	86	86
Total Water Accounts	**21,576**	**21,769**	**21,964**	**22,161**	**22,360**

Water usage projections through FY 2020 are shown in Table 3-6. Water sales revenue is expected to continue to decline in FY 2016 relative to previous years as a result of the ongoing drought, and the state's water use restrictions. Due to current drought conditions, California Governor Brown issued executive order B-29-15 on April 1, 2015, which mandates a 25 percent reduction in urban water use statewide. The State Water Resources Control Board (SWRCB) determined that the City of Redlands must reduce water consumption by 36 percent relative to calendar year (CY) 2013 levels. Water usage is anticipated to rebound in FY 2017 and again in FY 2018, with a permanent 10 percent reduction in sales relative to FY 2014.

Table 3-6: Commodity Water Sales Estimates (HCF)

Subordinate Class	FY 2016 (Estimated)	FY 2017 (Projected)	FY 2018 (Projected)	FY 2019 (Projected)	FY 2020 (Projected)
SFR	4,717,034	5,188,738	5,448,175	5,339,211	5,232,427
MFR	1,070,305	1,177,335	1,236,202	1,211,478	1,187,248
Non-Residential	715,884	787,472	826,846	810,309	794,103
School	340,507	374,557	393,285	385,420	377,711
Municipal	43,968	48,365	50,783	49,767	48,772
Non-Building	993,775	1,093,152	1,147,810	1,124,854	1,102,357
Fire Service	19,278	21,206	22,266	21,821	21,384
Non-Potable	461,410	507,551	532,928	522,270	511,824
Total Water Sales	**8,362,160**	**9,198,376**	**9,658,295**	**9,465,129**	**9,275,827**

Table 3-7 shows the rate revenue generated in each study year with projected usage and current rates. Note, revenues for FY 2016 and beyond use FY 2016 rates. The estimated rate revenues in FY 2016 are $19,240,666. This amount becomes our revenue requirement for the cost of service analysis in Section 4.

Table 3-7: Projected Water Rate Revenues (No Revenue Adjustments)

Subordinate Class	FY 2016 (Estimated)	FY 2017 (Projected)	FY 2018 (Projected)	FY 2019 (Projected)	FY 2020 (Projected)
Building Water Use	$16,984,299	$17,989,224	$18,614,168	$18,436,502	$18,264,187
Non Building (rrigation) Water Use	$1,915,904	$2,074,795	$2,163,541	$2,126,268	$2,089,740
Fire Hydrant Revenue	$68,725	$68,038	$67,358	$66,684	$66,017
Fire Protection Revenue	$271,738	$274,900	$276,639	$275,909	$275,193
Total Water Rate Revenue	**$19,240,666**	**$20,406,957**	**$21,121,706**	**$20,905,363**	**$20,695,137**

The utility also derives revenues from other non-rate sources. These revenues consist of other operating, miscellaneous, and non-operating revenues and are summarized in Table 3-8. "B" Contract water usage is provided to some irrigation customers that only pay for pumping from wells.

Table 3-8: Other and Non-Operating Revenues

Subordinate Class	FY 2016 (Estimated)	FY 2017 (Projected)	FY 2018 (Projected)	FY 2019 (Projected)	FY 2020 (Projected)
"B" Contract Water Usage	$110,000	$110,000	$110,000	$110,000	$110,000
Other Operating Revenue	$683,000	$683,000	$683,000	$683,000	$683,000
Non-Operating Revenue	$0	$0	$0	$0	$0
Investment/Interest Income	$42,871	$50,917	$75,670	$92,683	$115,573
Total Other Revenues	**$835,871**	**$843,917**	**$868,670**	**$885,683**	**$908,573**

3.2 OPERATIONS AND MAINTENANCE (O&M) EXPENSES

The City's Fiscal Year 2015-16 O&M budget and the inflationary factors (from Section 2) are used to project O&M costs shown in Table 3-9. These expenses are summarized by cost center. Expenses are based in the City's budgeted FY 2016 values.

Table 3-9: Projected O&M Expenses

Cost Centers	FY 2016 (Estimated)	FY 2017 (Projected)	FY 2018 (Projected)	FY 2019 (Projected)	FY 2020 (Projected)
Salaries & Benefits	$6,220,275	$6,451,031	$6,690,918	$6,940,319	$7,199,636
Services	$8,222,834	$8,574,379	$8,954,157	$9,267,033	$9,591,271
Supplies	$2,317,510	$2,435,317	$2,535,727	$2,599,967	$2,666,023
Fixed Assets	$298,000	$306,940	$316,148	$325,633	$335,402
Total O&M Expenses	**$17,058,619**	**$17,767,667**	**$18,496,951**	**$19,132,952**	**$19,792,331**

3.3 EXISTING DEBT SERVICE

Table 3-10 shows rate funded debt service. The City has three outstanding long-term debt obligations. The water fund is responsible for 100 percent of the SRF loan and 90 percent of all other debt service. The

remaining debt service is funded through the collection of development impact fees (DIF). The Series 2012A water refunding bonds will be repaid in FY 2016.

Table 3-10: Projected Debt Service

Cost Centers	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Series 2012A Water Refunding Bonds					
Principal	$1,195,000				
Interest	$17,925				
Total	**$1,212,925**				
2007 Safe Drinking Water Project Loan					
Principal	$291,947	$298,819	$305,852	$313,051	$320,419
Interest	$91,772	$84,900	$77,867	$70,668	$63,300
Total	**$383,719**	**$383,719**	**$383,719**	**$383,719**	**$383,719**
2010 SRF Loan					
Principal	$446,613	$457,856	$469,382	$481,198	$493,312
Interest	$222,316	$211,073	$199,548	$187,732	$175,618
Total	**$668,930**	**$668,930**	**$668,930**	**$668,930**	**$668,930**
Total Debt Service Principal	$1,933,560	$756,675	$775,234	$794,249	$813,730
Total Debt Service Interest	$332,013	$295,973	$277,414	$258,400	$238,918
Total Debt Service	**$2,265,573**	**$1,052,648**	**$1,052,648**	**$1,052,648**	**$1,052,648**
% Water Fund +SRF	64%	90%	90%	90%	90%
Total Debt Service - Water	**$1,690,782**	**$1,014,276**	**$1,014,276**	**$1,014,276**	**$1,014,276**

3.4 CAPITAL IMPROVEMENT PLAN

Table 3-11 shows the detailed 5-year CIP provided by the City. Over the next 10 years all CIP will be funded through proposed rates (also known as PAYGO). The vast majority of the replacement CIP involves water main replacement, both backlogged and the replacement of water mains that have exceeded their useful life. Note that Table 3-11 shows both rate funded replacement projects and DIF funded expansion projects.

Table 3-11: Detailed Capital Improvement Plan

	Budgeted FY 2016	*Projected* FY 2017	*Projected* FY 2018	*Projected* FY 2019	*Projected* FY 2020
Replacement Projects					
5th Ave Booster Replacement	$ -	$ -	$ -	$ 400,000	$ -
Additional PRV Stations	$ -	$ -	$ -	$ -	$ -
Dearborn 1-1750, 1-1900 (add'l booster)	$ -	$ 425,000	$ 425,000	$ -	$ -
Dynamic Optimization System	$ 200,000	$ -	$ -	$ -	$ -
HAWC 1723/1724 Booster Panel Replacement	$ -	$ 150,000	$ -	$ -	$ -
HAWC Boosters Replacement	$ -	$ 400,000	$ -	$ -	$ -
HAWC Cla-Val Vault Replacement	$ -	$ 200,000	$ -	$ -	$ -
HAWC Refurbishing (including new roof design	$ -	$ -	$ 500,000	$ -	$ -
Backlog pipe	$ -	$ -	$ 2,000,000	$ 2,000,000	$ 2,500,000
Local/Master Planned Water Mains	$ 3,000,000	$ 5,000,000	$ 5,150,000	$ 5,304,500	$ 5,463,635
Highline Replacement	$ -	$ -	$ -	$ -	$ -
Mill Creek Booster Replacement	$ -	$ -	$ -	$ -	$ 200,000
Reservoir Recoat/Rehab	$ 750,000	$ -	$ -	$ -	$ -
Sand Canyon Booster Replacement	$ -	$ -	$ -	$ 200,000	$ -
South Reservoir	$ -	$ -	$ 800,000	$ -	$ -
Utilities Building Improvements	$ 123,600	$ 127,308	$ 131,127	$ 135,061	$ 139,113
Water Production Annual Replacement	$ 515,000	$ 530,450	$ 546,364	$ 562,754	$ 579,637
Water Studies and Projects	$ 206,000	$ 212,180	$ 218,545	$ 225,102	$ 231,855
Water System Improvements	$ 334,750	$ 344,793	$ 355,136	$ 365,790	$ 376,764
Subtotal Replacement Projects	**$ 5,129,350**	**$ 7,389,731**	**$ 10,126,172**	**$ 9,193,208**	**$ 9,491,004**
Expansion Projects (DIF Funded)					
Highline Replacement		$ -	$ -	$ -	$ -
Master Planned Water Mains	$ 226,600	$ 233,398	$ 240,400	$ 247,612	$ 255,040
Water Studies and Projects	$ 20,600	$ 21,218	$ 21,855	$ 22,510	$ 23,185
Subtotal Expansion Projects (DIF Funded)	**$ 247,200**	**$ 254,616**	**$ 262,254**	**$ 270,122**	**$ 278,226**
TOTAL CIP PROJECTS	**$ 5,376,550**	**$ 7,644,347**	**$ 10,388,427**	**$ 9,463,330**	**$ 9,769,230**

3.5 STATUS QUO FINANCIAL PLAN (NO REVENUE ADJUSTMENTS)

Table 3-12 displays the cash flow of the City's water enterprise under current rates over the Study period. The cash flow incorporates revenues and expenses to show the overall position of the utility. All projections shown in the table are based upon the City's current rate structure and do not include rate adjustments. The cash flow incorporates the water enterprise data shown in the preceding tables of this section.

Under the "status-quo" scenario, revenues generated from rates and other miscellaneous revenues are inadequate to meet the revenue requirement and achieve reserve targets over the Study period. In each year, the utility generates a large negative cash balance which quickly draws down reserves. In FY 2020 the Water Service Fund (501) projects a negative balance of $29.8 million (not shown below). Not shown on the table is in FY 2021 the City does not meet its debt coverage requirements and would be in technical default with its debt holders.

Table 3-12: Five-Year Cash Flow, Status Quo Financial Plan

			Budgeted FY 2016	*Projected* FY 2017	*Projected* FY 2018	*Projected* FY 2019	*Projected* FY 2020
Revenues under Existing Rates			$ 18,900,202	$ 20,064,019	$ 20,777,709	$ 20,562,770	$ 20,353,927
Fire Hydrant and Fire Protection			$ 340,464	$ 342,938	$ 343,997	$ 342,593	$ 341,210
Additional Revenue Required:							
Year	**% Adj.**	**Effective**					
FY 2016	0.0%	April	$ -	$ -	$ -	$ -	$ -
FY 2017	0.0%	July		$ -	$ -	$ -	$ -
FY 2018	0.0%	July			$ -	$ -	$ -
FY 2019	0.0%	July				$ -	$ -
FY 2020	0.0%	July					$ -
Revenue Adjustments			$ -	$ -	$ -	$ -	$ -
Total Revenue from Rates			**$ 19,240,666**	**$ 20,406,957**	**$ 21,121,706**	**$ 20,905,363**	**$ 20,695,137**
"B" Contract Water Usage			$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000
Other Operating Revenue			$ 683,000	$ 683,000	$ 683,000	$ 683,000	$ 683,000
Non-Operating Revenue			$ -	$ -	$ -	$ -	$ -
Investment/Interest Income			$ 40,580	$ 24,398	$ (27,267)	$ (101,472)	$ (181,320)
Total Other Revenue			**$ 833,580**	**$ 817,398**	**$ 765,733**	**$ 691,528**	**$ 611,680**
TOTAL REVENUE			**$ 20,074,246**	**$ 21,224,355**	**$ 21,887,439**	**$ 21,596,891**	**$ 21,306,818**
Water O&M Expenses			$ 17,058,620	$ 17,767,668	$ 18,496,952	$ 19,132,952	$ 19,792,331
Transfer to Water Projects (503)			$ 5,129,350	$ 7,389,731	$ 10,126,172	$ 9,193,208	$ 9,491,004
Transfer to Water Debt Service (506)			$ 1,690,782	$ 1,014,276	$ 1,014,276	$ 1,014,276	$ 1,014,276
Expansion Capital Debt			$ -	$ -	$ -	$ -	$ -
Proposed (Future) Debt			$ -	$ -	$ -	$ -	$ -
TOTAL REVENUE REQUIREMENTS			**$ 23,878,751**	**$ 26,171,675**	**$ 29,637,401**	**$ 29,340,436**	**$ 30,297,611**
Non-Cumulative Annual Cash Balance			**$ (3,804,505)**	**$ (4,947,321)**	**$ (7,749,962)**	**$ (7,743,545)**	**$ (8,990,793)**
Debt Coverage (all debt)			146%	358%	352%	265%	176%
Req'd Debt Coverage - 125%			125%	125%	125%	125%	125%

3.6 PROPOSED FINANCIAL PLAN AND REVENUE ADJUSTMENTS

The proposed rate adjustments help ensure adequate revenue to fund operating expenses, capital expenditures, and utility compliance with bond covenants. This financial plan assumes the first revenue adjustment would occur on April 1, 2016, with the second adjustment occurring on January 1, 2017. The proposed revenue adjustments will enable the utility to replace approximately 25 miles of water mains that are overdue for replacement as well as continue the water main replacement program to avoid any future backlog. The proposed adjustments also allow the City to maintain compliance with its bond covenant of 125% coverage through the planning horizon.

Revenue adjustments represent the average increase in rates for the enterprise as a whole. Actual percent increases (or decreases) in rates are dependent upon the cost of service analysis and are unique to each customer class and meter size.

Table 3-13 shows the proposed financial plan. Although Table 3-13 shows anticipated revenue adjustments for FYs 2016 through 2020, the City will review and confirm the required revenue adjustments on a biennial basis. The rates presented in Section 6 are based on the proposed financial plan below. Council has chosen to implement the rate adjustments in July 2016 and each subsequent July through the Study period.

Table 3-13: Proposed Rate Adjustments

	FY 2016	FY 2017	FY 2018	FY 2019 (Not to be implemented at this time)	FY 2020 (Not to be implemented at this time)
Revenue Adjustment	19%	11%	10%	2%	2%

Table 3-14 shows the water cash flow detail over the next five years with the revenue adjustments shown in Table 3-13. The first two lines show rate revenue under current rates. The line titled "Total Revenue from Rates" shows revenue with proposed revenue adjustments. Also shown are rate funded capital projects and rate funded debt service payments (90 percent of total debt service). The second to last line shows that the water utility meets debt coverage requirements (last line) for the Study period. Lastly, with the exception of FY 2016 the utility is generating positive cash balances for reserve funding.

Table 3-14: Five-Year Water Operating Cash Flow

			Budgeted FY 2016	*Projected* FY 2017	*Projected* FY 2018	*Projected* FY 2019	*Projected* FY 2020
Revenues under Existing Rates			$ 18,900,202	$ 20,064,019	$ 20,777,709	$ 20,562,770	$ 20,353,927
Fire Hydrant and Fire Protection			$ 340,464	$ 342,938	$ 343,997	$ 342,593	$ 341,210
Additional Revenue Required:							
Year	**% Adj.**	**Effective**					
FY 2016	19.0%	April	$ 913,932	$ 3,877,322	$ 4,013,124	$ 3,972,019	$ 3,932,076
FY 2017	11.0%	July		$ 2,671,271	$ 2,764,831	$ 2,736,512	$ 2,708,993
FY 2018	10.0%	July			$ 2,789,966	$ 2,761,389	$ 2,733,621
FY 2019	2.0%	July				$ 607,506	$ 601,397
FY 2020	2.0%	July					$ 613,424
Revenue Adjustments			$ 913,932	$ 6,548,593	$ 9,567,921	$ 10,077,426	$ 10,589,511
Total Revenue from Rates			**$ 20,154,598**	**$ 26,955,550**	**$ 30,689,627**	**$ 30,982,789**	**$ 31,284,648**
"B" Contract Water Usage			$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000
Other Operating Revenue			$ 683,000	$ 683,000	$ 683,000	$ 683,000	$ 683,000
Non-Operating Revenue			$ -	$ -	$ -	$ -	$ -
Investment/Interest Income			$ 42,871	$ 55,945	$ 96,154	$ 121,909	$ 148,161
Total Other Revenue			**$ 835,871**	**$ 848,945**	**$ 889,154**	**$ 914,909**	**$ 941,161**
TOTAL REVENUE			**$ 20,990,469**	**$ 27,804,494**	**$ 31,578,781**	**$ 31,897,698**	**$ 32,225,809**
Water O&M Expenses			$ 17,058,620	$ 17,767,668	$ 18,496,952	$ 19,132,952	$ 19,792,331
Transfer to Water Projects (503)			$ 5,129,350	$ 7,389,731	$ 10,126,172	$ 9,193,208	$ 9,491,004
Transfer to Water Debt Service (506)			$ 1,690,782	$ 1,014,276	$ 1,014,276	$ 1,014,276	$ 1,014,276
Expansion Capital Debt			$ -	$ -	$ -	$ -	$ -
Proposed (Future) Debt			$ -	$ -	$ -	$ -	$ -
TOTAL REVENUE REQUIREMENTS			**$ 23,878,751**	**$ 26,171,675**	**$ 29,637,401**	**$ 29,340,436**	**$ 30,297,611**
Non-Cumulative Annual Cash Balance			**$ (2,888,283)**	**$ 1,632,819**	**$ 1,941,380**	**$ 2,557,262**	**$ 1,928,198**
Debt Coverage (all debt)			187%	983%	1273%	1244%	1213%
Req'd Debt Coverage - 125%			125%	125%	125%	125%	125%

The following figures portray the FY 2016 through FY 2020 financial plan in graphical format. Figure 3-1 shows the recommended revenue adjustments (blue bars) for the next five years. The revenue adjustments are 19 percent, 11 percent, and 10 percent for FY 2016, 2017, and 2018 respectively; and two percent in FY 2019 and 2020. The figure also shows calculated and minimum debt coverage requirements in the green and red lines respectively.

Figure 3-1: Proposed Revenue Adjustments

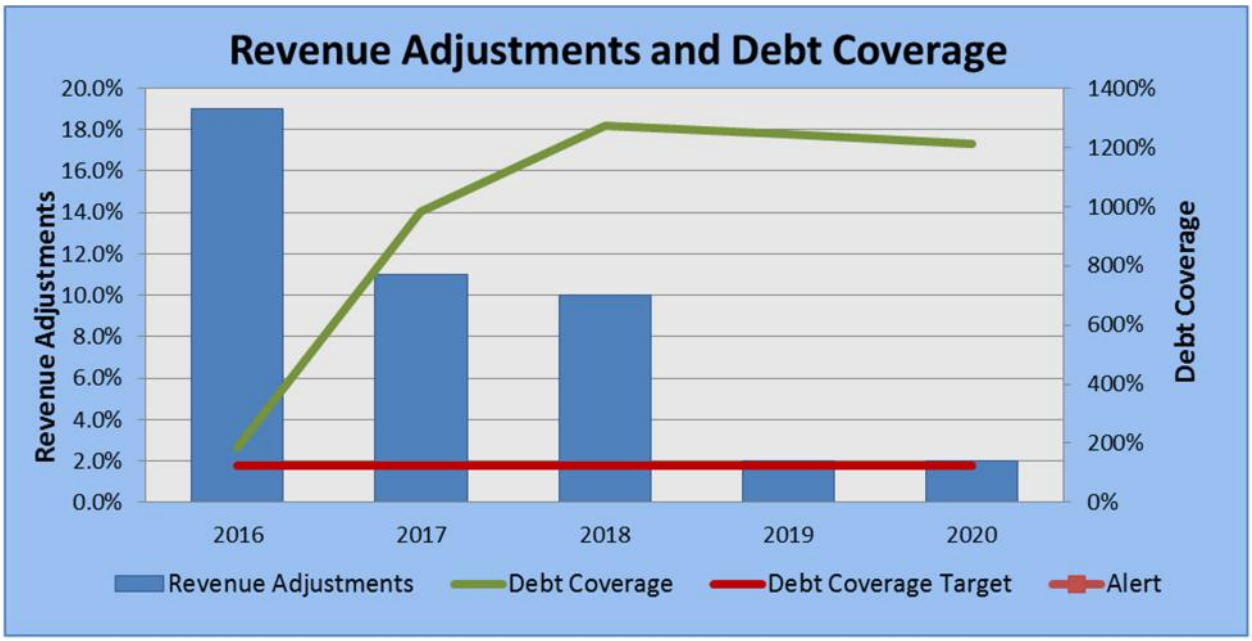


Figure 3-2 illustrates the financial plan – it compares current and proposed revenues with expenses. The expenses, inclusive of O&M, capital expenditures, reserve funding and debt service, are shown by the stacked bars; and total revenues at current and proposed rates are shown by the horizontal trend lines. The proposed revenue (dark green) tracks at the top of the stacked bars. Current revenue (in red) from existing rates is inadequate to meet future total expenses.

Figure 3-2: Proposed Financial Plan

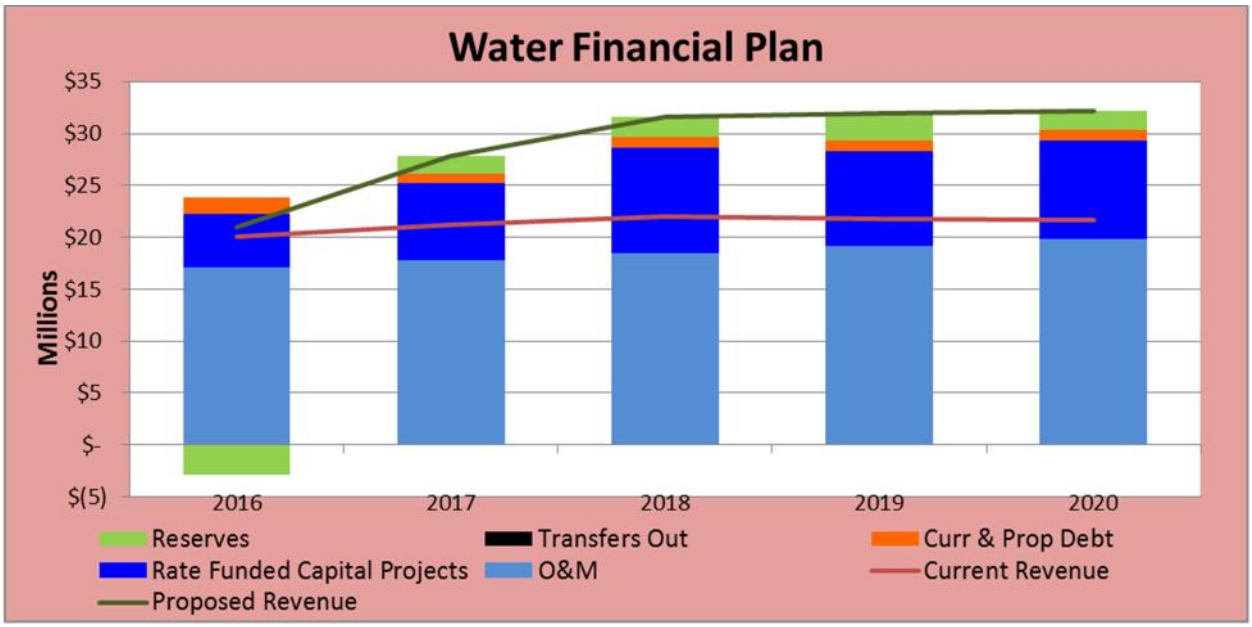


Figure 3-3 summarizes the projected CIP and its funding sources, either rate funded (PAYGO) or DIF funded (for expansion projects). Replacement CIP is shown as orange bars whereas DIF CIP is purple. The City plans on funding all replacement CIP, including the backlog of water main replacement projects, through rates (orange bar). No debt is issued over the Study period.

Figure 3-3: Projected CIP and Funding Sources

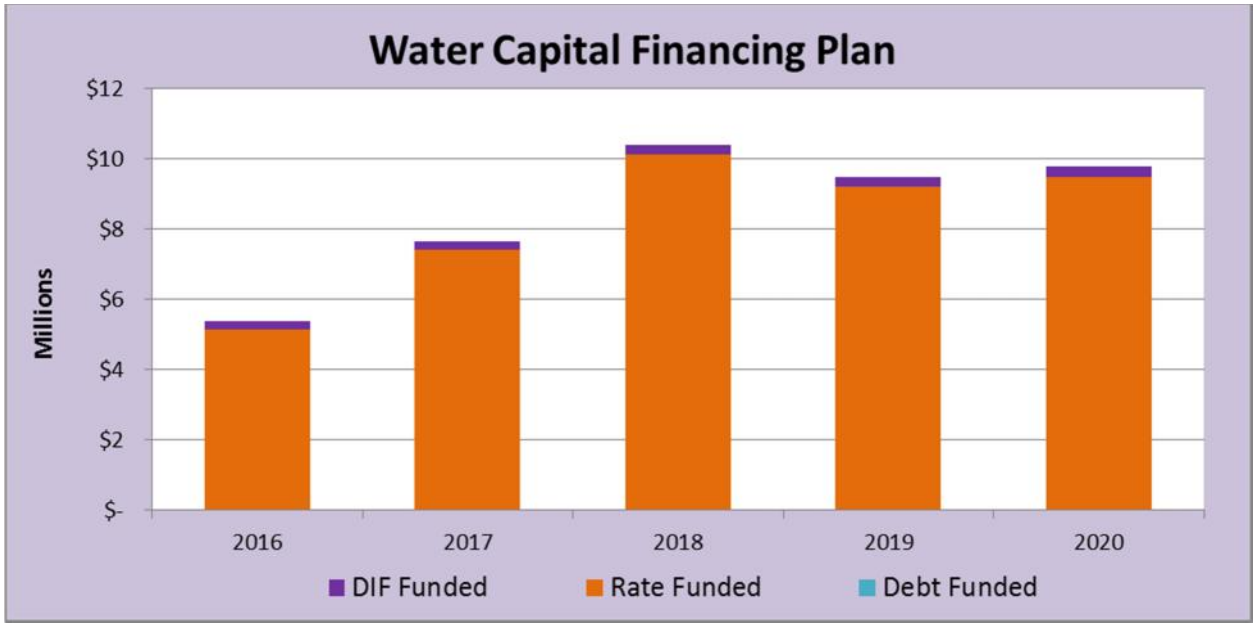
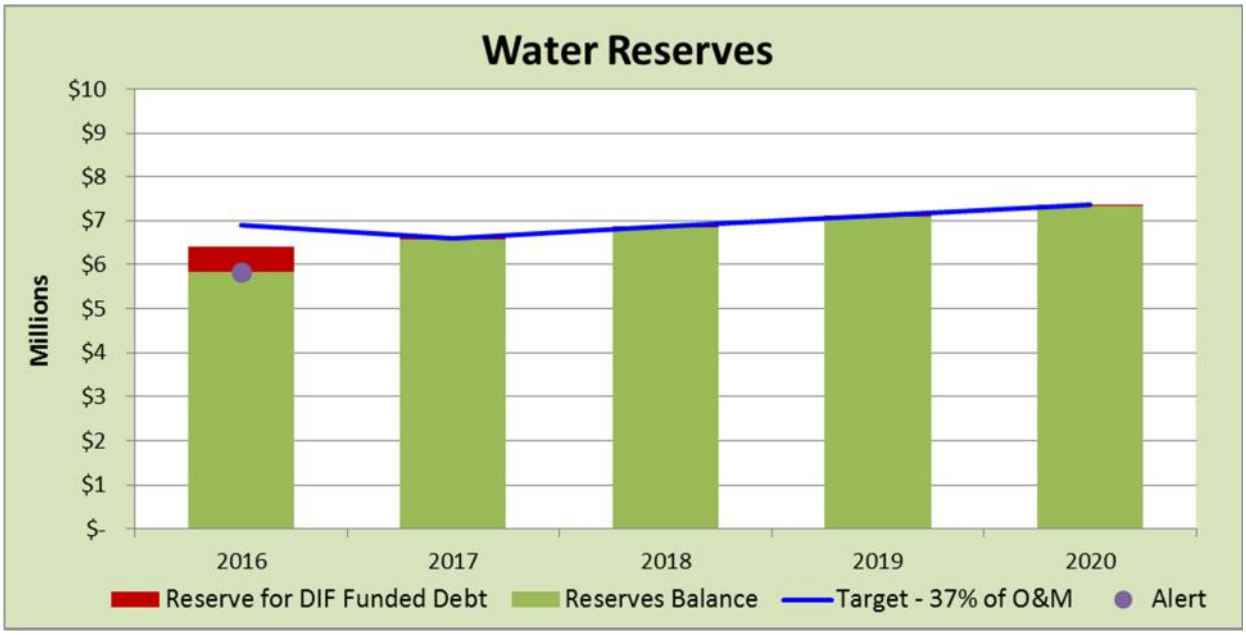


Figure 3-4 displays the ending water reserve balance for the water utility where the horizontal trend line in blue indicates the target reserve balance and the bars indicate respective ending reserve balances. The reserve target is 37% of annual water operating and maintenance expenses. The proposed financial plan achieves the reserve target in all years with the proposed financial plan.

Figure 3-4: Projected Ending Balances



3.7 RECOMMENDED POLICIES – WATER

Water Service Fund (501) – The water service fund is used to provide funds for working capital to meet ongoing expenses of the water enterprise for capital projects and rate funded debt service. The fund is a repository for the net annual cash balance of the water enterprise and does not have a target.

Water Reserves – The City maintains a water reserve to meet unanticipated or larger than anticipated operating expenses during the year. It functions as an operating reserve and a rate stabilization reserve. Currently, the City's water reserve is fully funded at approximately $6.4M, with a target of $6.3M. The target balance for the water reserve is 37 percent of annual O&M expenses. This reserve ensures working capital to support the operation, maintenance and administration of the utility and buffers against unforeseen costs/events such as an interruption in utility service or the bi-monthly billing system.

Water Projects Fund (503) – The water projects fund supports replacement capital projects and receives funding from rate revenue and transfers from the water bond fund (505). Though the City does not maintain a fund balance, an ideal target for this reserve would be one year's worth of average CIP expenditures (approximately $7.5M).

Water Bond Fund (505) - is a holding fund for debt proceeds. Funds are transferred into the Water Project Fund (503) to cover debt funded capital project expenses.

Water Debt Service Fund (506) - The water debt service fund has no target balance and is used to fund debt service – both rate funded debt service and DIF funded debt service.

Development Impact Fee Reserves (508 & 509) – The City maintains two funds that are funded through Development Impact Fee (DIF) revenue. Fund 508 is the water source acquisition fund and supports water source acquisition expenses – which is the purchase of shares in nearby water companies. The water source acquisition fee- which is one of the water DIFs levied by the City - assumes that incremental increases in water demand requires the City to purchase an equivalent amount of water supply. Fund 509 is the water capital improvement fund which funds capital expenditures/projects required to meet the water demand/delivery needs due to new customers. This fund receives revenue from the other DIF levied by the City – the water capital improvement charge. The projects funded by fund 509 are expansion related to meet new customer demands.

Table 3-15: Five-Year Water Enterprise Fund Balances

	Fund Balances	Budgeted FY 2016	*Projected* FY 2017	*Projected* FY 2018	*Projected* FY 2019	*Projected* FY 2020
	Water Service Fund (501)					
1	Beginning Balance	$3,720,116	$ 153,319	$ 1,930,308	$ 3,947,376	$ 6,612,855
2	Transfer to 509 -Expansion Capital	$ (213,362)	$ 318,685	$ 317,164	$ 315,474	$ 313,610
3	Annual Cash Balance	$ (2,888,283)	$ 1,632,819	$ 1,941,380	$ 2,557,262	$ 1,928,198
4	**Ending Balance**	**$ 153,319**	**$ 1,930,308**	**$ 3,947,376**	**$ 6,612,855**	**$ 8,568,211**
5	Interest	$ 11,301	$ 7,090	$ 28,673	$ 51,910	$ 75,406
6						
7	**Water Projects Fund (503)**					
8	Beginning Balance	$ -	$ -	$ -	$ -	$ -
9	Transfer from Water Service Fund (501)	$ 5,129,350	$ 7,389,731	$ 10,126,172	$ 9,193,208	$ 9,491,004
10	Transfer from Water Bond Fund (505)	$ -	$ -	$ -	$ -	$ -
11	Expenses (CIP Replacment Projs)	$ (5,129,350)	$ (7,389,731)	$ (10,126,172)	$ (9,193,208)	$ (9,491,004)
12	**Ending Balance**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
13	*Interest*	$ -	$ -	$ -	$ -	$ -
14						
15	**Water Bond Fund (505)**					
16	Beginning Balance	$ -	$ -	$ -	$ -	$ -
17	New Bond Issues	$ -	$ -	$ -	$ -	$ -
18	Transfer to 503	$ -	$ -	$ -	$ -	$ -
19	**Ending Balance**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
20						
21	**Water Debt Service Fund (506)**					
22	Beginning Balance	$ -	$ -	$ -	$ -	$ -
23	Transfer from 501 - Existing Debt	$ 1,690,782	$ 1,014,276	$ 1,014,276	$ 1,014,276	$ 1,014,276
24	Transfer from 501- Proposed Debt	$ -	$ -	$ -	$ -	$ -
25	Transfer from 509 - DIF Funded Debt	$ 574,792	$ 38,372	$ 38,372	$ 38,372	$ 38,372
26	Existing Debt Service	$ (2,265,573)	$ (1,052,648)	$ (1,052,648)	$ (1,052,648)	$ (1,052,648)
27	Proposed Debt Service	$ -	$ -	$ -	$ -	$ -
28	**Ending Balance**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
29						
30	**Water Source Acquisition Fund (508)**					
31	**Beginning Cash Balance**	$ -	$ -	$ -	$ -	$ -
32	**Sources**					
33	DIF	$ 127,617	$ 128,255	$ 129,538	$ 130,833	$ 132,141
34	Loan from 501	$ 172,383	$ -	$ -	$ -	$ -
35	Total Sources	$ 300,000	$ 128,255	$ 129,538	$ 130,833	$ 132,141
36	**Uses**					
37	Expense - Source Acquisition	$ 300,000	$ -	$ -	$ -	$ -
38	Repayment of Loan from 501	$ -	$ 128,255	$ 129,538	$ 130,833	$ 60,288
39	Total Uses of Funds	$ 300,000	$ 128,255	$ 129,538	$ 130,833	$ 60,288
40	**Ending Balance**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 71,853**
41						
42	**Water Capital Improvement Fund (509**					
43	**Beginning Cash Balance**	$ -	$ -	$ -	$ -	$ -
44	**Sources**					
45	DIF Revenue	$ 608,630	$ 611,673	$ 617,790	$ 623,968	$ 630,207
46	Loan from 501	$ 213,362	$ -	$ -	$ -	$ -
47	Total Sources	$ 821,992	$ 611,673	$ 617,790	$ 623,968	$ 630,207
48						
49	**Uses**					
50	Transfer from 506 - DIF Debt Service	$ 574,792	$ 38,372	$ 38,372	$ 38,372	$ 38,372
51	Expansion Capital Projects	$ 247,200	$ 254,616	$ 262,254	$ 270,122	$ 278,226
52	Repayment of Loan from 501	$ -	$ 318,685	$ 317,164	$ 315,474	$ 313,610
53	Total Uses of Funds	$ 821,992	$ 611,673	$ 617,790	$ 623,968	$ 630,207
54	**Ending Balance**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
55						
56	**Water Reserves**					
57	Beginning Balance	$ 6,214,000	$ 6,414,000	$ 6,614,000	$ 6,882,244	$ 7,117,564
58	Transfer from/(to) Water Service Fund (	$ 200,000	$ 200,000	$ 200,000	$ 200,000	$ 200,000
59	**Balance b/f Transfers**	**$ 6,414,000**	**$ 6,614,000**	**$ 6,814,000**	**$ 7,082,244**	**$ 7,317,564**
60	Reserve Funding	$ -	$ -	$ 68,244	$ 35,320	$ 43,970
61	**Final Balance**	**$ 6,414,000**	**$ 6,614,000**	**$ 6,882,244**	**$ 7,117,564**	**$ 7,361,534**
62	*Interest*	$ 31,570	$ 48,855	$ 67,481	$ 69,999	$ 72,395

4. COST OF SERVICE ANALYSIS

Please see Sections 1.3 and 1.4 of the Executive Summary for cost based rate setting legal requirements, process, and methodology.

4.1 COST OF SERVICE ANALYSIS

The principles of a cost of service analysis were described in Section 1.3. A cost of service analysis distributes a utility's revenue requirements (costs) to each customer class. After determining a utility's revenue requirement, the next step in a cost of service analysis is to functionalize its O&M costs. The **functions** may include but are not limited to:

1. Water supply
2. Treatment
3. Transmission
4. Distribution and storage
5. Meter service
6. Customer billing and collection
7. General and administrative costs

The functionalization of costs allows us to better allocate the functionalized costs to the **cost causation components**. The cost causation components include, but are not limited to:

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

Peaking costs are further divided into maximum day and maximum hour demand. 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, such as distribution and storage facilities, and the O&M costs associated with those facilities, are designed to meet the peaking demands of customers. Therefore, extra capacity[6] costs include the O&M and capital costs associated with meeting peak customer demand. This method is consistent with the AWWA M1 Manual, and is widely used in the water industry to perform cost of service analyses.

4.2 ALLOCATION OF FUNCTIONALIZED EXPENSES TO COST COMPONENTS

After functionalizing expenses, the next step is to allocate the functionalized expenses to cost components. To do so we must identify system wide peaking factors which are shown in column 2 of Table 4-1. The system-wide peaking factors are used to derive the cost component allocation bases (i.e., percentages) shown in columns 3 through 5 of Table 4-2. Functionalized expenses are then allocated to the cost components using these allocation bases. To understand the interpretation of the percentages

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

shown in columns 3 through 6 of Table 4-1 we must first establish the base use as the average daily demand during the year.

As an example, the functionalized expenses that are allocated to the cost components using the maximum day basis (line 2) attributes 47.6 percent (0.90/1.90) of the demand (and therefore costs) to base (average daily demand) use and 42.4 percent (0.81/1.90) to maximum day (peaking) use. Expenses allocated using the maximum hour basis allocates 33.5 percent (0.77/2.30) of costs are due to base, 29.1 percent (0.67/2.30) to max day, 27.4 percent (0.63/2.30) to max hour, and the remaining (100%-33.5%-29.1%-27.4%, or, 0.23/2.30) costs to public fire protection. These allocation bases are used to assign the functionalized costs to the cost components in Table 4-2.

Table 4-1: System-Wide Peaking Factors and Allocation to Cost Components

	Factors	Base	Max Day	Max Hour	Fire Service	Total
Base	**1.00**	100.0%				**100%**
Max Day	**1.90**	47.6%	42.4%		10%	**100%**
Max Hour	**2.30**	33.5%	29.1%	27.4%	10%	**100%**

Table 4-2 shows the allocation basis for the City's O&M costs. The top row of Table 4-2 shows the cost causation components and the left most column shows the allocation basis. For example, costs using the allocation basis max hour are allocated 19% to base, 14% to max day, 42% to max hour, 15% to meter and 10% to fire protection cost components. This means that 19% of costs allocated according to max hour are due to meeting base, or average, customer demands, 14% of costs are due to meeting max day demands and 42% of costs are due to meeting max hour demands. A similar argument is made for the remaining allocations bases.

Table 4-2: Cost Causation Component Allocation Basis

	Cost Causation Component							
Allocation Basis	Base	Max Day	Max Hour	Meters	Billing & Customer Service	Fire Protection	Conservation	General
Base	95%			5%				
Max Day	37%	47%		5%		10%		
Max Hour	19%	14%	42%	15%		10%		
Meters				100%				
Customer					100%			
Fire Service						100%		
Conservation							100%	
General					12%			88%

Table 4-3 illustrates the allocation of the City's O&M costs (which are partially functionalized) to the cost components using the allocation bases shown in Table 4-2. For example, water engineering costs are allocated using the max day allocation basis- therefore 37% of water engineering costs (in the FY 2016 total column) are allocated to the base component, 47% to the max day component and 5% and 10% to the meter and fire protection cost components respectively. The rest of the O&M costs are allocated similarly according to the allocation basis shown in the allocation basis column.

Table 4-3: Allocation of O&M Expenses by Cost Component

O&M Cost	Allocation Basis	Base	Max Day	Max Hour	Meters	Billing & Customer Service	Fire Service	Conservation	General	Total
Water Admin & General	General	$0	$0	$0	$0	$419,000	$0	$0	$2,987,501	$3,406,500
Water Engineering	Max Day	$297,086	$373,954	$0	$39,473	$0	$78,946	$0	$0	$789,459
Water Production & Operation - General	Max Day	$1,640,081	$2,064,438	$0	$217,913	$0	$435,826	$0	$0	$4,358,258
Water Production Maintenance	Max Day	$725,905	$913,726	$0	$96,449	$0	$192,898	$0	$0	$1,928,978
Water Treatment - HTWTP	Max Day	$206,909	$260,444	$0	$27,491	$0	$54,983	$0	$0	$549,827
Water Treatment - HHWTP	Max Day	$292,520	$368,208	$0	$38,866	$0	$77,733	$0	$0	$777,327
Water Quality - General	Base	$475,977	$0	$0	$25,051	$0	$0	$0	$0	$501,028
Water Distribution - General	Max Hour	$984,608	$752,936	$2,258,807	$799,270	$0	$532,847	$0	$0	$5,328,468
Water Conservation Program	Conservation	$0	$0	$0	$0	$0	$0	$243,755	$0	$243,755
"B" Contract (Reimbursable)	Base	$95,000	$0	$0	$5,000	$0	$0	$0	$0	$100,000
"B" Contract (City)	Base	$9,500	$0	$0	$500	$0	$0	$0	$0	$10,000
South Mountain Water Reimbursable	Base	$9,500	$0	$0	$500	$0	$0	$0	$0	$10,000
% Allocation to Each Cost Component		26.3%	26.3%	12.5%	6.9%	2.3%	7.6%	1.4%	16.6%	100.0%

4.3 REVENUE REQUIREMENT – TO BE RECOVERED FROM RATES

Table 4-4 shows the revenue requirement derivation with the total revenue required from rates shown in the last line ($22,896,393). The total shown in column 2 (from left) is the total O&M and column 3 is the capital revenue requirements that are allocated to the cost components.

RFC calculated water rates using the FYE 2016 revenue requirement. The annual rate revenue requirement includes O&M expenses, debt service and capital costs. O&M expenses include costs directly related to the supply, treatment, and distribution of water as well as routine maintenance of system facilities and personnel. To arrive at the rate revenue requirement, we subtract revenue from other sources and make adjustments for annual cash balances and for the fact that the impending rate adjustment will take place near the end of the fiscal year – therefore we must annualize the rate increase. The result is the total revenue required from rates. This is the amount that the water service charge and commodity rates are designed to collect.

Table 4-4: Revenue Requirement

	FYE 2016		
Revenue Requirement	**O&M Expenses**	**Capital Costs**	**Total**
O&M Expenses	$17,058,620		$17,058,620
Rate Funded Capital		$5,129,350	$5,129,350
R&R Debt Service		$1,690,782	$1,690,782
Future Debt Service		$0	$0
Subtotal Expenses	***$17,058,620***	***$6,820,132***	***$23,878,751***
Less: Rev. from Other Sources			
"B" Contract Water Sales	$110,000		$110,000
Other Operating Rev.	$683,000		$683,000
Non-Operating Rev.	$0		$0
Loan Payment from Cemetery Fund	$0		$0
Interest Income	$42,871		$42,871
Subtotal	***$835,871***	***$0***	***$835,871***
Less: Adjustments			
Annual Cash Balance	$2,888,283		$2,888,283
Annualize Rate Increase	$(2,741,795)		$(2,741,795)
Subtotal	***$146,488***	***$0***	***$146,488***
Annual Rate Revenue Requirement	**$16,076,261**	**$6,820,132**	**$22,896,393**

4.4 UNIT COST COMPONENT DERIVATION

The end goal is to proportionately distribute the cost components to each user class. To do so we must calculate the cost component unit costs, which starts by assessing the total units demanded by each class for each cost component. Projected usage (base units of service) for the test year is shown in Table 4-5.

Table 4-5: Projected Usage FY 2016

Class/Tier	FY 2016
SFR	5,448,175
MFR	1,236,202
Non-Residential	826,846
School	393,285
Municipal	50,783
Non-Building	1,147,810
Fire Service	22,266
Total (Potable)	**9,125,367**

Second, the peaking factors establish the maximum day and maximum hour requirements for the water system and each class. Max day and max hour factors are determined by multiplying the max month factors by the average day factor to calculate the max day factor in Table 4-6. The max hour factor is calculated in the same manner.

The system factors (previously described) are used to determine the maximum day and maximum hour requirements to assist in determining unit costs in Table 4-8. The class peaking factors in Table 4-6 are the basis for the peaking unit rate differentials discussed in Table 6-7 of Section 6.3.

Table 4-6: Customer Class Peaking Factors

Customer Peaking Factors	Base	Max Day	Max Hour
SFR	**1.00**	2.00	3.00
MFR	**1.00**	2.00	3.00
Non-Residential	**1.00**	1.75	2.50
School	**1.00**	1.75	2.50
Municipal	**1.00**	1.75	2.50
Non-Building	**1.00**	3.00	5.00
Fire Service	**1.00**	1.75	2.50

Table 4-7 shows the calculation of cost component units for average (daily) demand, max day demand, and max hour demand, as well as the total equivalent meters (discussed in detail in section 6.2) and annual number of bills issued (also discussed in section 6.2).

Daily use is calculated as annual use divided by 365 days. For example, SFR customers are estimated to use 5,448,175 hcf annually, or 14,927 hcf daily. The max day demand is then calculated as the daily demand multiplied by the max day factor (14,927 X 190% = 28,360). However, we must subtract the anticipated daily usage (14,927) from the max day usage (28,360) to calculate the max day units of service (13,434). Max hour units of service are calculated similarly, and the calculation is completed for all customer classes.

Table 4-7: Derivation of Cost Component Units

Customer Class	Annual Usage (HCF)	Daily Usage (HCF)	Max Day Factor	Max Day Demand (HCF)	Max Day (HCF)	Max Hour Factor	Max Hour Demand (HCF)	Max Hour (HCF)	Equiv. Meters	No. of Bills (annual)
SFR	5,448,175	14,927	190%	28,360	13,434	230%	34,331	5,971	35,681	110,421
MFR	1,236,202	3,387	190%	6,435	3,048	230%	7,790	1,355	3,398	5,457
Non-Residential	826,846	2,265	190%	4,304	2,039	230%	5,210	906	4,626	6,924
School	393,285	1,077	190%	2,047	970	230%	2,478	431	592	312
Municipal	50,783	139	190%	264	125	230%	320	56	192	168
Non-Building	1,147,810	3,145	190%	5,975	2,830	230%	7,233	1,258	2,291	2,748
Fire Service	22,266	61	190%	116	55	230%	140	24	77,151	2,910
Non-Potable (For Service Charge)									592	516
Total	**9,125,367**	**25,001**		**47,502**	**22,501**		**57,502**	**10,000**	**124,523**	**129,457**

Table 4-8 shows the cost component unit cost derivation. The operating revenue requirement shown in the column furthest top right of Table 4-8 ($15,661,134) is allocated to the cost components using the resulting O&M allocation percentages from Table 4-3. Capital funding ($7,235,259), which includes rate funded capital and debt service, is allocated in the same manner. General costs ($3,408,078) are redistributed in proportion to the resulting allocation of the other cost components. Public fire protection costs ($1,155,884) are reallocated to the meter service component. Lastly, we allocate a portion (34 percent) of peaking costs (max and max hour) to the meter component ($3,470,014) to yield the adjusted cost of service.

The total adjusted cost of service is divided by the respective units of service in

Table 4-7 to calculate the unit cost of the various cost components. For example, the unit cost for the base component is determined by dividing the total base cost ($9,200,644) by total water use (9,125,367 HCF) to derive a base unit cost of $1.01. Max day and max hour costs are divided by the total max day and max hour use to determine a unit rate in HCF/day. Annual customer costs are divided by the estimated number of annual bi-monthly bills and meter costs are divided by total meter equivalencies to determine a cost per equivalent meter. The unit costs are used to distribute the cost components to the customer classes in Section 4.5.

Table 4-8: Cost Component Unit Cost

	Base	Max Day	Max Hour	Meters	Billing & Customer Service	Total Fire Protection	Conservation	General	Total
Net Operating Costs	$ 4,229,967	$ 4,226,949	$ 2,016,995	$ 1,116,643	$ 374,144	$ 1,226,223	$ 217,660	$ 2,667,680	$ 16,076,261
Capital Costs	$ 3,497,522	$ 2,281,082	$ 101,972	$ 7,679	$ 169,025	$ -	$ -	$ 762,851	$ 6,820,132
Total Cost of Service	$ 7,727,489	$ 6,508,031	$ 2,118,967	$ 1,124,322	$ 543,169	$ 1,226,223	$ 217,660	$ 3,430,531	$ 22,896,393
Allocation of General Costs - %	39.7%	33.4%	10.9%	5.8%	2.8%	6.3%	1.1%	15.0%	100.0%
Allocation of General Costs	$ 1,361,840	$ 1,146,931	$ 373,432	$ 198,143	$ 95,724	$ 216,101	$ 38,359	$ (3,430,531)	
Allocation of Peaking to Meter		$ (2,625,652)	$ (854,893)	$ 3,480,545					
Allocation of Billing Cost to Meter				$ -	$ -				
Total Rev. Req by Cost Component	$ 9,089,329	$ 5,029,310	$ 1,637,507	$ 4,803,010	$ 638,894	$ 1,442,324	$ 256,019	$ -	$ 22,896,393
Allocation of Public Fire Service				$ 1,187,891		$ (1,187,891)			
Rev. Reqmnt by Cost Component	$ 9,089,329	$ 5,029,310	$ 1,637,507	$ 5,990,901	$ 638,894	$ 254,433	$ 256,019	$ -	$ 22,896,393
Units of Service	9,125,367	22,501	10,000	46,780	129,457	485	9,103,101		
Units of Measure	hcf	hcf/day	hcf/day	Equiv Meters	No. Bills/Yr				
Total Unit Cost of Service	$ 1.00	$ 0.61	$ 0.45	$ 21.34	$ 4.94	$ 0.55	$ 0.028		

4.5 DISTRIBUTION OF COST COMPONENTS TO CUSTOMER CLASSES

The final step in a cost of service analysis is to distribute the cost components to the user classes using the unit costs derived in Table 5-8. We determine the cost of service for each class by distributing the unit costs in Table 4-8 to customer classes based on the number of units demanded from each class. The cost to serve each class is shown in the right most column of Table 4-9. Table 4-9 shows the derivation of the cost to serve (i.e., cost of service for) each class. Base (which includes water supply and delivery), conservation, and 66 percent of peaking costs are collected through the commodity (volumetric) rates ($/HCF). Meters, billing and customer service, 34 percent of peaking, and public fire protection costs[7] are collected through the City's fixed service charge providing fixed revenue. The allocation of some of the peaking costs to the fixed component helps to increase revenue stability especially with the reductions in usage due to conservation. These costs are fixed and help to recover some of the fixed costs through fixed meter charges.

To derive the cost to serve each class, the unit costs from are multiplied by the units shown in

[7] Fire protection costs were previously allocated to the Meters cost component. What shows in Table 5-8is *private* fire costs.

Table 4-7 for each class. For example, the base costs for the single family class (SFR) is calculated by multiplying the base unit cost ($1.01) by the annual SFR use (5,448,175) to arrive at a total of $5,493,118. Similarly the SFR *customer* costs are derived by multiplying the customer unit cost ($4.94) by the number of SFR bills (110,421) to arrive at a total cost of $544,952. Similar calculations for each of the remaining user classes and cost components yield the total cost to serve each user class. Note that the total cost of service is equal to the revenue requirement in Table 4-4 as intended. We have now calculated the cost to serve each user class and can proceed to derive rates to collect the cost to serve each class.

Table 4-9: Allocation of Costs to Customer Class

	Base	Max Day	Max Hour	Meters	Billing & Customer Service	Fire Service	Conservation	General	Total Cost of Service
Combined City									
SFR	$5,426,659	$3,002,680	$977,651	$4,569,413	$544,951		$153,227		$14,674,580
MFR	$1,231,320	$681,314	$221,831	$435,164	$26,932		$34,767		$2,631,329
Non-Residential	$823,581	$455,704	$148,374	$592,439	$34,171		$23,255		$2,077,524
School	$391,732	$216,753	$70,573	$75,862	$1,540		$11,061		$767,522
Municipal	$50,582	$27,988	$9,113	$24,649	$829		$1,428		$114,590
Non-Building	$1,143,277	$632,598	$205,969	$293,373	$13,562		$32,281		$2,321,061
Fire Service	$22,178	$12,272	$3,996		$14,361	$254,433			$307,240
Non-Potable	$0	$0	$0		$2,547				$2,547
Total	**$9,089,329**	**$5,029,310**	**$1,637,507**	**$5,990,901**	**$638,894**	**$254,433**	**$256,019**		**$22,896,393**

The total cost to serve each class is collected through a combination of fixed service charges and volumetric (water usage) rates. RFC maintained the current proportion of revenue collected through fixed and variable (volumetric) charges – approximately 30% fixed revenue and 70% volumetric revenue.

5. RATE STRUCTURE MODIFICATIONS

5.1 PROPOSED TIER DEFINITIONS AND ALLOCATION FACTORS

This study evaluated two alternative rate structures: the existing inclining block rate and a water budget rate structure. During the Study, RFC, working with City staff, the UAC, and City Council chose to revise the existing rate structure. The water budget rate structure will not be adopted at this time, however, the structure, methodology, and definitions are found in the appendices of this report.

While the City will maintain the existing rate structure, RFC proposes revisions to the tier definitions to align with the costs and availability of providing water from each of the City's five water sources. To meet the requirements of cost of service for each tier, RFC is proposing to use the cost of water as one of the components of the rates. Different water sources have different costs of production. The lowest cost water is provided in Tier 1 to provide affordability and allocated to each customer account equally. Similarly other sources are allocated to each account until the use for each account is met. The proposed changes and rationale are detailed in the following subsections, with all revisions shown graphically in Table 5-1.

5.1.1 Tier 1 Definition

The City's lowest cost source of water is its water right to Mill Creek surface water. The total cost is approximately $23 per acre foot (AF). On average this source provides 4,730 AF, or 2,062,000 HCF annually. Given the City has 21,490 potable water accounts, the amount available to each account is 16 HCF bi-monthly. 16 HCF becomes the new Tier 1 definition.

5.1.2 Tier 2 Definition

The City's second lowest cost source of water is its shares in Crafton Mutual Water Co, with water from Mill Creek. The total cost is approximately $79 per AF and on average provides 3,280 AF, or 1,430,000 HCF annually. Availability per account is equal to 11 HCF bi-monthly. 11 HCF, or water use between 17-27 HCF in a bi-monthly period, becomes the new Tier 2 definition.

5.1.3 Tier 3 Definition

Tier 3 is a blend of all remaining water supplies- Santa Ana River surface water via Bear Valley Mutual Water Co, local groundwater, and imported water via the State Water Project. The costs of these sources are $120, $133, and $155 per AF, respectively. All water demand in excess of 27 HCF (Tier 1 plus Tier 2) is Tier 3.

Table 5-1: Bi-Monthly Water Tier Definitions

Variable	Existing	Revised
Tier 1	10	16
Tier 2	11-60	17-27
Tier 3	>60	>27

6. RATES AND CUSTOMER IMPACTS

6.1 EXISTING RATE STRUCTURE AND RATES

The current water rate structure consists of a bi-monthly service charge by meter size and a three-tier water usage rate for all building usage and a two-tier rate for all non-building or irrigation use. Bi-monthly fixed charges are shown in Table 6-1.

Table 6-1: Current Bi-Monthly Fixed Charges by Meter Size

Meter Size	Existing Rates (Inside City)	Existing Rates (Outside City)
5/8-in	$28.08	$31.23
3/4-in	$37.48	$40.61
1-in	$55.67	$60.67
1 1/2-in	$99.77	$109.22
2-in	$147.20	$161.47
3-in	$254.17	$279.34
4-in	$392.02	$431.35
6-in	$722.87	$796.23
8-in	$1,064.73	$1,173.84

Table 6-2 shows existing commodity rates. The two tier rates for the non-building user class are on par with Tier 2 and Tier 3 of the building user class as shown in Table 5-2. The non-building user class is outdoor irrigation use. The current commodity rate structure differentiates between inside and outside city accounts. As previously stated, a prior analysis determined that outside city rates will cease, and there will be one rate for both inside and outside city customers, starting with the City's next rate adjustment. The original justification for inside/outside City rates is no longer valid. To date, outside City customers are charged on a rate base (value of the utility assets) and depreciation of that rate base. The inside City customers, who are the owners of the utility, have received a proper return on this rate base and the rate base has depreciated such that the cost of serving inside/outside City customers is identical.

Table 6-2: Existing Bi-Monthly Commodity Rate

Tier	Tier Width (HCF)	Inside City ($ /HCF)	Outside City ($/HCF)
Building			
Tier 1	0-10	$0.87	$0.88
Tier 2	11-60	$1.49	$1.52
Tier 3	60+	$1.64	$1.67
Non-Building			
Tier 1	0-60	$1.49	$1.52
Tier 2	60+	$1.64	$1.67

6.2 PROPOSED WATER SERVICE (FIXED) CHARGES AND PRIVATE FIRE CHARGES

The City's bi-monthly fixed charges generate approximately 30% of total rate revenue. The service charge recovers costs associated with 1) customer and billing related costs, 2) meter service costs and 3) a portion of capacity related costs and public fire protection. Customer costs are the same for all customers regardless of meter size and include such costs as meter reading, billing, collection and accounting. Meter service costs are the costs to maintain water meters. Capacity costs are the costs associated with meeting peak demand, or demand above the average daily demand. Table 6-3 shows the derivation of the service charge including the two components of the charge – the customer component and the meter service and capacity component.

Meter service costs and capacity costs are recovered based on the hydraulic capacity of the meter. The capacity ratio column shows the estimated capacity (flow) of each meter size in relation to a 5/8 inch meter and these capacity ratios are used to scale up the meter service and capacity component for each meter size shown in the center column. RFC utilized a modified version of the American Water Works Association (AWWA) meter hydraulic capacity ratios in calculating the meter component of the fixed charge. Note that the City provided data shows one 10 inch meter (non-residential) and one 12 inch meter (non-building) for which the City is likely charging an 8 inch service charge. RFC suggests charging the appropriate charge based on the capacity/size of the meter as shown in Table 6-3 and Table 6-4.

Table 6-3: Fixed Charge Cost Components

Meter Size	Capacity Ratio	Meter Service and Capacity	Customer Component	Total Charge
5/8-in	1.00	$21.35	$4.94	$26.29
3/4-in	1.43	$30.42	$4.94	$35.36
1-in	2.25	$48.03	$4.94	$52.97
1 1/2-in	4.25	$90.72	$4.94	$95.66
2-in	6.40	$136.61	$4.94	$141.55
3-in	11.25	$240.13	$4.94	$245.07
4-in	17.50	$373.53	$4.94	$378.47
6-in	32.50	$693.69	$4.94	$698.63
8-in	48.00	$1,024.52	$4.94	$1,029.46
10-in	114.00	$2,433.23	$4.94	$2,438.17
12-in	150.00	$3,201.62	$4.94	$3,206.56

Table 6-4 shows the proposed bi-monthly service charge for the next three years.

Table 6-4: Proposed Bi-Monthly Fixed Charge

Meter Size	Proposed Charge (July 2016)	Proposed Charge (July 2017)	Proposed Charge (July 2018)
5/8-in	$26.28	$29.17	$32.10
3/4-in	$35.35	$39.24	$43.17
1-in	$52.96	$58.78	$64.67
1 1/2-in	$95.65	$106.17	$116.79
2-in	$141.54	$157.11	$172.83
3-in	$245.06	$272.01	$299.23
4-in	$378.46	$420.09	$462.10
6-in	$698.62	$775.47	$853.02
8-in	$1,029.45	$1,142.69	$1,256.97
10-in	$2,438.16	$2,706.36	$2,977.00
12-in	$3,206.55	$3,559.27	$3,915.20

Table 6-5 shows the proposed bi-monthly private fire protection charges by size of connection. Private fire line charges are based on operation/maintenance and replacement costs directly associated with the service. Replacement costs are estimated for components of the City fire service and calculated as bi-monthly amounts, which if invested, would recover adequate funds to replace the components at the end of their useful lives. Customer charges for service and billing are added to the replacement cost charges to derive the total bi-monthly charge.

Table 6-5: Proposed Bi-Monthly Fire Line Charges

Meter Size	Proposed Charge (July 2016)	Proposed Charge (July 2017)	Proposed Charge (July 2018)
2-in	$8.34	$9.25	$10.19
3-in	$14.82	$16.45	$18.10
4-in	$26.00	$28.86	$31.75
6-in	$66.12	$73.39	$80.73
8-in	$135.31	$150.20	$165.22
10-in	$239.40	$265.73	$292.32
12-in	$383.66	$425.86	$468.46

6.3 PROPOSED WATER USAGE RATES

Table 6-6 shows the current and proposed water usage rates. Table 6-6 also shows the new tier breakpoints. The City chose to adjust the tier breakpoints based on the long term water availability from its five water sources. Over the past ten years the City has sourced more water from its most economical source – Mill Creek - and has set the first tier based on the amount of water available from this source. The adjustment to the Tier 2 breakpoint also reflects the amount of water available from its next most economical source of water, Crafton Water Company.

Table 6-6: Current and Proposed Bi-Monthly Water Usage Rates

	Prior Tier Breakpoints (HCF)[1]	New Tier Breakpoints (HCF)	Current Rate (Inside City/Outside City)	Proposed July 2016
Building				
Tier 1	10	16	$0.87/$0.88	$1.18
Tier 2	11-60	17-27	$1.49/$1.52	$1.45
Tier 3	>60	>27	$1.64/$1.67	$2.20
Non-Building				
Tier 1	60	17-27	$1.49/$1.52	$1.45
Tier 2	>60	>27	$1.64/$1.67	$2.20

Table 6-7 shows the derivation of the tiered water usage rates for each tier. Every tier pays the same rate for the delivery of water – which is essentially the use of the distribution system to meet average daily demand. What differentiates the rates for each tier is how the remaining cost components – supply, peaking and conservation costs- are distributed to each class. Each component is described below Table 6-7. Demand in higher tiers forces the City to obtain more expensive sources of water and so those tiers are assigned the supply costs (second column from the left) of more expensive water sources as well as the costs for conservation programs. The peaking unit rates for each tier reflect the allocation of peaking costs discussed in the cost of service section. Non-building Tier 1 and Tier 2 rates are identical to Tier 2 and Tier 3 building rates.

Table 6-7: Variable Cost Components

Tier	Supply ($ /HCF)	Delivery ($ /HCF)	Peaking	Conservation	Total Rate
Tier 1	$0.06	$0.75	$0.37	$0.00	$1.18
Tier 2	$0.18	$0.75	$0.50	$0.02	$1.45
Tier 3	$0.30	$0.75	$1.10	$0.04	$2.20

Supply costs are the costs associated with obtaining and treating water. The supply costs for each tier reflect the amount of water that is allocated to that tier from each of the City's five water sources. Tier 1 was allocated the City's most economical source of water – known as Mill Creek. Tier 2 (for both building and non-building user classes) water is obtained from the next most economical source of water, the Crafton Water Company, which is surface water from the Mill Creek. Water for Tier 3 is obtained from the three remaining and least economical water sources. These three sources are: 1) shares held in Bear Valley Mutual Water Company (Santa Ana River surface water); 2) groundwater from City wells; and, 3) State Water Project water via the San Bernardino Valley Municipal Water District. The above mentioned sources are listed in ascending order of cost.

Delivery costs are operating and capital costs of the water system associated with delivering water to all customers at a constant average rate of use. This is synonymous to the base costs discussed in the cost of service section. Therefore, delivery costs are spread over all units of water, irrespective of customer class or tiers, to calculate the rates shown in Table 6-7.

Peaking costs, or extra-capacity costs, represent costs incurred to meet customer peak demands for water in excess of a base (or average day) usage as discussed in the cost of service section. Total extra capacity costs are comprised of 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 demand is the maximum usage in an hour on the maximum usage day. Different facilities, such as the distribution system and storage facilities, and the O&M costs associated with those facilities, are designed to meet the peaking demands of customers. Therefore, extra capacity costs include the O&M and capital costs associated with meeting peak customer demand. The peaking costs are distributed to each tier using a peaking factor. For this study RFC allocated 26%, 32% and 42% of peaking costs to Tiers 1, 2 and 3, respectively based on the usage characteristics of those tiers. In other words, this means that Tiers 1, 2 and 3 are responsible for 26%, 32% and 42% of total peaking costs respectively. This means that Tiers 2 and 3 are responsible for the majority (74%) of peaking costs which is in line with industry practice since water use in Tiers 2 and 3 is responsible for exerting peaking demands on the utility through outdoor irrigation requirements.

Conservation costs are allocated similarly to the peaking factors above. Conservation costs consist of those costs related to implementing, performing, and administering the City's various conservation programs. Conservation costs are allocated to water in Tier 2 and 3, where water consumption is considered discretionary and for which most conservation programs are designed to promote water efficiency. Allocation of conservation costs to upper tiers also helps provide a stronger price signal for conservation and efficient use, consistent with City and State of California policy objectives.

Table 6-8 shows the proposed water usage rates for the next three years.

Table 6-8: Proposed Bi-Monthly Water Usage Rates

	Current Tier Breakpoints (HCF)	New Tier Breakpoints (HCF)	Proposed July 2016	Proposed July 2017	Proposed July 2018
Building					
Tier 1	10	16	$1.18	$1.31	$1.46
Tier 2	11-60	17-27	$1.45	$1.61	$1.78
Tier 3	>60	>27	$2.20	$2.44	$2.69
Non-Building					
Tier 1	60	17-27	$1.45	$1.61	$1.78
Tier 2	>60	>27	$2.20	$2.44	$2.69

6.4 BILL IMPACTS

Table 6-9 shows customer bill impacts assuming a 3/4-inch meter. The left most columns of Table 6-9 show the mean (average) and median usage for each sub-class. The median is the mid-point of consumption – that is 50% of customers use less than the shown amount and 50% use more than the shown amount. The right most column shows the cumulative percent of single family bills that use the amount shown in the bi-monthly usage column. For example, 50% of the bills use 45 HCF or less bi-monthly. The impact to the average (mean) and median single-family residence using 56 HCF and 45 HCF bi-monthly is an increase of $19.14 and $11.39 respectively. Table 6-9 also shows the average use for multi-family and non-residential (commercial) customers and their corresponding impacts.

Table 6-9: Building Customer Impacts (3/4" Meter)

Non-Res.	MFR	SFR	Bi-monthly Usage (HCF)	Total Existing Charge	Total Proposed Charge	% Change	$ Change	SFR Cumulative % of Bills
			5	$41.83	$41.26	-1.4%	$(0.57)	4%
			10	$46.18	$47.17	2.1%	$0.99	8%
			15	$53.63	$53.07	-1.0%	$(0.56)	13%
			20	$61.08	$60.05	-1.7%	$(1.03)	19%
		Mode	27	$71.51	$70.20	-1.8%	$(1.31)	28%
Median		**Median**	45	$98.33	$109.72	11.6%	$11.39	50%
			50	$105.78	$120.69	14.1%	$14.91	55%
		Mean	56	$114.72	$133.86	16.7%	$19.14	61%
			70	$137.08	$164.60	20.1%	$27.52	71%
	Median		80	$153.48	$186.55	21.5%	$33.07	77%
			90	$169.88	$208.50	22.7%	$38.62	81%
Mean			100	$186.28	$230.45	23.7%	$44.17	84%
			200	$350.28	$449.97	28.5%	$99.69	97%
	Mean		258	$445.40	$577.29	29.6%	$131.89	98%
			300	$514.28	$669.49	30.2%	$155.21	99%

Table 6-10 shows the bill impacts, assuming a 2 inch meter, to the non-building (irrigation) class. The median and average (mean) use for this class is 166 and 450 HCF respectively, which corresponds to bill impacts of $75.39 and $233.06 respectively.

Table 6-10: Non-Building Customer Impacts (2" Meter)

Non-Building	Bi-monthly Usage (HCF)	Total Existing Charge	Total Proposed Charge	% Change	$ Change
	20	$177.00	$170.55	-3.6%	$(6.45)
Mode -33	40	$206.80	$209.24	1.2%	$2.44
	80	$269.40	$297.04	10.3%	$27.64
	120	$335.00	$384.85	14.9%	$49.85
Median	166	$410.44	$485.83	18.4%	$75.39
	200	$466.20	$560.47	20.2%	$94.27
	300	$630.20	$779.98	23.8%	$149.78
	400	$794.20	$999.50	25.9%	$205.30
Mean	450	$876.20	$1,109.26	26.6%	$233.06
	500	$958.20	$1,219.02	27.2%	$260.82
	600	$1,122.20	$1,438.54	28.2%	$316.34
	700	$1,286.20	$1,658.05	28.9%	$371.85
	800	$1,450.20	$1,877.57	29.5%	$427.37
	900	$1,614.20	$2,097.09	29.9%	$482.89
	1000	$1,778.20	$2,316.61	30.3%	$538.41

7. WASTEWATER ENTERPRISE FINANCIAL PLAN

This section describes the wastewater enterprise, the City's customer account and water use data, and corresponding financial plan. To develop the financial plan, RFC projects annual expenses and revenues, models reserve balances and transfers between funds, capital expenditures and calculated debt service coverage ratios to estimate the amount of additional rate revenue needed per year. This section of the report provides a discussion of O&M expenses, the capital improvement plan, water reserve funding, projected revenue under existing rates and the revenue adjustments required to ensure the fiscal sustainability and solvency of the water enterprise.

7.1 REVENUE REQUIREMENT

A utility's revenue requirement is the amount of revenue needed to operate, maintain and ensure fiscal solvency of the utility for one year. The revenue requirement includes operation and maintenance (O&M) expenses, rate funded capital expenditures, debt service payments, and reserve requirements (funding for reserves). Subsections 7.2 through 7.6 discuss the revenue requirement including O&M expenses, debt service requirements, the capital improvement plan (expenses), and reserve funding over the 5-year planning period.

7.1.1 Revenues from Current Rates

The current rates, last updated January 1, 2013, were originally developed in the 2012 Rate Study. The City's wastewater charges are a fixed charge for residential customers, and a variable charge for non-residential customers based on water use and dependent on the strength of wastewater generated. Higher strength wastewater flows require additional treatment and therefore the costs to provide service to these customers is higher. Under the existing rates a single family home has a bi-monthly fixed charge of $46.48. Current service charges are shown in

Table 7-1. Current units of service are shown in

Table 7-2. A single family residence is considered to be one equivalent dwelling unit (EDU) and a multi-family dwelling unit is considered to be 0.75 EDU.

Table 7-1: Current Bi-Monthly Wastewater Rates

Customer Class	Current Rate (1/1/2013)
Residential	
Single Family	$46.48
Multi-Family	$34.91
Non-Residential ($/hcf)	
Minimum Charge	$34.91
Low Strength I	$1.90
Low Strength II	$2.01
Low Strength III	$2.45
Medium Strength I	$2.94
Medium Strength II	$3.38
Medium Strength III	$3.82
High Strength I	$4.27
High Strength II	$4.64
Large Volume User	$2.56
Schools	
Elementary	$110.84
Secondary and High Schools	$184.74
Septage	
Minimum Charge	$11.70
Septage	$0.10 ($/gal)

Table 7-2: Current Units of Service

Customer Class	EDUs[8]
Single Family	15,574
Multi-Family	9,419
Customer Class	**Yearly Water Use (HCF)**
Minimum Charge	
Low Strength I	15,789
Low Strength II	403,571
Low Strength III	87,072
Medium Strength I	32,064
Medium Strength II	40,149
Medium Strength III	23,292
High Strength I	8,420
High Strength II	158,538
Large Volume User	41,772
Customer Class	**ADA**
Elementary	5,077
Secondary and High Schools	16,843
Septage	517 (HCF)

7.2 OPERATIONS AND MAINTENANCE (O&M) EXPENSES

The City's Fiscal Year 2014-15 O&M budget and the inflationary factors (discussed in Section 2) are used to project O&M costs. Table 7-3 shows total budgeted and projected O&M expenses for Fiscal Year 2014-15 and the subsequent four years of the study period. Expenses are projected based on inflation factors previously discussed.

Table 7-3: Projected Wastewater O&M Expenses and Debt Service

Budget Component	FY 2016 (Projected)	FY 2017 (Projected)	FY 2018 (Projected)	FY 2019 (Projected)	FY 2020 (Projected)
Salaries & Benefits	$3,133,011	$3,247,165	$3,365,753	$3,488,957	$3,616,968
Services	$2,933,914	$3,035,322	$3,140,441	$3,249,417	$3,362,400
Supplies	$1,083,087	$1,115,580	$1,149,047	$1,183,518	$1,219,024
Fixed Assets	$76,510	$78,805	$81,169	$83,605	$86,113
Total O&M Expenses	**$7,226,522**	**$7,476,872**	**$7,736,410**	**$8,005,496**	**$8,284,504**

7.3 EXISTING DEBT SERVICE

Table 7-4 shows rate funded debt service. The City has two outstanding long-term debt obligations. The wastewater fund is responsible for approximately 45 percent of the annual debt service for the 2012A

[8] *EDU = Equivalent Dwelling Units*

bonds and approximately 50 percent of the debt service on the SRF loan. The remaining debt service is funded through the collection of development impact fees (DIF). The total debt service obligation for the wastewater enterprise in FY 2016 is $641,183 (0.45 x $1,019,250 = $458,663 and 0.50 x $365,039 = $182,520), less any proportional interest earned in the debt service fund (estimated at $91 in FY 2016).

Table 7-4: Projected Debt Service

Cost Centers	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Series 2012A Wastewater Refunding Bonds					
Principal	$900,000	$925,000	$960,000	$990,000	$-
Interest	$119,250	$91,875	$58,800	$19,800	$-
Total	**$1,019,250**	**$1,016,875**	**$1,018,800**	**$1,009,800**	**$-**
2005 SRF Loan – CA Recycled Water Project					
Principal	$285,168	$292,297	$299,604	$307,095	$314,772
Interest	$79,871	$72,742	$65,434	$57,944	$50,267
Total	**$365,039**	**$365,039**	**$365,039**	**$365,039**	**$365,039**
Total Debt Service					
Principal	$1,185,168	$1,217,297	$1,259,604	$1,297,095	$314,772
Interest	$199,121	$164,617	$124,234	$77,744	$50,267
Total	**$1,384,289**	**$1,381,914**	**$1,383,839**	**$1,374,839**	**$365,039**

7.4 CAPITAL IMPROVEMENT PLAN

The City provided a long-term CIP to address future wastewater infrastructure needs and it is shown in Table 7-5. The Wastewater Enterprise's future CIP needs will be funded through proposed rates, also known as pay-as-you-go (PAYGO). Major components of the CIP include membrane biofilm reactor (Zenon) membrane replacement at the wastewater reclamation plant and ongoing collection main replacement. Note that Table 7-5 shows both rate funded replacement projects and DIF funded expansion projects.

Table 7-5: Detailed Wastewater Capital Improvement Plan

	Projected FY 2016	*Projected* FY 2017	*Projected* FY 2018	*Projected* FY 2019	*Projected* FY 2020
Replacement Projects					
Automated Controls	$ -	$ -	$ -	$ -	$ -
Laboratory Upgrades	$ 350,000	$ -	$ -	$ -	$ -
Collection Mains	$ 412,000	$ 424,360	$ 437,091	$ 450,204	$ 463,710
Master Planning and Study	$ 206,000	$ 212,180	$ 218,545	$ 225,102	$ 231,855
SCADA Tie In	$ -	$ -	$ -	$ -	$ -
Submersible Mixers	$ -	$ 150,000	$ -	$ -	$ -
Turbo Blowers w/VFD	$ 125,000	$ -	$ -	$ -	$ -
Utilities Building Improvements	$ 77,250	$ 79,568	$ 81,955	$ 84,413	$ 86,946
Vortex Grit Chamber and Fine Scree	$ -	$ -	$ 750,000	$ -	$ -
WWTP Annual Replacement	$ 283,250	$ 291,748	$ 300,500	$ 309,515	$ 318,800
Zenon Membrane Replacments	$ 1,496,667	$ 1,496,667	$ -	$ -	$ -
Vactor Truck	$ -	$ -	$ -	$ -	$ -
Subtotal Replacement Projects	**$ 2,950,167**	**$ 2,654,522**	**$ 1,788,091**	**$ 1,069,233**	**$ 1,101,310**
Expansion Projects (DIF Funded)					
Master Planned Sewer Mains	$ 103,000	$ 106,090	$ 109,273	$ 112,551	$ 115,927
Master Planning and Study	$ 15,450	$ 15,914	$ 16,391	$ 16,883	$ 17,389
Subtotal Expansion Projects (DIF Funded	**$ 118,450**	**$ 122,004**	**$ 125,664**	**$ 129,434**	**$ 133,317**
TOTAL CIP PROJECTS	**$ 3,068,617**	**$ 2,776,526**	**$ 1,913,754**	**$ 1,198,667**	**$ 1,234,627**

7.5 STATUS QUO FINANCIAL PLAN

Table 7-6 displays the cash flow of the City's wastewater enterprise under current rates over the Study period. The cash flow incorporates revenues and expenses to show the overall position of the utility. All projections shown in the table are based upon the City's current rate structure and do not include rate adjustments. The cash flow incorporates the wastewater enterprise data shown in the preceding tables of this section.

Under the "status-quo" scenario, revenues generated from rates and other miscellaneous revenues are inadequate to meet the revenue requirement and achieve reserve targets, coverage requirements, and capital funding over the Study period. In each year, the utility generates a negative cash balance which draws down reserves. In FY 2018 and 2019 the wastewater enterprise does not meet its coverage requirements on existing debt. Additionally, the utility requires reserves to pay for capital R&R funding, reducing reserve balances.

Table 7-6: Five-Year Cash Flow, Status Quo Financial Plan

			Projected FY 2016	*Projected* FY 2017	*Projected* FY 2018	*Projected* FY 2019	*Projected* FY 2020
Sewer Revenue under Existing Rates			$ 8,705,550	$ 8,707,502	$ 8,709,478	$ 8,711,479	$ 8,713,504
Septage Revenue			$ 38,700	$ 38,700	$ 38,700	$ 38,700	$ 38,700
Total Revenue from Current Rates			$ 8,744,250	$ 8,746,202	$ 8,748,178	$ 8,750,179	$ 8,752,204
Year	**% Adj.**	**Effective**					
FY 2016	0.0%	April	$ -	$ -	$ -	$ -	$ -
FY 2017	0.0%	July		$ -	$ -	$ -	$ -
FY 2018	0.0%	July			$ -	$ -	$ -
FY 2019	0.0%	July				$ -	$ -
FY 2020	0.0%	July					$ -
Total Additional Revenues			$ -	$ -	$ -	$ -	$ -
Total Revenue from Rates			$ 8,744,250	$ 8,746,202	$ 8,748,178	$ 8,750,179	$ 8,752,204
Other Operating Revenue							
Recycled Water Usage			$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000
Other Operating Revenue			$ 284,200	$ 284,200	$ 284,200	$ 284,200	$ 284,200
Non-Operating Revenue			$ -	$ -	$ -	$ -	$ -
Investment/Interest Income			$ 92,538	$ 107,818	$ 95,585	$ 88,549	$ 87,235
Loan Payment from General Fund			$ -	$ -	$ -	$ -	$ -
TOTAL REVENUE			**$ 9,370,988**	**$ 9,388,220**	**$ 9,377,962**	**$ 9,372,927**	**$ 9,373,640**
O&M Expenses			$ 7,226,522	$ 7,476,872	$ 7,736,410	$ 8,005,496	$ 8,284,504
Transfer to Sewer Projects Fund (523)			$ 2,283,500	$ 1,987,855	$ 1,788,091	$ 1,069,233	$ 1,101,310
Transfer to Debt Service Fund (526)			$ 641,092	$ 640,023	$ 640,889	$ 636,839	$ 182,429
Proposed Debt Service			$ -	$ -	$ -	$ -	$ -
Transfer to WW Reserves			$ -	$ -	$ -	$ -	$ -
TOTAL REVENUE REQUIREMENTS			**$ 10,151,114**	**$ 10,104,750**	**$ 10,165,390**	**$ 9,711,569**	**$ 9,568,244**
Non-Cumulative Annual Cash Balance			**$ (780,126)**	**$ (716,531)**	**$ (787,428)**	**$ (338,642)**	**$ (194,605)**
Debt Coverage			160%	144%	124%	106%	322%
Req'd Debt Coverage - 125%			125%	125%	125%	125%	125%

7.6 PROPOSED FINANCIAL PLAN AND REVENUE ADJUSTMENTS

The proposed rate adjustments help ensure adequate revenue to fund operating expenses, capital expenditures, and compliance with bond covenants. This financial plan assumes the first revenue adjustment will occur on April 1, 2016, with the second adjustment occurring on July 1, 2017. The proposed revenue adjustments will enable the utility to maintain compliance with its bond covenant of 125 percent coverage through the planning horizon.

RFC recommends 2.5 percent rate adjustments through the Study period. The revenue adjustments were presented and approved by the City of Redlands Utility Advisory Committee, as well as the City Council. Revenue adjustments represent the average increase in rates for the enterprise as a whole. Since the structure of the wastewater costs has not changed rates will be based upon the previous cost of service analysis, the revenue adjustments are applied "across-the-board" to all customer classes. All customers' rates will increase by 2.5 percent.

Table 7-7 shows the proposed financial plan. Although Table 7-7 shows anticipated revenue adjustments for FYs 2016 through 2020, the City will review and confirm the required revenue adjustments on a biennial basis. Note that Council has chosen to implement the rate adjustments in July 2016 and each

subsequent July through the Study period. The rates presented in Section 8 are based on the proposed financial plan.

Table 7-7: Proposed Rate Adjustments

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Revenue Adjustment	2.5%	2.5%	2.5%	2.5%	2.5%

Table 7-8 shows the cash flow detail for the wastewater enterprise over the next five years. Estimated sewer revenue from existing rates without rate adjustments is shown in the third row. The proportion of debt that is rate funded is approximately 45% of the 2012A loan and 50% of the State Revolving Fund (SRF) loan. The remaining debt is funded by DIF revenue. For the first three years of the study period, the wastewater utility will be operating a small deficit and using reserves. A summarized operating financial plan is shown in Table 7-9.

Table 7-8: Five-Year Wastewater Enterprise Proposed Financial Plan - Pro-forma

			Projected FY 2016	*Projected* FY 2017	*Projected* FY 2018	*Projected* FY 2019	*Projected* FY 2020
Sewer Revenue under Existing Rates			$ 8,705,550	$ 8,707,502	$ 8,709,478	$ 8,711,479	$ 8,713,504
Septage Revenue			$ 38,700	$ 38,700	$ 38,700	$ 38,700	$ 38,700
Total Revenue from Current Rates			$ 8,744,250	$ 8,746,202	$ 8,748,178	$ 8,750,179	$ 8,752,204
Year	**% Adj.**	**Effective**					
FY 2016	2.5%	April	$ 54,652	$ 218,655	$ 218,704	$ 218,754	$ 218,805
FY 2017	2.5%	July		$ 224,121	$ 224,172	$ 224,223	$ 224,275
FY 2018	2.5%	July			$ 229,776	$ 229,829	$ 229,882
FY 2019	2.5%	July				$ 235,575	$ 235,629
FY 2020	2.5%	July					$ 241,520
Total Additional Revenues			$ 54,652	$ 442,776	$ 672,653	$ 908,381	$ 1,150,112
Total Revenue from Rates			$ 8,798,902	$ 9,188,978	$ 9,420,831	$ 9,658,560	$ 9,902,316
Other Operating Revenue							
Recycled Water Usage			$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000
Other Operating Revenue			$ 284,200	$ 284,200	$ 284,200	$ 284,200	$ 284,200
Non-Operating Revenue			$ -	$ -	$ -	$ -	$ -
Investment/Interest Income			$ 92,743	$ 110,594	$ 103,994	$ 104,987	$ 114,184
Loan Payment from General Fund			$ -	$ -	$ -	$ -	$ -
TOTAL REVENUE			**$ 9,425,845**	**$ 9,833,773**	**$ 10,059,025**	**$ 10,297,748**	**$ 10,550,700**
O&M Expenses			$ 7,226,522	$ 7,476,872	$ 7,736,410	$ 8,005,496	$ 8,284,504
Transfer to Sewer Projects Fund (523)			$ 2,283,500	$ 1,987,855	$ 1,788,091	$ 1,069,233	$ 1,101,310
Transfer to Debt Service Fund (526)			$ 641,092	$ 640,023	$ 640,889	$ 636,839	$ 182,429
Proposed Debt Service			$ -	$ -	$ -	$ -	$ -
Transfer to WW Reserves			$ -	$ -	$ -	$ -	$ -
TOTAL REVENUE REQUIREMENTS			**$ 10,151,114**	**$ 10,104,750**	**$ 10,165,390**	**$ 9,711,569**	**$ 9,568,244**
Non-Cumulative Annual Cash Balance			**$ (725,269)**	**$ (270,978)**	**$ (106,366)**	**$ 586,178**	**$ 982,455**
Debt Coverage			164%	176%	174%	173%	644%
Req'd Debt Coverage - 125%			125%	125%	125%	125%	125%

Table 7-9: Five-Year Wastewater Enterprise Operating Financial Plan

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Total Revenues	$9,425,845	$9,833,773	$10,059,025	$10,297,748	$10,550,700
Total O&M Expenses	$7,226,522	$7,476,872	$7,736,410	$8,005,496	$8,284,504
Rate Funded Debt Service	$641,092	$640,023	$640,889	$636,839	$182,429
Annual Cash Balance (Net Revenue)	$(725,269)	$(270,978)	$(106,366)	$586,178	$982,455
Ending Wastewater Reserve Balance	$5,320,667	$4,654,000	$4,654,000	$4,654,000	$4,654,000
Total Wastewater Reserve Target	$2,673,813	$2,766,443	$2,862,472	$2,962,034	$3,065,267
Debt Coverage	**164%**	**176%**	**174%**	**173%**	**644%**

The following graphs summarize the City's financial plan over the next 5 years. Figure 7-1 shows the recommended revenue adjustments of 2.5 percent for the next five years as blue bars. The figure also shows the calculated and minimum debt coverage requirements in the green and red lines, respectively.

Figure 7-1: Proposed Revenue Adjustments

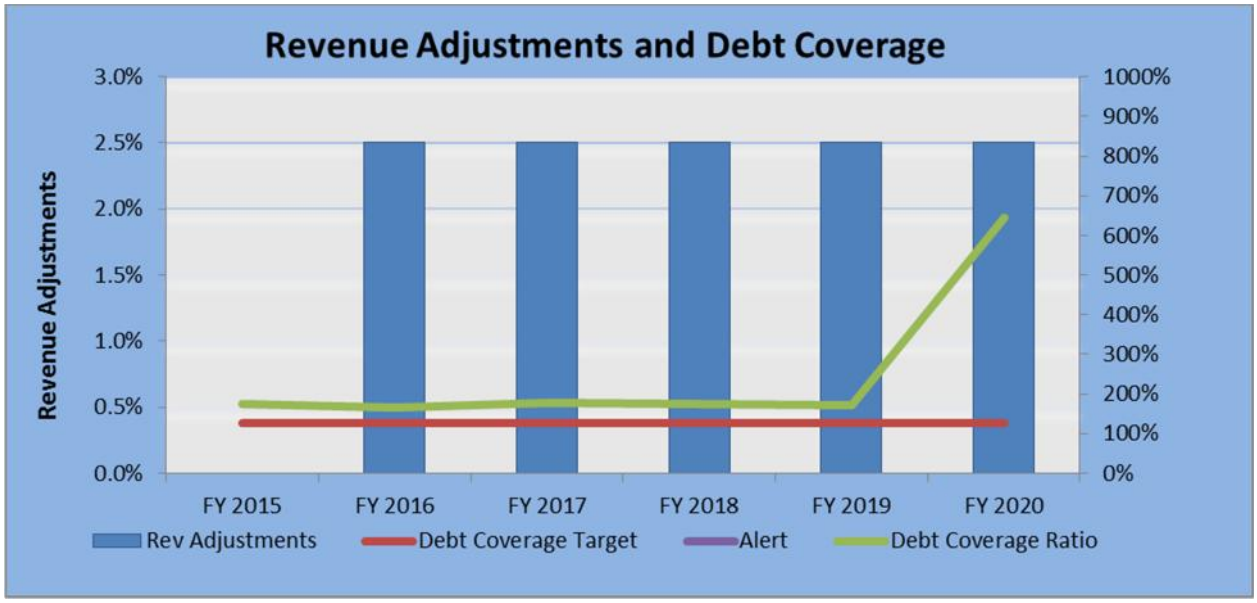


Figure 7-2 illustrates the operating financial plan, where the expenses, inclusive of reserve funding, capital projects, debt service, and any transfers, are shown by stacked bars; and total revenue at current rates and proposed rates are shown by the horizontal trend lines. Proposed revenue is shown in green and tracks at the top of the stacked bars. Revenues from existing rates are inadequate to meet future expenses (as shown by the red line) while proposed revenues meet expenses over the study period. Reserves will be drawn upon, as shown by the negative amount for reserves (green bar below the x axis), in FY 2016 through 2018 to meet total expenses.

Figure 7-2: Proposed Financial Plan

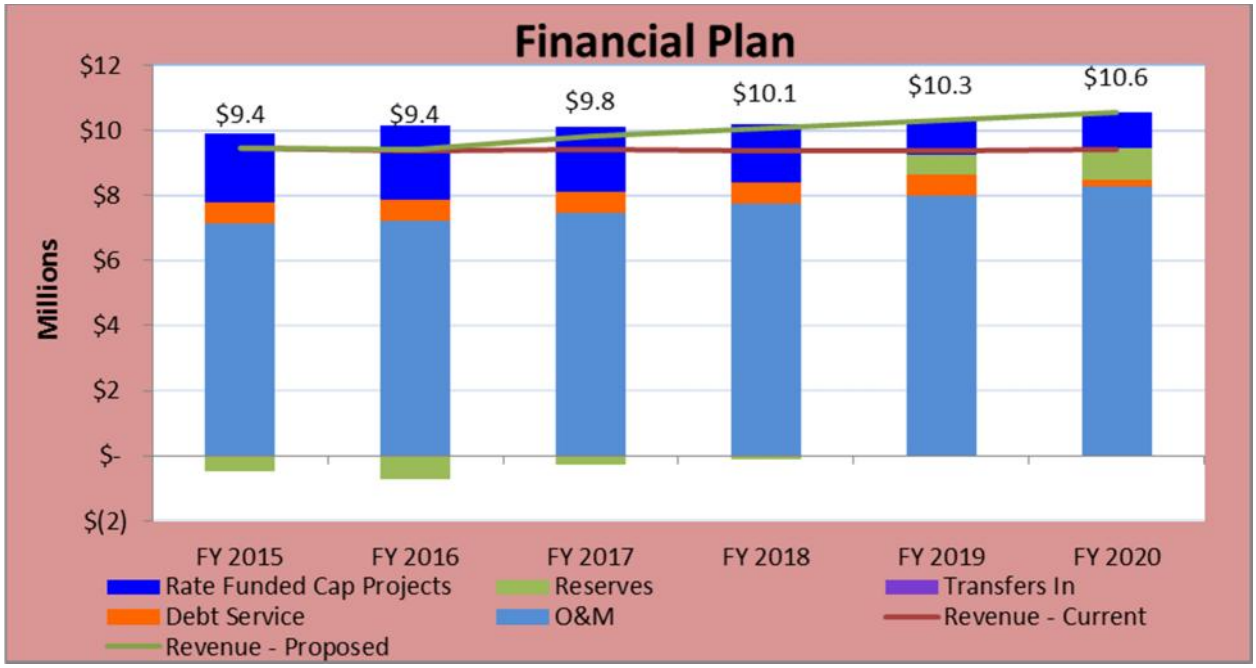


Figure 7-3 summarizes the projected CIP and its funding sources - either rate funded, reserve funded for replacement projects, or DIF funded for expansion projects. Replacement CIP includes both the orange and aqua bars below; whereas DIF CIP is shown in purple. A majority of capital project expense includes membrane replacement (at the wastewater treatment plant) and replacement of collection mains.

Figure 7-3: Proposed CIP and Funding Sources

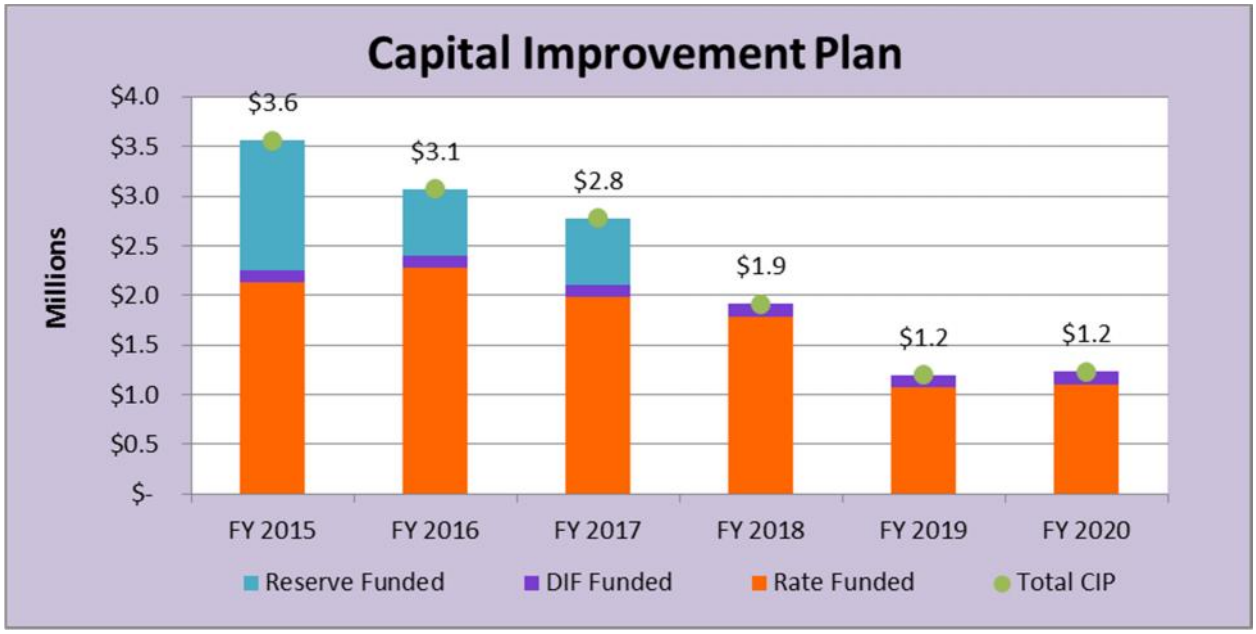
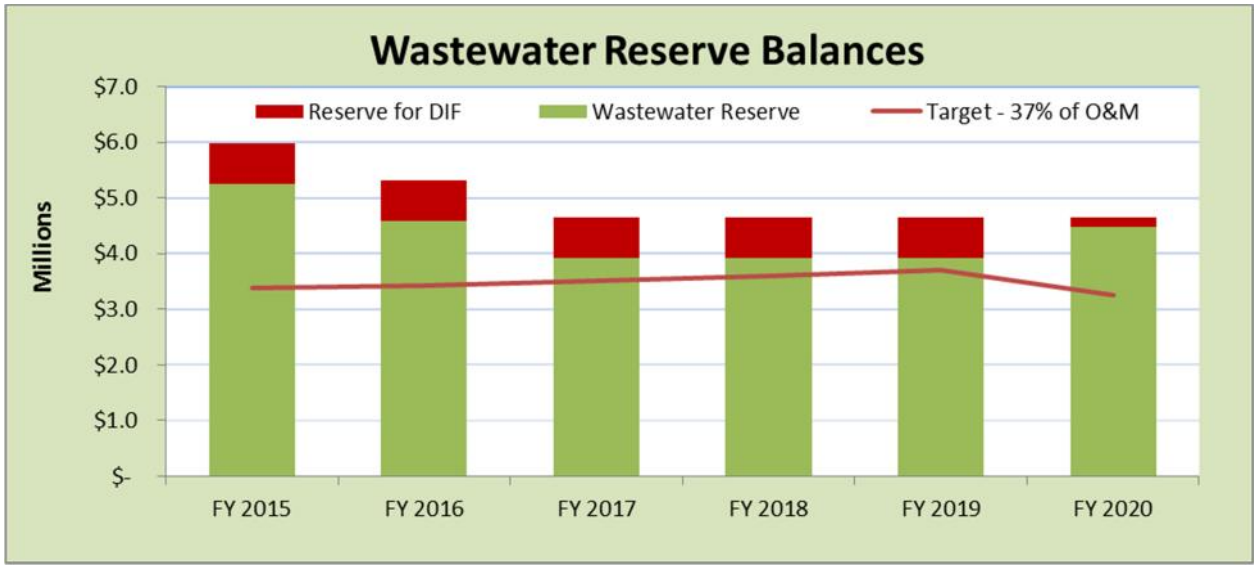


Figure 7-4 displays the ending wastewater reserve balance, inclusive of wastewater reserve and DIF reserve funds, where the horizontal trend line in red indicates the target reserve balance and the bars indicate the respective ending reserve balances that comprise the total amount in this reserve. The recommended target in the fund is to maintain 37% of the City's annual wastewater operating and maintenance expenses. Note the reduction in reserve target in FY 2020 is due to the retirement of the 2012 Wastewater Refunding Bonds and corresponding reserve for the DIF reserve portion of the debt service. The proposed financial plan achieves the reserve target throughout the study period.

Figure 7-4: Projected Ending Balances



7.7 RECOMMENDED POLICIES – WASTEWATER

Wastewater Reserves – The City's wastewater reserve serves as an operating reserve and a rate stabilization reserve and also funds capital repair and replacement (R&R) projects. Currently, the City's wastewater reserve is fully funded at approximately $5.3M ending FY 2016, with a target of roughly $2.7M. The target is 37 percent of annual O&M expenses.

Wastewater Service Fund (521) – The wastewater service fund is a repository for the net annual cash balance and provides working capital for the wastewater operations, funding for capital projects and rate funded debt service.

Sewer Projects Fund (523) and Capital Improvement Fund (529) – These two funds are capital reserves for R&R projects (523) and expansion (DIF funded) projects (529) respectively. The replacement capital reserve - 523 - currently does not have a target. RFC recommends the five year average of R&R CIP expenditures as a target for this reserve (approximately $2.4M). Currently the reserve receives transfers from the 521 fund in an amount sufficient to support capital projects but maintains no balance. The expansion fund – 529 - projects are funded by the collection of DIFs. The projects in this reserve are expansions to the existing system to serve new accounts and service areas.

Wastewater Debt Service Fund (526) - The wastewater debt service fund maintains no balance and covers annual debt service payments by obtaining funds from 521 and 529.

Table 7-10: Five-Year Wastewater Fund Balances

Line No.		*Projected* FY 2016	*Projected* FY 2017	*Projected* FY 2018	*Projected* FY 2019
	Wastewater Service Fund (521) (Cap Projects and Debt Service)				
1	Beginning Balance	$ 6,549,193	$ 5,823,924	$ 5,552,946	$ 5,446,580
2	Transfer from/(to) WW Reserves	$ 666,667	$ 666,667	$ -	$ -
3	Annual Cash Balance	$ (725,269)	$ (270,978)	$ (106,366)	$ 586,178
4	Transfer to Local Transportation (209)	$ -	$ -	$ -	$ -
5	Transfer from/(to) Sewer Projects Fund (523)	$ (666,667)	$ (666,667)	$ -	$ -
6	Ending Balance	$ 5,823,924	$ 5,552,946	$ 5,446,580	$ 6,032,759
7	*Interest*	*$ 46,225*	*$ 56,614*	*$ 54,751*	*$ 57,158*
	Sewer Projects Fund (523) (Replacement CIP Projects)				
8	Beginning Balance	$ -	$ -	$ -	$ -
9	Transfer from WW Service Fund (521)	$ 666,667	$ 666,667	$ -	$ -
10	Transfer from WW Service Fund (521) (Rate Fund Capital)	$ 2,283,500	$ 1,987,855	$ 1,788,091	$ 1,069,233
11	Replacement Capital Projects	$ (2,950,167)	$ (2,654,522)	$ (1,788,091)	$ (1,069,233)
12	Ending Balance	$ -	$ -	$ -	$ -
13	*Interest*	*$ -*	*$ -*	*$ -*	*$ -*
	Wastewater Debt Service Fund (526) (For 2012A Bonds and 2005 SRF)				
14	Beginning Balance	$ 0	$ (0)	$ -	$ -
15	Revenue	$ 200	$ 200	$ 200	$ 200
16	Transfer from WW Service Fund (521) (Debt Service)	$ 641,092	$ 640,023	$ 640,889	$ 636,839
17	Transfer from WW Cap Improv Fund (529) (Remaining Debt Service)	$ 742,997	$ 741,691	$ 742,749	$ 737,799
18	Existing Debt Service	$ (1,384,289)	$ (1,381,914)	$ (1,383,839)	$ (1,374,839)
19	Proposed Debt Service	$ -	$ -	$ -	$ -
20	Ending Balance	$ (0)	$ -	$ -	$ (0)
21	*Interest*	*$ -*	*$ -*	*$ -*	*$ -*
	Wastewater Capital Improvement Fund (529) (Expansion Capital - DIF)				
22	Beginning Balance	$ 617,076	$ 479,916	$ 341,415	$ 199,101
23	Revenue (Development Impact Fee)	$ 724,287	$ 725,193	$ 726,099	$ 727,007
24	Transfer to Wastewater Debt Service (526)	$ (742,997)	$ (741,691)	$ (742,749)	$ (737,799)
25	Expansion Capital Projects	$ (118,450)	$ (122,004)	$ (125,664)	$ (129,434)
26	Ending Balance	$ 479,916	$ 341,415	$ 199,101	$ 58,874
27	*Interest*	*$ 4,114*	*$ 4,107*	*$ 2,703*	*$ 1,290*
	Wastewater Reserves (Operating Reserve)				
28	Beginning Balance	$ 5,987,333	$ 5,320,667	$ 4,654,000	$ 4,654,000
29	Transfer from/(to) WW Service Fund (521)	$ (666,667)	$ (666,667)	$ -	$ -
30	Ending Balance	$ 5,320,667	$ 4,654,000	$ 4,654,000	$ 4,654,000
31	*Interest*	*$ 42,405*	*$ 49,873*	*$ 46,540*	*$ 46,540*

8. WASTEWATER SYSTEM RATE DESIGN AND CUSTOMER IMPACTS

8.1 EXISTING RATE STRUCTURE AND RATES

The current wastewater rate structure consists of a fixed bi-monthly sewer charge for residential customers and a variable charge for commercial customers based upon both water use and wastewater strength. Table 8-1 shows the current wastewater rates for each user.

Table 8-1: Current Wastewater Rates

Customer Class	Current Rate (1/1/2013)
Residential	
Single Family	$46.48
Multi-Family	$34.91
Non-Residential	
Minimum Charge	$34.91
Low Strength I	$1.90
Low Strength II	$2.01
Low Strength III	$2.45
Medium Strength I	$2.94
Medium Strength II	$3.38
Medium Strength III	$3.82
High Strength I	$4.27
High Strength II	$4.64
Large Volume User	$2.56
Schools	
Elementary	$110.84
Secondary and High Schools	$184.74
Septage	
Minimum Charge	$11.70
Septage	$0.10 ($/gal)

During the 2004 rate study, RFC recommended changes to the City's wastewater rate structure based on input from the UAC. The changes included expanding the classification of non-residential customers from three categories to eight. This new classification included three classifications of low strength users, three classifications of medium strength users, and two classifications of high strength users, as shown in Table 8-2 below. For this planning period, the UAC retained the existing wastewater rate structure.

Table 8-2: Wastewater Strengths for Non-Residential Customers

Category	BOD + SS (mg/L)
Low Strength	0-200
	201-400
	401-600
Medium Strength	601-800
	801-1,000
	1,001-1,200
High Strength	1,201-1,400
	>1,400

8.2 RATE DESIGN

Proposed wastewater rates are based upon the previous cost of service analysis performed for the City by RFC. Rates in the following subsection maintain the same allocation of costs to customer classes and apply revenue adjustments (rate increases) equally across all classes. Section 8.2 discusses the "across the board" rate increases and Section 8.3 illustrates the impact of the proposed rates.

8.3 PROPOSED WASTEWATER RATES

"Across the board" rate increases apply an equal percentage increase to each existing rate. It is quite common to implement across the board rate increases for several years in between cost of service studies by simply escalating current rates. Table 8-3 shows the proposed across the board rate increases for the bi-monthly service charges for the residential class, and usage charges for the non-residential customer classes. All rates will be implemented in July 2016, with subsequent increases in each July.

Table 8-3: Proposed Wastewater Rates with Revenue Adjustments

Customer Class	Current Rates	Proposed Rates (July 2016)	Proposed Rates (July 2017)	Proposed Rates (July 2018)
Residential				
Single Family Residential	$46.48	$47.64	$48.83	$50.05
Multi-Family Residential	$34.91	$35.78	$36.68	$37.59
Non-Residential				
Minimum Charge	$34.91	$35.78	$36.68	$37.59
Low Strength I	$1.90	$1.95	$2.00	$2.05
Low Strength II	$2.01	$2.06	$2.11	$2.16
Low Strength III	$2.45	$2.51	$2.57	$2.64
Medium Strength I	$2.94	$3.01	$3.09	$3.17
Medium Strength II	$3.38	$3.46	$3.55	$3.64
Medium Strength III	$3.82	$3.92	$4.01	$4.11
High Strength I	$4.27	$4.38	$4.49	$4.60
High Strength II	$4.64	$4.76	$4.87	$5.00
Large Volume User	$2.56	$2.62	$2.69	$2.76
Schools ($/100 ADA)[9]				
Elementary	$110.84	$113.61	$116.45	$119.36
Secondary/High Schools	$184.74	$189.36	$194.09	$198.94
Septage				
Minimum Charge	$11.70	$11.99	$12.29	$12.60
Septage ($/gal)	$0.10	$0.10	$0.11	$0.11

8.4 BILL IMPACTS

Table 8-4 shows the bill impacts for each user class assuming across the board rates. Each customer class' rates increase by 2.5 percent. This translates to a bi-monthly increase of $1.16 for single family residential (SFR) customers and a bi-monthly increase of $0.87 for multi-family residential (MFR) customers.

[9] ADA stands for Average Daily Attendance

Table 8-4: Customer Impacts – Across the Board Increase

Customer Class	No. of Customers	Current Charge	Across the Board - Proposed Charge (FY 2015)	Dollar Increase	Percent Increase
Residential					
SFR	15,574	$46.48	$47.64	$1.16	2.5%
MFR	9,419	$34.91	$35.78	$0.87	2.5%
Non-Residential					
		$/HCF	$/HCF		
Low Strength I	8	$1.90	$1.95	$0.05	2.5%
Low Strength II	777	$2.01	$2.06	$0.05	2.5%
Low Strength III	97	$2.45	$2.51	$0.06	2.5%
Medium Strength I	28	$2.94	$3.01	$0.07	2.5%
Medium Strength II	45	$3.38	$3.46	$0.08	2.5%
Medium Strength III	11	$3.82	$3.92	$0.10	2.5%
High Strength I	4	$4.27	$4.38	$0.11	2.5%
High Strength II	129	$4.64	$4.76	$0.12	2.5%
Large Volume User	1	$2.56	$2.62	$0.06	2.5%
Schools					
Elementary	13	$110.84	$113.61	$2.77	2.5%
Secondary and High Schools	8	$184.74	$189.36	$4.62	2.5%
Septage		$0.10		$0.00	

APPENDIX A: WATER BUDGET ALTERNATIVE RATE STRUCTURE

The City wished to evaluate a water budget rate structure that creates fair and equitable rates, provides revenue stability to the utility, and acts as a water resource management tool for long term and strategic planning purposes. As with all water rates, the rate structure must strictly meet the criteria of Proposition 218. The description of the allocations to individual parcel accounts and the development of water budgets is described in detail in this appendix and Appendix B. The water budget rate structure is ideally suited for residential and irrigation accounts. Non-residential accounts are heterogeneous and not ideally suited for water budget rate structures and would be converted to uniform rates.

A water budget attempts to determine an efficient level of water usage based on parcel specific, and household specific in the case of residential accounts, characteristics. Therefore the "allocation" of water for customers vary based on criteria including household size, landscape area, and weather. Residential accounts have an indoor allocation, or budget, to meet household needs (e.g. cooking, cleaning, and sanitation) and an outdoor allocation to meet the irrigation demands of their individual parcel. The outdoor budget considers a parcel's landscape, or irrigated area, and evapotranspiration from the landscape for each billing period, among other factors. The sum of the **indoor** and **outdoor** budgets equals an account's **total water budget**. A water budget rate structure is in essence a special case of a traditional inclining block rate structure where the tier sizes are account specific. That is the tier widths, or the amount of water in each tier, is different among customers in the same class, and varies with the weather for a single account throughout the year.

RFC proposes a commodity rate structure with supply costs tied to the quantity of water available from different sources and demand costs based on the type of demand (peaking) from customers.

The proposed rate structure divides the existing commodity rate into two components. The first component is the **water supply charge** which recovers costs for purchasing and producing water, delivery costs under average conditions, and costs associated with City water conservation programs. The second component is the **peaking charge** and recovers capacity related costs. Customer's peak use characteristics affect the volume and timing of their water use, which influences the sizing and operation of the entire water system. Note, the amount of commodity revenue, as a percentage of total revenue, remains the same; the commodity revenue, however, is collected over two distinct charges.

Tiers are defined by water supply availability and by water budget allocation. Tiers based on water supply availability are defined as follows: The City has five sources of water that are organized into three cost groups based upon the cost of each source. Each cost group provides a specific number of units of water to each account. The lowest cost water provides on average 16 HCF per bi-monthly billing period. The second lowest cost water provides on average an additional 11 HCF per period. The three most expensive sources of supply constitute the water to supply demand in Tier 3 (Tier 2 for Non-Building accounts), or all use greater than 27 HCF bi-monthly. RFC proposes that commercial accounts be restructured to a uniform rate to acknowledge the diversity of use within the class.

Tiers based on water budget allocation are defined by the indoor and outdoor allocations. Tier 1, indoor allocations, are set by default as the efficient water use of a four person household for single family and three person household for multi-family[10]. Tier 2, outdoor allocations, are based on landscape area and historical weather patterns for efficient water usage based on the *Model Water Efficient Landscape Ordinance*. While the Tier 1 indoor allocation will be the same for most residential customers unless they request changes to their household density (number of persons in household), the outdoor allocation will vary with the landscape area of each property.

[10] The rate structure allows for variances for households that have more than, or less than, the default value of four.

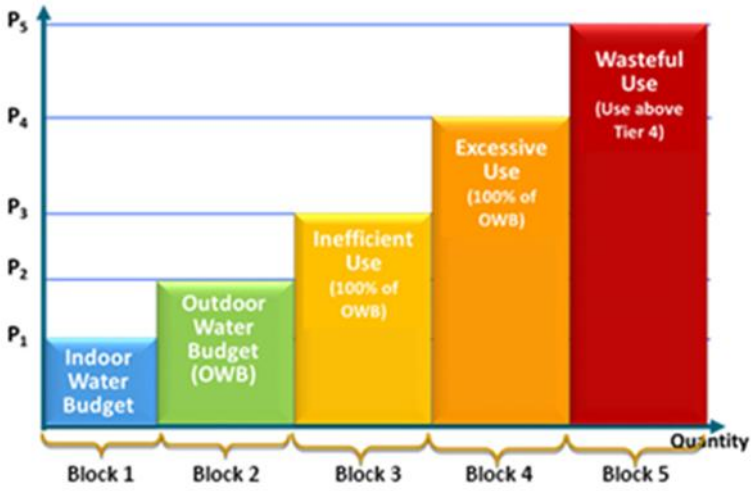
APPENDIX B – WATER BUDGET METHODOLOGY AND TIER DEFINITIONS

The City wished to evaluate a water budget rate structure for both residential, landscape irrigation water customers. The description of the allocations to individual customers and the development of water budgets is described here for completeness of this report.

WATER BUDGET DEFINITIONS

The American Water Works Association Journal defines a water budget as "the quantity of water required for an *efficient* level of water use by that customer" (*Source: American Water Works Association Journal, May 2008, Volume 100, Number 5*). Therefore, each customer has his or her own allocation or water budget as shown in the following figures. Figure B-1 shows how the block breaks are might be set for a City's water budget customers. Block 1 is defined by the allotment for indoor use and Block 2 is defined by the allotment for efficient outdoor use. In the example, blocks 3 and 4 are each set to 100% of the Outdoor Water Budget (OWB). For example, if the Block 2 OWB was 12 units, Block 3 would be 12 units, and Block 4 would be an additional 12 units. Any use beyond Block 4 is considered wasteful and falls into Block 5.

Figure B-1: Water Budget Blocks



It is worth noting that water budget rate structures are customized for each customer, which result in different block breaks for different customers.

PARCEL ALLOCATION (WATER BUDGET) DEVELOPMENT METHODOLOGY

Residential Indoor Budget (Essential Use) Definition

The indoor water budget (IWB) is determined by a customer's household size and a standard consumption per person. The proposed IWB formula is as follows:

$$IWB = \frac{GPCD * Household\ \ Size * Dwelling\ Units * Days\ of\ Service * DF_{indoor}}{748} + V_{indoor}$$

where

- GPCD – Gallons per capita per day.
- Household Size – Number of residents per dwelling unit.
- Dwelling Units – The number of dwelling units served by the meter. By way of example, a single family residence is one dwelling unit.
- Days of Service – The number of days of service varies with each billing cycle for each customer. The actual number of days of service will be applied to calculate the indoor water budget for each billing cycle.
- DF_{indoor} – Indoor drought factor. The percentage of indoor water budget allotted during drought conditions. The drought factor is determined based on the degree of water shortage and is subject to the approval of the City's Council. The indoor drought factor is currently set at 100 percent.
- V_{indoor} – Indoor variance. The additional water allotment to be granted for extenuating circumstances is subject to the City's approval or verification as outlined in the City's variance program. Variances may be requested by submitting a "Variance/Adjustment Request Form" found on the City's website.
- 748 is the conversion unit from gallons to a billing unit of one hundred cubic feet (HCF).

Outdoor Budget (Efficient Use) Definition

The outdoor water budget (OWB) is determined by three main variables: irrigable landscape area, weather data and an evapotranspiration (ET) Adjustment Factor. The irrigable landscape area is measured as the square footage of landscape surface on a customer's property. The weather data is based on the reference evapotranspiration (ET_0), which is the amount of water loss to the atmosphere over a given time period at given specific atmospheric conditions. ET_0 is the amount of water (in inches of water) needed for a hypothetical reference crop to maintain its health and appearance. The ET Adjustment Factor (ETAF) is a coefficient that adjusts ET_0 values based on plant factor and irrigation system efficiency.

The formula to calculate an outdoor water budget is as follows:

$$OWB = \left(\frac{Landscape\ \ Area\ * ET_0 * ETAF}{1200} + V_{outdoor} \right) * DF_{outdoor}$$

where

- ET_0 is measured in inches of water during the billing period based on a 25 year rolling average ET_O from the California Irrigation Management Information System (CIMIS) station at UC Riverside.

- ETAF (% of ET_0) is set to 80%. The 80% ETAF is equivalent to the standard set by the California Model Water Efficient Landscape Ordinance. That ordinance has recently been updated to 70% for existing landscapes and 55% for new development and the City will review after implementation and revise the ETAF if appropriate for the service area.
- Landscape Area (or Irrigable Landscape Area) in square feet is the measured irrigable landscape served by a customer's meter.
- $DF_{outdoor}$ – Outdoor drought factor. The percentage of outdoor water budget allotted during drought conditions. The drought factor is determined based on the degree of water shortage and is subject to the approval of the City's Council. The outdoor drought factor is currently set at 100 percent.
- $V_{outdoor}$ – Outdoor variance. The additional water allotment to be granted for extenuating circumstances is subject to the City's approval or verification as outlined in the variance program. An outdoor variance is subject to outdoor drought factor.
- 1,200 is the conversion unit from inch*ft2 to billing unit of hundred cubic feet (HCF).

PROPOSED BUDGET DEFINITIONS AND ALLOCATION FACTORS

Residential Indoor Budget (Essential Use) Definition (Tier 1)

The State of California has targeted 55 gallons per person per day (gpcd) as an efficient indoor use goal. RFC recommends the rate structure reflect the State's goal. Therefore, the definition for single family residential Tier 1 will be 55 gpcd multiplied by 4 persons multiplied by the days of service (on average 60). That equals approximately 9 HCF monthly, or 18 HCF bi-monthly. The indoor definition for multi-family customers is the same as single family, except the assumed household density is 3 persons rather than 4. Irrigation accounts do not receive an indoor budget as all use is outdoors.

Outdoor Budget (Efficient Use) Definition (Tier 2)

Outdoor budgets reflect the unique parcel characteristics of an account, as well as the specific billing period during the year. The outdoor budget consists of a parcel's irrigable area, historical weather in the service area for the service period, and ETAF. Multi-family residential accounts with dedicated landscape/irrigation meters would not receive an outdoor budget.

Inefficient/Excessive Use Definition (Tier 3)

All use in excess of the total water budget (TWB, or, indoor water budget plus outdoor water budget) is considered inefficient and falls in to Tier 3.

Table B-1: Water Budget Factors and Block Definitions

Variable	Revised
SFR Household Size	4
MFR Household Size	3
GPCD	55
ETAF	80%
Inefficient Use	>TWB

PROPOSED WATER BUDGET RATES

The water budget structure rates that follow are based on the same cost of service as presented in Section 4. Rates use separate tier definitions for water supply and for peaking. Water supply tiers are based upon source availability to meet demand. Peaking tiers are based upon water budget allocations presented earlier in this Appendix and in Appendix A.

The rate structure proposes that single family residential (SFR) and multi-family residential (MFR) classes have their own rate structure. Additionally Non-Building (Irrigation) retain its two tier structure as part of the water budget structure. Lastly, a new class Non-Residential is created and has a uniform (non-water budget) rate structure. This class includes commercial, industrial, and governmental accounts that use water heterogeneously and therefore are not good candidates for allocation based structures.

Table B-2 shows the rate components and total proposed water supply rate. The tier widths are the same as the updated inclining tier structure presented in this report. Base supply costs are the same for each tier in each class. Tier 1 Non-Building is a blended rate as 27 units includes the first and second tier of SFR and MFR classes.

Table B-2: Water Supply Rates

Class/Tier	Tier Width	Base Supply	Delivery	Conservation	Proposed Supply Rate
SFR					
Tier 1	**16**	***$0.06***	***$0.77***	***$0.01***	**$0.84**
Tier 2	**27**	***$0.18***	***$0.77***	***$0.02***	**$0.98**
Tier 3	**27+**	***$0.30***	***$0.77***	***$0.05***	**$1.12**
MFR					
Tier 1	**16**	***$0.06***	***$0.77***	***$0.01***	**$0.84**
Tier 2	**27**	***$0.18***	***$0.77***	***$0.01***	**$0.97**
Tier 3	**27+**	***$0.30***	***$0.77***	***$0.04***	**$1.11**
Non-Building					
Tier 1	**27**	***$0.11***	***$0.77***	***$0.01***	**$0.89**
Tier 2	**27+**	***$0.30***	***$0.77***	***$0.03***	**$1.10**
Non-Residential	**Uniform**	***$0.28***	***$0.77***	***$0.03***	**$1.14**

Table B-3 shows the proposed peaking rates based upon derived water budget allocations for each customer. The peaking factor shown corresponds to the way water is used within each respective class and tier.

Table B-3: Water Supply Rates

Class/Tier	Tier Width	Peaking Factor	Peaking Rate
SFR			
Tier 1	Indoor	**0.67**	**$0.33**
Tier 2	Outdoor	**1.75**	**$0.86**
Tier 3	>budget	**1.79**	**$0.89**
MFR			
Tier 1	Indoor	**0.50**	**$0.36**
Tier 2	Outdoor	**0.54**	**$0.38**
Tier 3	>budget	**1.90**	**$1.35**
Non-Building			
Tier 1	Outdoor	**0.50**	**$0.20**
Tier 2	>budget	**2.34**	**$0.90**
Non-Residential	Uniform	**1.21**	**$0.80**

Table B-4 combines the rates in Tables B-1 and B-2 to show a total rate for comparison with the traditional inclining tier rates. Note that the total rate shown is only accurate for customers who have budget allocations that match the supply tiers of 16 and 27 units. For almost all accounts the allocations will be different from the water supply tiers due to factors such as household size, irrigable area, and time of year.

Table B-4: Water Supply Rates

Class/Tier	Supply Tier Width	Proposed Supply Rate	Peaking Tier Width	Proposed Peaking Rate	Total Rate (assuming same Tier Widths)
SFR					
Tier 1	**16**	**$0.84**	18	**$0.33**	**$1.17**
Tier 2	**27**	**$0.98**	Variable	**$0.86**	**$1.84**
Tier 3	**27+**	**$1.12**	>budget	**$0.89**	**$2.01**
MFR					
Tier 1	**16**	**$0.84**	14	**$0.36**	**$1.20**
Tier 2	**27**	**$0.97**	Variable	**$0.38**	**$1.35**
Tier 3	**27+**	**$1.11**	>budget	**$1.35**	**$2.46**
Non-Building					
Tier 1	**27**	**$0.89**	Variable	**$0.20**	**$1.09**
Tier 2	**27+**	**$1.10**	>budget	**$0.90**	**$2.00**
Non-Residential	**Uniform**	**$1.14**	N/A	**$0.80**	**$1.94**

Figures B-2 and B-3 illustrate the bill impacts of two different customers. In Figure B-2, one customer (Parcel A) uses exactly their allocation while the second customer (Parcel B) goes over their allocation. In Figure B-3 Parcel A remains at their allocation while Parcel B is under their allocation.

Figure B-2: Over Bi-Monthly Allocation

4 person household, 3,600 sq ft irrigable area, May/Jun Usage

	Parcel A	Parcel B
Water Use	50	75
Water Budget	50	50
Meter Size	3/4"	3/4"

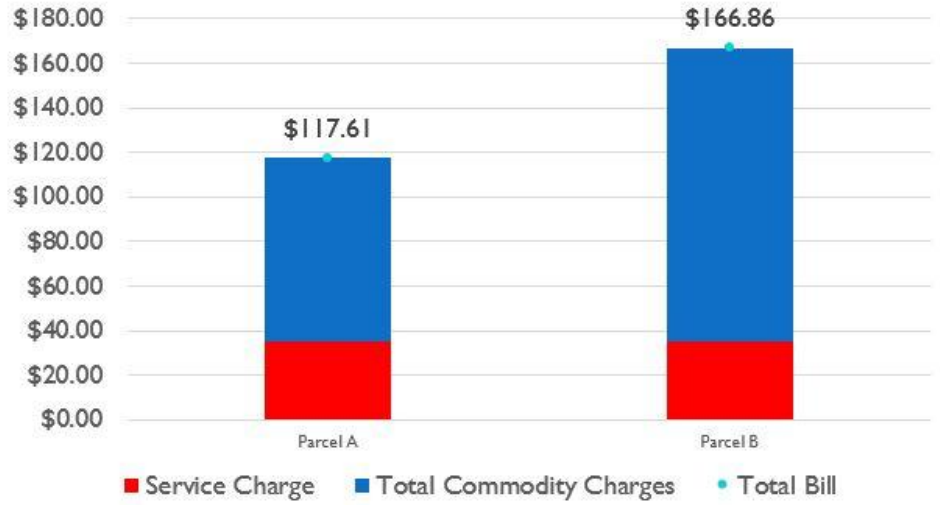
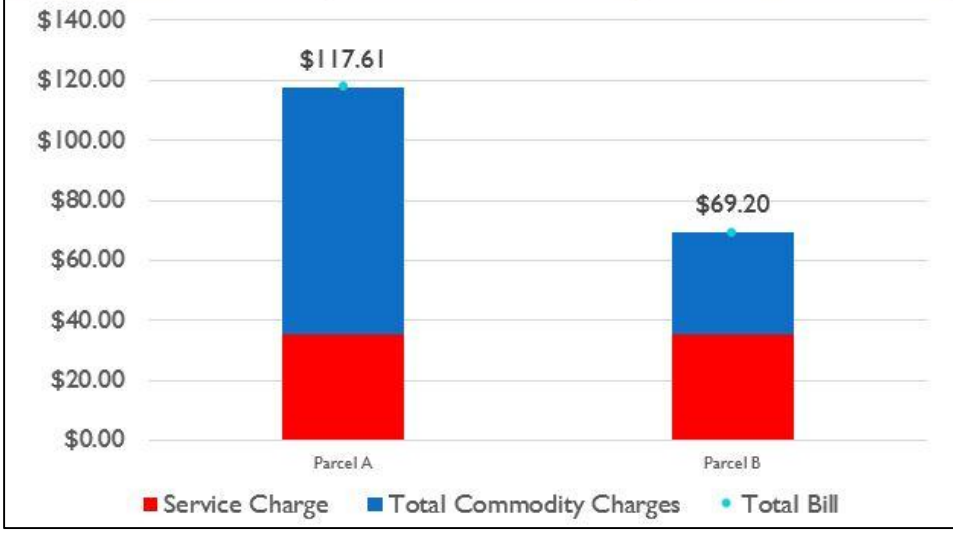


Figure B-3: Under Bi-Monthly Allocation

4 person household, 3,600 sq ft irrigable area, May/Jun Usage

	Parcel A	Parcel B
Water Use	50	25
Water Budget	50	50
Meter Size	3/4"	3/4"



APPENDIX C – 2015 WASTEWATER COST OF SERVICE ANALYSIS

COST OF SERVICE BASED RATE SETTING METHODOLOGY

Proposition 218 requires that rates reflect the proportional cost of providing service. California Government Code Section 54999 requires agencies to perform a cost of service study at least once every ten years. The goal of a cost of service analysis is to ascertain the cost to serve each user class thereby ensuring that rates are fair and equitable to all classes.

RFC performed a cost of service analysis for the City's Wastewater Enterprise based on FY 2013-14 flow data, the most recent available. The cost of service analysis is dependent on each customer classes' flow and pollutant loading (also known as wastewater strength) as measured by the biochemical oxygen demand (BOD) and total suspended solids (TSS) of each classes' wastewater. The cost of service for each class also depends on the revenue requirement for the utility. The following section describes the methodology used to allocate the utility's operating and capital costs to three cost causation components – 1) wastewater flow, 2) TSS and 3) BOD. The first step is a mass balance analysis to identify how much of each cost component each customer class is contributing to the wastewater treatment plant. Customer classes which contribute more flow and pollutants (BOD and TSS) are assigned a higher cost of service to reflect the costs associated with treating not only more wastewater flow, but more polluted flow.

MASS BALANCE

The mass balance analysis identifies the flows and strengths (as measured by BOD and TSS) contributed to the wastewater treatment plant (influent) from each customer class as well as the inflow and infiltration[11] into the collection system (e.g. rain and groundwater). Table C-1 shows the total flow and estimated strength (i.e. BOD and TSS concentrations in mg/L) of each customer class – with non-residential customers in the upper portion of the table and residential customers shown at the bottom.

[11] *Infiltration and Inflow estimate is based on average industry standards for typical wastewater systems*

Table C-1: Wastewater Flows and Strengths by Class

	Cost Component		
	WW Flow (mgd)	**BOD** (mg/L)	**TSS** (mg/L)
Total Flow	5.78	245	218
Infiltration and Inflow	0.29	50	50
Net Flow from All Customers	5.49	255	227
Non-Residential			
Low Strength I	0.03	50	50
Low Strength II	0.69	150	150
Low Strength III	0.15	250	250
Medium Strength I	0.06	350	350
Medium Strength II	0.07	450	450
Medium Strength III	0.04	550	550
High Strength I	0.01	650	650
High Strength II	0.27	750	750
Large Volume User	0.09	250	250
Elementary School	0.03	130	130
Secondary & High School	0.17	130	130
Subtotal Non-Residential Flow	1.60	297	297
Septage	0.0011	5,400	21,000
Net Residential Flow	**3.89**		
Estimated Flow and Strength of	(mgd)		
1 Single Family Unit (EDU)	**172**	**236**	**192**
	(gpd)	(mg/L)	(mg/L)

The City currently has 15,574 single family and 9,419 multi-family dwelling units for a total of 24,993 dwelling units. This study assumed that a multi-family dwelling unit equates to 75% of a single family dwelling unit. Therefore the total number of equivalent dwelling units is 22,638. Dividing the net residential wastewater flow by the number of equivalent dwelling units yields an average wastewater flow of approximately 172 gallons per day for a single family unit - shown in the bottom of Table 7-1. The wastewater strengths shown in the right two columns are taken from characteristic sewage generation tables published by the City of Los Angeles as of August 2014. A restaurant or a food processing facility is an example of a typical high strength customer. A laundromat or manufacturing facility (machine shop, electronic equipment, printing/publishing) are examples of medium strength customers. Typically, commercial retail establishments (not restaurants) would fall into the low strength category.

Using these published strengths for non-residential customers shown in Table C-1 we can estimate the total BOD and TSS loading from non-residential customers as shown in Table C-2. Since we know the total flow, BOD and TSS loading into the plant, we calculate the flow and strength for residential customers by subtracting the non-residential loadings from the total plant loadings. The calculated residential strength is 236 and 192 mg/L for BOD and TSS respectively. This is within range of accepted standards for the flow

and strength of residential customers which is approximately 215 mg/L BOD and 200 mg/L TSS. Table C-2 shows the total flow and strength loadings from each customer class – these figures will be used to calculate unit costs for the three cost components (flow, BOD and TSS) in Table C-6.

Table C-2: Flow and Strength Contributions by Each Customer Class

Customer Class	WW Flow	BOD	TSS
	hcf	lb/yr	lb/yr
Residential			
Single Family Residence	1,305,896	1,923,710	1,565,092
Multi-Family Residence	592,345	872,581	709,914
Subtotal Residential	**1,898,241**	**2,796,291**	**2,275,006**
Commercial			
Low Strength I	13,263	4,137	4,137
Low Strength II	338,999	317,218	317,218
Low Strength III	73,140	114,068	114,068
Medium Strength I	26,933	58,807	58,807
Medium Strength II	33,725	94,676	94,676
Medium Strength III	19,565	67,129	67,129
High Strength I	7,073	28,679	28,679
High Strength II	133,172	623,075	623,075
Large Volume User	41,772	65,147	65,147
Subtotal Commercial	**687,643**	**1,372,936**	**1,372,936**
Other			
Elementary Schools	12,388	10,046	10,046
Secondary & High Schools	82,187	66,652	66,652
Subtotal Other	**94,575**	**76,699**	**76,699**
Subtotal Non Residential	**782,218**	**1,449,635**	**1,449,635**
Septage	517	17,429	67,779
TOTAL	**2,680,977**	**4,263,355**	**3,792,420**

ALLOCATION OF REVENUE REQUIREMENTS

The next step in a cost of service analysis is to allocate the utility's rate revenue requirement to the cost causation components (flow, BOD and TSS). The requirement is allocated using the percentages shown in Tables C-3 and C-4. The percentages are based on engineering judgement, industry standards and discussions with City staff. The bottom of Tables C-3 and C-4 show the resulting overall O&M allocation and asset (capital) allocation to each cost component. The asset allocation, shown in Table C-4, is the result of a prior analysis in which all wastewater assets were allocated to each cost component. These percentages are used to allocate the utility's rate revenue requirement to the three cost components in Table C-6.

Table C-3: Allocation Factors for Wastewater O&M Expenses

O&M Expenses	Flow	BOD	TSS	Total
Administration	54%	23%	23%	100%
Engineering	54%	23%	23%	100%
Treatment & Operations	59%	21%	21%	100%
Treatment Plant Maintenance	59%	21%	21%	100%
Quality Control	0%	50%	50%	100%
Industrial Waste Monitoring	100%	0%	0%	100%
Collection System	100%	0%	0%	100%
WW Joint Lab	0%	50%	50%	100%
WW Joint Lab	0%	50%	50%	100%
Resulting Allocation	**54%**	**23%**	**23%**	**100%**

Table C-4: Allocation Factors for Wastewater Capital Expenditures

Asset Allocation	Flow	BOD	TSS	Total
Resulting Wastewater Infrastructure Allocation	**79%**	**11%**	**11%**	**100%**

Table C-5 shows the net rate revenue requirement. The rate revenue requirement takes the total revenue requirement – which includes O&M expenses, rate funded debt service and capital projects- and subtracts revenue from other sources as well as the total adjustments to yield the $9 million rate revenue requirement shown in the lower right.

Table C-5: Revenue Requirement from Rates (FY 2015)

	FY 2015		
Revenue Requirements	**Operating**	**Capital**	**Total**
O&M Expenses	$7,134,506		$7,134,506
Transfers to Sewer Projects Fund		$2,130,000	$2,130,000
Transfer to Debt Service Fund		$642,127	$642,127
Transfer to Capital Improvement Fund		$0	$0
Transfer to WW Reserves		$0	$0
Total Revenue Requirements	**$7,134,506**	**$2,772,127**	**$9,906,633**
Revenue from Other Sources			
Less Septage Revenue	$0		$0
Recycled Water	$250,000		$250,000
Other Operating	$284,200		$284,200
Non-Operating	$0		$0
Interest Revenue		$70,716	$70,716
Total Revenue from Other Sources	**$534,200**	**$70,716**	**$604,916**
Less Adjustments			
Adjustments for Cash Balance	$419,254		$419,254
Adjustment for Annualizing Rate Increase	($165,512)		($165,512)
Total Adjustments	**$253,743**	**$0**	**$253,743**
Revenue to be Collected from Rates	**$6,346,563**	**$2,701,411**	**$9,047,975**

The ultimate goal of a cost of service analysis is to distribute the revenue required from rates to each customer class. In order to distribute the revenue requirement to the different user classes we calculate cost component unit costs as shown in Table C-6. The unit cost components in line 7 are developed by dividing the total annual costs (line 3) allocated to each component by the total annual wastewater flow or annual BOD/TSS loading shown in line 5.

Table C-6: Unit Cost of Service

Line No.		WW Flow	BOD	TSS	Total
1	Operating Cost	$3,427,310	$1,459,627	$1,459,627	$6,346,563
2	Capital Cost	$2,029,583	$335,914	$335,914	$2,701,411
3	**Total Cost**	**$5,456,893**	**$1,795,541**	**$1,795,541**	**$9,047,975**
4	% Allocation	60.3%	19.8%	19.8%	
5	**Units of Service**	**2,680,977**	**4,262,593**	**3,791,800**	
6	Units	HCF/yr	lb./yr	lb./yr	
7	**Unit Cost**	**$2.04**	**$0.42**	**$0.47**	
		$ / HCF WW	$ / lb BOD	$ / lb TSS	

The unit costs shown in Table C-6 are then applied to the wastewater flow and estimated loadings from each customer class, shown in Table C-2, to determine the cost to serve (or cost of service) for each class. If a particular class contributes more flow, or has a higher strength sewage (as evidenced by their

strength), it will realize a higher cost of service. Table C-7 shows the derivation of the cost of service by customer class. Note that the total cost of service is the same as the revenue requirement shown in Tables C-6 and C-5. The cost to serve each user class is then used to develop rates for each class – this was discussed in Section 8.

Table C-7: Derivation of the Cost to Serve Each User Class

Customer Class	WW Flow	BOD	TSS	Total Cost of Service
Single Family	$2,658,037	$810,108	$740,920	$4,209,065
Multi-family	$1,205,666	$367,459	$336,076	$1,909,200
Low Strength I	$26,996	$1,743	$1,959	$30,698
Low Strength II	$690,003	$133,622	$150,213	$973,839
Low Strength III	$148,871	$48,049	$54,015	$250,935
Medium Strength I	$54,821	$24,771	$27,847	$107,439
Medium Strength II	$68,645	$39,880	$44,832	$153,358
Medium Strength III	$39,823	$28,277	$31,788	$99,887
High Strength I	$14,396	$12,081	$13,581	$40,057
High Strength II	$271,059	$262,459	$295,047	$828,565
Large Volume User	$85,024	$27,442	$30,849	$143,315
Elementary School	$25,214	$4,232	$4,757	$34,203
Secondary & High School	$167,285	$28,076	$31,562	$226,923
Septage	$1,053	$7,342	$32,096	$40,490
Total	**$5,456,893**	**$1,795,541**	**$1,795,541**	**$9,047,975**