BOARD OF SUPERVISORS AGENDA ITEM REPORT

Requested Board Meeting Date: December 12, 2017

Title: Adjustment of the High Strength Factor for Commercial Billing Class

Introduction/Background:

The treatment of high Strength wastewater results in additional operational costs such as increased electricity and chemical usage. "Strength" is an indicator of the relative impact of sanitary sewage on county treatment processes. Strength factors include, but are not limited to, measurements of Chemical Oxygen Demand, Suspended Solids, and Total Nitrogen concentrations. Therefore, a Strength factor is built into the sewer user fee calculation to account for wastewater with values higher than normally expected from residential wastewater. This assures the fair and equitable distribution of wastewater treatment operational costs when all users pay their proportionate share.

Discussion:

A critical component of wastewater billing is to ensure the fair and equitable distribution of wastewater maintenance and operation costs for each customer billing class. An inherent flaw in the current sewer user fee methodology is that the Commercial Billing Class is assessed the same Strength factor as the Residential Billing Class despite the following:

1. A higher cost of treatment. Due to the lack of dilution from bath, dishwasher, laundry, and shower wastewater, commercial wastewater is recognized throughout the industry as having higher overall Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), and Total Nitrogen (TN) concentrations compared to the base residential sewage concentrations.

2. Economic inequality. Commercial properties such as shopping centers and strip malls often contain multiple, mixed-use businesses using a single water meter. Due to the inability to distinguish between flows from the different sources, these accounts are billed under the Commercial Bill Class, and, therefore, a stand-alone restaurant with its own water meter is currently assessed a higher Strength factor than a similar restaurant nearby in a shopping center.

3. Contrary to the industry standard. The most commonly referenced industry standard is the American Water Works Association. As outlined in the 2016 Water and Wastewater Rate Survey, and on page 39 of the Rate Structure Study, commercial customers across the United States pay on average approximately 20 - 40% more than residential customers.

4. Sampling data confirmation. Utilizing sampling data conducted by the Department in 2013, 2015, and 2017, the Strength factor for the Commercial Bill Class should be higher than the current 1.0 factor for mixed-use commercial properties (2.31), commercial properties with both mixed-use and commercial offices (1.39), and commercial offices (1.16).

Conclusion:

For the reasons outlined above, the Department, utilizing the most conservative data, recommends a 16 percent adjustment to the Strength factor for the Commercial Billing Class in order to begin to equitably recover the cost of service for that bill class. This is not a 16 percent sewer user fee increase, this is a 16 percent increase to the high strength factor only; therefore, conservation-minded customers who utilize less water will realize a lesser, overall increase to their bill. The 16 percent factor is based on industry benchmarking, local sampling analyses, and certain intuitive estimates.

Recommendation:

Approve a 16 percent adjustmet to the Strength factor for the Commercial Billing Class.

Fiscal Impact:

Increase will likely generate $3.5M additional annual revenue.

Board of Supervisor District:

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ All

Department: Regional Wastewater Reclamation Department Telephone: 724-6500

Contact: Jennifer C. Coyle Telephone: 724-9788

Department Director Signature/Date: 11/22/17

Deputy County Administrator Signature/Date: 11/22/17

County Administrator Signature/Date: 11/22/17

PIMA COUNTY
WASTEWATER RECLAMATION

REGIONAL WASTEWATER RECLAMATION ADVISORY COMMITTEE
201 NORTH STONE AVENUE
TUCSON, ARIZONA 85701-1207

November 22, 2017

The Honorable Chair and Members
Pima County Board of Supervisors
130 West Congress Street, 11th Floor
Tucson, Arizona 85701

RE: Recommendation to Adjust the High Strength Factor for the Commercial Billing Class

Dear Honorable Chair and Members:

Since August 2016, the Regional Wastewater Reclamation Advisory Committee (Committee) has extensively participated in the Rate Structure Study (Study) project with the Regional Wastewater Reclamation Department (Department), the Finance and Risk Management Department (F&RM), and the consultant, Raftelis Financial Consultants Inc. The Study was not intended to determine the level of revenue required to ensure the wastewater utility's financial sustainability, but rather to determine an appropriate rate structure including a cost of service analysis. The Committee has extensively reviewed the Study, invited the consultant to present at multiple Committee meetings in person and telephonically, hosted a public meeting, and the 2016 Chair and Vice Chair served on the Study Leadership Team. We have focused on understanding the details of the Study, maintaining open communication with you on the progress of the Study, and remaining sensitive to the impacts that may result from the Study.

A critical component of the cost of service analysis is to ensure the fair and equitable distribution of wastewater maintenance and operation costs for each customer billing class. An inherent flaw in the current sewer user fee methodology is that the Commercial Billing Class is assessed the same sewage strength rate as the Residential Billing Class despite the following:

1. A higher cost of treatment. Due to the lack of dilution from bath, dishwasher, laundry, and shower wastewater, commercial wastewater is recognized throughout the industry to have higher overall Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), and Total Nitrogen (TN) concentrations compared to the base residential sewage concentrations.

2. Economic inequality. Commercial properties such as shopping centers and strip malls often contain multiple, mixed-use businesses using a single water meter. Due to the inability to distinguish between flows from the different sources, these accounts are billed under the Commercial Bill Class, and, therefore, a stand-alone restaurant with its own water meter is currently assessed a higher strength rate than a similar restaurant nearby in a shopping center.

3. Industry standard. The most commonly referenced industry standard is the American Water Works Association. As outlined in the 2016 Water and Wastewater Rate Survey, and on page 39 of the Study, commercial customers across the United States pay on average approximately 20 – 40% more than residential customers.

4. Sampling data from 2013, and 2015, and 2017 indicate that the rate strength code should be higher than the current 1.0 factor for mixed-use commercial properties, commercial offices, and commercial properties with both mixed-use and commercial offices.

For the reasons mentioned above, the Department, utilizing the most conservative data, recommends a 16 percent increase to the Commercial strength factor in order to begin to equitably recover the cost of service for that bill class. This is not a 16 percent sewer user fee increase, this is a 16 percent increase to the volumetric rate only; therefore, conservation-minded customers who utilize less water will realize a lesser, overall increase to their bill. The 16 percent factor is based on industry benchmarking, local sampling analyses, and certain intuitive estimates.

On October 16, 2017, the RWRAC sponsored a public meeting on the proposed rate increase to educate the public, business community, elected officials, and citizens on the reasons for the proposed increase. Notice of this meeting was published on September 29, 2017, in the Daily Territorial and on October 1, 2017 in the Arizona Daily Star. RWRD's Community Relations staff also reached out to various business organizations and associations to further the public outreach on this matter. A press release was sent to the media on October 12, 2017, resulting in an Arizona Daily Star article and KGUN 9 news story on October 16, 2017. Seven constituents attended the public meeting. None of these individuals addressed the Committee during the public Call to Audience or expressed opposition. To date, the Department has received one letter on this topic.

Subsequent to the public meeting, the RWRAC Financial Subcommittee met on October 18, 2017, and in a unanimous vote of 5-0, moved to recommend to the full Committee a one-time 16 percent increase to the Commercial strength code in accordance with the Study.

On November 16, 2017, the full Committee held a meeting and in a vote of 8 to 2, the RWRAC recommends to the Pima County Board of Supervisors a high strength rate increase to the Commercial Billing Class of 16 percent which allocates revenue requirements to this customer class in a more fair and equitable manner that complies with industry standards.

The members of RWRAC look forward to continuing its close working relationship with the Board of Supervisors and the Regional Wastewater Reclamation Department. All committee members are available at your convenience for any questions or further discussion.

Sincerely,

Corin Marron, Chair

Charles Matthewson, Vice Chair

c: C.H. Huckelberry, County Administrator
Carmine DeBonis, Deputy County Administrator – Public Works
Tom Burke, Deputy County Administrator – Administration
Jackson Jenkins, Director, Regional Wastewater Reclamation Department
Keith Dommer, Director, Finance and Risk Management Department
Julie Castaneda, Clerk of the Board
Charles Wesselhoft, Deputy County Attorney, Pima County Attorney's Office
Members, Regional Wastewater Reclamation Advisory Committee

Greater Oro Valley Chamber of Commerce

7435 N. Oracle Rd., Suite 107
Oro Valley, AZ 85704
P: 520.297.2191
F: 520.742.7960
orovalleychamber.com

Nov. 3, 2017

Members of the Pima County Board of Supervisors
County staff

Ladies and gentlemen,

Within, please find comment on **Ordinance No. 2017-38**, relating to **wastewater, Item 30** on your **Tuesday, Nov. 7 agenda.**

Staff from the **Regional Wastewater Reclamation Department** has done well to reach out to business organizations, such as the **Greater Oro Valley Chamber of Commerce**, regarding the **commercial rate increase proposal** before you today. I attended the **Oct. 16 open house** regarding the case, and have had **informative correspondence** with staff afterward. I thank them.

I've learned some things, among them that you have a complex challenge before you. Please note – this is a **staff-level comment,** not one considered by the Chamber's board of directors.

Without expertise, may we observe …

* It became clear from presentations and from the consultant's report that Pima County has a **hard time measuring the strength of wastewater** collected from **each commercial enterprise.** We don't have meters at every business in a strip mall or business park; thousands of businesses move their wastewater through a master meter, and you're about to increase their rates **regardless of their relative wastewater strength**. That's how it is, and we understand.

Moving forward, isn't there a way for Pima County **to incentivize** the installation of **more meters in new commercial complexes with multiple tenants,** allowing **more exact sampling of wastewater strength,** and resulting in **fair, appropriately assigned charges** for the many users now **lumped into the commercial billing class?** A dentist's office is not a roofing company is not a chiropractor is not a counseling center, among the uses in our own office complex. Yet we're all on one meter, of course at the landlord's prerogative.

* Pima County Regional Wastewater Reclamation is **aggressively trying to repay the debt we all incurred to improve and expand our system.** Expedited repayment is prudent, of course, particularly given the seeming certainty that interest rates will rise over time. If I understand correctly, this **debt should be retired by 2028,** just over 10 years from now. If, as staff indicated, this enormous physical plant improvement *"provides for the wastewater capacity needs of the community for at least 25 years into the future,"* will ratepayers begin to see a **stabilization,** or perhaps a **decrease,** in wastewater treatment bills **once debt is retired and facilities remain at adequate capacity?**

* Lastly, **it's clear you're going to increase rates,** and – while the **percentage is attention-grabbing** -- the overall dollar amount of **$6.5** million is not punitive when spread over up to 20,000 commercial accounts. Staff is recommending a **16 percent increase,** with the suggestion of a phased implementation of **8 percent a year over 2 years,** which will *"more than likely negate any future sewer user fee increase for the next few years."* (Let's hope that's so!) It appears an **8 percent increase over 2 years** is actually a **16.64 percent increase.** If you'll raise rates by a total of 16 percent, can we adjust accordingly?

I appreciate your time and service.

Respectfully submitted,

Dave Perry
President / CEO
Greater Oro Valley Chamber of Commerce

PIMA COUNTY
WASTEWATER RECLAMATION
201 NORTH STONE AVENUE
TUCSON, ARIZONA 85701-1207

JACKSON JENKINS
DIRECTOR

PH: (520) 724-6500
FAX: (520) 724-9635

November 8, 2017

Mr. Dave Perry, President/CEO
Greater Oro Valley Chamber of Commerce
7435 N. Oracle Road, Suite 107
Oro Valley, AZ 85704

Re: Your Letter Dated November 3, 2017, to the Board of Supervisors and County Staff

Dear Mr. Perry:

Thank you for your letter regarding the proposed rate increase to the Commercial Billing Class for wastewater service. I am pleased to hear that my staff was successful in their public outreach to inform business organizations, such as yours, of this proposed rate increase and that you were able to attend the public meeting on October 16, 2017. I would like to respond to the three main questions presented in your letter.

Pima County does not see a reason at this time to incentivize the installation of individual meters in new commercial complexes with multiple tenants. Not only would this be costly for the development community – and ultimately small business owners – Tucson Water costs would most likely increase due to the need to read additional meters versus a single meter. Furthermore, an individual meter would address our billing conundrum of assigning a Class Code to an account based on services provided (i.e. bakery, restaurant, commercial, etc.); however, it will not aid in our sampling efforts to determine the wastewater characteristics of each and every business. The wastewater from all businesses in a strip mall would still flow through to the main sewer line and the first point of access where the sampling is conducted. The sampling of commercial businesses would still remain complex, unless the business installed a private sampling well/manway that could be accessed. This is again another cost for our business community and, as I'm sure you'll understand, not one we are willing to pursue at this time.

Yes, the debt issued for the Regional Optimization Master Plan will be repaid by 2028. In addition to this debt, the Department has a $30 to $45 million annual Capital Improvement Program which is approximately 3% of our net capital asset and primarily funded by debt due to the County's expenditure limitation mandated by the State Constitution. I have attached a portion of the Department's audited financial statements released on June 30, 2017, showing the 2017 $45 million debt issue that is scheduled to be paid off in 2031. Similar amounts of debt are planned to be issued annually in order to provide for augmentation to support economic development and growth in our region, and to ensure proper maintenance of our critical infrastructure for generations to come. As the Regional Optimization Master Plan debt continues to be repaid over the next several years, the Department's debt service may stabilize at a lower annual amount and debt service may have less impact on the Department's rate setting.

To ensure an equitable recovery of costs for the Commercial bill class, the Department recommends an increase to the commercial class rate of 16%. The Pima County Board of Supervisors could adopt a two-year phased implementation plan that would increase the commercial class rate factor from the current 1.00 to 1.08 in the first year and then to the recommended factor of 1.16 the second year. This would be an 8.00% increase in the first year and a 7.41% increase in the second year.

I appreciate involvement such as yours in our public process and I hope this letter provides further information into the complexities of wastewater billing. This agenda item was originally scheduled to go before the Board of Supervisors for their consideration at the November 7, 2017, meeting; however, it was continued and is now scheduled for the December 12, 2017, meeting.

Please do not hesitate to contact me at (520) 724-6525 if you have further questions or would like to discuss this topic further.

Sincerely,

Jackson Jenkins, Director
Regional Wastewater Reclamation Department

Attachment

c: Carmine DeBonis, Deputy County Administrator – Public Works
Keith Dommer, Director, Finance and Risk Management Department
Jennifer C. Coyle, Special Assistant to the Director, Regional Wastewater Reclamation Department
Julie Castaneda, Clerk of the Board, Pima County

Note 5 – Long-Term Liabilities (continued)

Wastewater Loan Payable—The Fund entered into loan agreement/amendment with the Water Infrastructure Financing Authority of Arizona (2009 loan payable) to provide funds for the construction and improvement of wastewater treatment facilities. Interest on the loan is payable semiannually. The Water Infrastructure Financing Authority of Arizona 2004 loan was repaid during fiscal year 2017.

Debt Covenants—All revenue bonds were issued and the loan agreements were executed with a first lien on the pledge of the Fund's net revenues and have restrictive covenants, primarily related to minimum utility rates and limitations on future bond issues. The bond covenants also require the Fund to either maintain a surety bond guaranteeing the payment of annual debt service or to maintain in the Bond Reserve Account monies equal to the average annual debt service payment. At June 30, 2017, the Fund had a surety bond to meet the requirements of the debt covenants. The County is also authorized to issue for the Fund additional parity bonds if certain conditions are met, primarily that net revenues for the fiscal year immediately preceding issuance of the parity bonds exceed 120 percent of the maximum annual debt service requirements immediately after such issuance.

Bonds, obligations and loan outstanding at June 30, 2017, were as follows:

Description	Interest Rates	Maturity Dates	Call Dates	Outstanding Principal
Series 2008	4.00%	2018-19	July 1, 2018	$ 16,320,000
Series 2009	3.75%	2018-20	July 1, 2019	4,185,000
Total sewer revenue bonds payable				$ 20,505,000
Series 2010	3.5-5.0%	2018-21	July 1, 2020	$ 58,980,000
Series 2011B	5.0%	2018-22	July 1, 2021	60,880,000
Series 2012A	2.0-5.0%	2018-27	July 1, 2022	96,375,000
Series 2014	5.00%	2018-28	July 1, 2023	40,600,000
Series 2016 Refunding	5.00%	2018-26		211,595,000
Series 2017	2.77%	2018-31		45,000,000
Total sewer revenue obligations payable				$ 513,430,000
2009 loan payable	0.96%	2018-24		$ 4,629,072
Total wastewater loan payable				$ 4,629,072

Revenue bond, obligation debt service and loan payment requirements to maturity are as follows:

	Revenue Bond Debt Service		Sewer Obligation Debt Service		Loan Payment Requirements	
Year ending June 30,	Principal	Interest	Principal	Interest	Principal	Interest
2018	$ 9,285,000	$ 809,738	$ 42,565,000	$ 24,367,850	$ 530,554	$ 107,524
2019	9,755,000	441,650	44,585,000	22,370,878	543,626	94,290
2020	1,465,000	54,937	54,565,000	20,206,078	557,021	80,730
2021			57,600,000	17,606,225	570,746	66,836
2022			59,840,000	14,871,007	584,810	52,599
2023-2027			234,965,000	32,154,256	1,842,315	68,829
2028-2031			19,310,000	1,261,390		
Total	$ 20,505,000	$ 1,306,325	$ 513,430,000	$ 132,837,684	$ 4,629,072	$ 470,808

PIMA COUNTY
WASTEWATER RECLAMATION

NOTICE OF PROPOSED INCREASE
TO THE COMMERCIAL BILLING CLASS STRENGTH CODE

Pursuant to ARS §11-251.13, Pima County is providing notice that on or after December 12, 2017, the Board of Supervisors will consider an increase of up to sixteen percent (16%) for the Commercial Billing Class strength code. This increase may be a phased implementation in smaller increments over a period of time, or a one-time sixteen percent (16%) increase.

The Commercial Billing Class includes customers primarily engaged in wholesale or retail, communication, finance, insurance, and any other non-residential service not identified as an Industrial Billing Class as outlined in Pima County Code, 13.24, Sanitary Sewer User Fees.

Sampling over the past several years by the Department has confirmed the higher cost of service for the Commercial Billing Class when compared to the Residential Billing Class. This information is outlined in the Raftelis Financial Consultants Rate Structure Study which can be obtained by calling the Regional Wastewater Reclamation Department at (520) 724-6500, or at 201 N Stone Ave, 8th Floor, Tucson, AZ, 85701.

There will be an opportunity to speak on the proposed increase during the public hearing at the Pima County Board of Supervisors meeting when the matter is scheduled for action, which is currently anticipated to occur on Tuesday, December 12, 2017.

Written comments can be sent to Jennifer C. Coyle, Pima County Regional Wastewater Reclamation Department, 201 N. Stone Avenue, 8th Floor, Tucson, AZ 85701.

PUBLIC NOTICE
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PUBLISH: The Daily Territorial
Nov. 17, 2017

PIMA COUNTY

WASTEWATER RECLAMATION

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Publish November 19, 2017
Arizona Daily Star

RAFTELIS
FINANCIAL CONSULTANTS, INC.

PIMA COUNTY
WASTEWATER RECLAMATION

Pima County
Regional Wastewater Reclamation Department

Rate Structure Study Report

Report | November 15, 2017

TABLE OF CONTENTS

LIST OF EXHIBITS

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1. EXECUTIVE SUMMARY

1.1 INTRODUCTION AND OBJECTIVES

Raftelis Financial Consultants, Inc. (RFC) is pleased to submit this report to the Pima County Regional Wastewater Reclamation Department (PCRWRD) summarizing the draft results of the Wastewater Rate Structure Study (Study). The Study began in August 2016. Preliminary results were presented to the Pima County Regional Wastewater Reclamation Advisory Committee (PCRWRAC) on December 15, 2016 and March 23, 2017. A summary of preliminary results was provided to the Pima County Board of Supervisors (Board) on April 10, 2017, through the Pima County Administrator, Chuck Huckelberry.

The primary objectives of the Study are:

1) Identify and prioritize PCRWRD's pricing objectives associated with the provision of wastewater services;
2) Identify the cost of service for PCRWRD's customer classes;
3) Evaluate the strengths and weaknesses of PCRWRD's current wastewater rate structure; and
4) Develop and evaluate alternative rate structures that align with PCRWRD's most important pricing objectives.

This report describes the methodology and results of the Study.

1.2 PRICING OBJECTIVES

RFC used a systematic approach to conduct this Study, designed around a process tailored specifically to PCRWRD's goals and objectives. The approach began with meetings, workshops, and interactive discussions with PCRWRD staff, Pima County Finance and Risk Management (PCF & RM) staff, and PCRWRAC representatives to provide a foundation for identifying and prioritizing PCRWRD's most important objectives in pricing wastewater services. These pricing objectives, in particular, revenue stability, simple to understand and update, consistency with cost of service principles, and affordability were used as focal points during the cost of service and rate design components of the Study. The goal was to identify rate structure alternatives that balance as many of these objectives as possible.

1.3 PCRWRD FINANCIAL PLAN REVENUE REQUIREMENTS

It is important to note this Study **did not**, and was never intended to, determine the level of revenue required to ensure the wastewater utility's financial sustainability; that is the function of PCRWRD's Financial Plan prepared by the Finance and Risk Management Department. The revenue requirements, or costs, used in this Study of approximately $158.5 million are based on information provided in PCRWRD's Financial Plan dated August 23, 2016 assuming the wastewater user rates and charges in place at the beginning of fiscal year (FY) 2016-17. The Board approved a 3% increase in wastewater user rates and charges in April 2017; however, this report does not include that

increase. The two primary components of revenue requirements are operating and maintenance (O&M) expenses and capital expenditures, in this case primarily debt service. Non-rate revenue from connection fees and miscellaneous charges offset the total revenue requirements. The final component is incorporating the portion of transfers out to meet the revenue required for sewer utility services as identified in the Financial Plan.

Exhibit 1.1 provides a breakdown of the revenue requirements for FY 2016-17 that aligns with PCRWRD's Financial Plan.

Exhibit 1.1: Summary of Revenue Requirements (FY 2016-17)

FY2017	Operating	Capital	Total
GROSS REVENUE REQUIREMENTS			
Total O&M	$ 84,563,807	$ -	$ 84,563,807
Total Debt Service	$ -	$ 75,399,344	$ 75,399,344
Total Gross Revenue Requirements	**$ 84,563,807**	**$ 75,399,344**	**$ 159,963,151**
OTHER REVENUE			
Connection Fee Revenue	$ -	$ (11,572,094)	$ (11,572,094)
Non-Rate Revenue	$ (1,810,854)	$ -	$ (1,810,854)
Total Other Revenue	**$ (1,810,854)**	**$ (11,572,094)**	**$ (13,382,948)**
Transfers for Purpose of Determining Rate Revenue Requirements	**$ -**	**$ 11,904,396**	**$ 11,904,396**
Net Revenue Requirements	**$ 82,752,953**	**$ 75,731,646**	**$ 158,484,599**

1.4 COST OF SERVICE ANALYSIS

RFC utilized the "functional cost methodology" described in the Water Environment Federations (WEF) publication, "Manual of Practice M27, Financing and Charges for Wastewater Systems." Once the revenue requirements have been established, costs were allocated to categories which relate to functions performed by the wastewater utility. The functional allocation process was completed collaboratively by both RFC and PCF & RM staff. The functional categories include:

- Wastewater Collection
- Wastewater Conveyance
- Wastewater Treatment
- Laboratory
- Account/Customer
- General and Administration

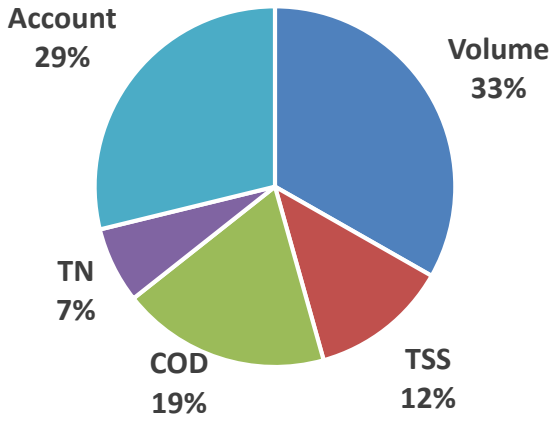
RFC, PCF & RM and PCRWRD staff went through an extensive cost allocation exercise to allocate O&M expenses to the appropriate functional categories. Fixed assets were provided to RFC with functional categories assigned. Piping infrastructure was allocated to collection and conveyance based on size and length.

In the functional cost methodology, functionalized costs and assets are then allocated to demand parameters, including account, volume, and strength components. Account costs include customer service and related costs and a portion of debt service; volume costs are associated with volumetric throughput, or the annual flow from customers, and strength costs reflect the treatment of pollutants within wastewater in the form of total suspended solids (TSS), chemical oxygen demand (COD), and total nitrogen (TN).

The revenue requirements by demand parameters were divided by the account, volume, and strength billable units to determine a unit cost for each component. All customer classes were assigned wastewater strength characteristics of TSS, COD, and TN based on sampling conducted by PCRWRD in 2013, 2015, and 2017. Total revenue requirements by customer class were then developed by multiplying the demand parameter unit costs per number of accounts, volume, and strength of each customer class.

Exhibit 1.2 presents the allocation of costs by demand parameters.

Exhibit 1.2: Allocation of Cost by Demand Parameters



The cost allocation methodology described above is consistent with industry standards and practices. But it is important to recognize that, in reality, the majority of PCRWRD's costs are "fixed" in nature, with the only variable costs being commodity related (e.g. energy, chemicals, utilities). For example, PCRWRD must staff and operate its facilities 24 hours a day, seven days a week, and 365 days a year regardless of whether a drop of wastewater is treated. Additionally, PCRWRD has issued a significant amount of debt to finance infrastructure investment to meet regulatory requirements and provide continued, safe and reliable service to customers, and this debt service is a fixed cost. However, like most wastewater utilities, the majority of PCRWRD's revenues are recovered volumetrically, which creates an imbalance between utility cost incurrence and revenue recovery. Thus, the wastewater utility industry is moving toward higher fixed fees to increase revenue stability, especially as per capita usage declines, utilities become more leveraged, and debt service becomes a larger portion of

annual costs. While financial stability is necessary, PCRWRD is also mindful of the need for reasonably equitable and affordable rate design.

1.5 EXISTING RATE STRUCTURE

After establishing customer class cost of service, the existing rate structure was evaluated considering PCRWRD's pricing objectives. PCRWRD's primary source of revenue is from volumetric rates and monthly fixed charges. **Exhibit 1.3** presents PCRWRD's existing wastewater rate structure. The monthly fixed charge, or service fee, is the same for each customer class except for income-reduced residential customers that pay a lower service fee. For these customers, the service fee is calculated as a percentage of the full service fee based on their income in relation to the Federal Poverty Level. The volumetric rate is uniform and based on a customer's average winter water usage, taken from the months of December, January and February. Income-reduced residential rates are also applied to the volumetric rates.

Exhibit 1.3: Existing User Charges

Existing User Charges		
Class Name	Service Fee	Volumetric Rate (per Ccf)
Residential	$12.63	$3.52
Income Reduced Residential | A	$3.16	$0.88
Income Reduced Residential | B	$6.32	$1.76
Income Reduced Residential | C	$9.47	$2.64
Multi-Family	$12.63	$3.52
Commercial	$12.63	$3.52
Commercial HS/Industrial	$12.63	$3.52 - $12.79

Volumetric rates are then multiplied by a high-strength factor for each customer class to account for wastewater strength. The current high strength factors are shown below in **Exhibit 1.4**.

Exhibit 1.4: Current High Strength Factors

CURRENT HIGH STRENGTH FACTORS (HSF)	
CLASSIFICATION	HSF CURRENT
C - Commercial	1.00
SJ - Printing, copying	1.01
SL - Industrial laundry	1.06
SB - Mortuary	1.09
SC - Laundromat	1.09
SK - Electric component manufacturer	1.14
SG - Car wash, self-service	1.19
SD - Pet Clinic	1.20
SH - Car wash, full-service	1.23
SO - Chemical, pharmaceutical	1.25
SI - Bottling company	1.68
SE - Restaurant, with seating	2.03
SA - Auto Body and Fender Repair	2.10
SF - Restaurant, fast food	2.32
SN - Miscellaneous food processor	2.33
SP - Meat packing	2.38
SM - Bakery	3.63

1.6 ALTERNATIVE RATE STRUCTURE DESIGN

Alternative rate structures were then developed to modify the existing rate structure to address the primary pricing objectives, such as revenue stability, simple to understand and update, and consistency with cost of service principles.

- *Revenue stability* - PCRWRD's costs are primarily fixed, and yet revenue is recovered predominantly through volumetric rates, like most utilities in the industry. As such, PCRWRD should consider options that increase fixed cost recovery through the service fee.
- *Simple to understand and update and consistent with cost of service principles* - The existing rate structure with 16 separate classes for commercial high strength and industrial customers is complex, administratively burdensome, significantly problematic from a billing standpoint, and creates challenges in communication with customers. PCRWRD should consider options that consolidate the number of classes to improve customer understanding and acceptance and reduce billing complexity, while still maintaining consistency with cost of service principles by recognizing the additional cost of treating higher strength wastewater.

To address these primary objectives, six rate structure alternatives were developed and are summarized below:

- ***Alternative One*** was calculated using the cost of service methodology summarized previously. This alternative incorporates a re-allocation of costs previously recovered by volumetric rates to recovery by service fees to improve revenue stability. For the volumetric rates, single-family and multi-family residential customers would be charged the same rate, while commercial and industrial customers would be consolidated into two different subclasses, with the goal of simplifying the volumetric rate structure.

- ***Alternative Two*** was developed based on similar reasoning as alternative one, with one notable exception: commercial and industrial customers are split into four categories rather than two. The categories are based on new sampling data and re-calculated high strength factors and represent an average wastewater strength for various customer groupings. This alternative provides slightly more granularity in classifying commercial and industrial customers when compared to alternative one. The same approach to developing the service fee would be applied in this alternative as alternative one.
- ***Alternative Three*** was designed to recover 100% of costs allocated to the single-family residential customer class through a flat monthly fixed fee. For multi-family residential and non-residential customers, the same approach and structure as alternative two was applied, including the service fee and the four volumetric subclasses.
- ***Alternative Four*** was developed to recover 100% of the utility's fixed costs through the monthly service fee, uniform for all classes, which would raise the monthly service to $45.23. A small volumetric rate would be applied to customer class demand in this rate structure, which would be implemented in the same manner as alternative two. This option is for demonstration purposes and is not a RFC recommendation.
- ***Alternative Five*** was developed based on similar reasoning as alternative one. The only difference is rather than having two volumetric rates for commercial and industrial customers, these two classes were consolidated into one class and one volumetric rate. Single-family residential and multifamily residential would still have one unique uniform volumetric rate. The same approach to developing the service fee for increased fixed revenue recovery would be applied in this alternative as alternative one.
- ***Alternative Six*** was developed based on a hybrid of alternatives three and five with the only difference being that single-family residential customers would pay a flat monthly fixed fee regardless of water consumption.

The rate structure alternatives are shown in **Exhibit 1.5**.

Exhibit 1.5: Rate Structure Alternatives

Service Fee	Current	Calculated	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
R - Residential	$12.63	$14.16	$14.16	$14.16	$35.28	$45.23	$14.16	$35.28
All Other Classes	$12.63	$14.16	$14.16	$14.16	$14.14	$45.23	$14.16	$14.14

Volumetric Rate (Ccf)								
R - Residential	$3.52	$3.34	$3.33	$3.34	*NA*	$0.37	$3.35	*NA*
MF - Multi-Family Residential	$3.52	$3.34	$3.33	$3.34	$3.33	$0.37	$3.35	$3.32
C - Commercial	$3.52	$3.89	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SA - Auto Body and Fender Repair	$7.40	$3.64	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SB - Mortuary	$3.84	$3.66	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SC - Laundromat	$3.84	$3.42	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SD - Pet Clinic	$4.23	$3.79	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SG - Car wash, self-service	$4.19	$3.34	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SH - Car wash, full-service	$4.33	$3.34	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SJ - Printing, copying	$3.56	$4.07	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SK - Electric component manufacturer	$4.02	$4.07	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SL - Industrial laundry	$3.73	$4.29	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SO - Chemical, pharmaceutical	$4.40	$3.51	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SF - Restaurant, fast food	$8.17	$5.03	$7.66	$4.85	$4.82	$0.54	$4.10	$4.10
SN - Miscellaneous food processor	$8.21	$4.66	$7.66	$4.85	$4.82	$0.54	$4.10	$4.10
SE - Restaurant, with seating	$7.15	$7.77	$7.66	$7.66	$7.61	$0.85	$4.10	$4.10
SI - Bottling company	$5.92	$7.52	$7.66	$7.66	$7.61	$0.85	$4.10	$4.10
SM - Bakery	$11.63	$11.57	$7.66	$10.70	$10.64	$1.19	$4.10	$4.10
SP - Meat packing	$8.38	$9.85	$7.66	$10.70	$10.64	$1.19	$4.10	$4.10

The corresponding residential customer impacts of representative customers at a variety of monthly levels of demand (volumes) are provided in **Exhibit 1.6**.

Exhibit 1.6: Monthly Residential Bill Impacts

Volume (Ccf)	Current Bill	Alternative 1	*$ Change*	Alternative 2	*$ Change*	Alternative 3	*$ Change*	Alternative 4	*$ Change*	Alternative 5	*$ Change*	Alternative 6	*$ Change*
0	$12.63	$14.16	*$ 1.53*	$14.16	*$ 1.53*	$35.28	*$ 22.65*	$45.23	*$ 32.60*	$14.16	*$ 1.53*	$35.28	*$ 22.65*
1	$16.15	$17.49	*$ 1.33*	$17.50	*$ 1.35*	$35.28	*$ 19.13*	$45.60	*$ 29.45*	$17.51	*$ 1.36*	$35.28	*$ 19.13*
2	$19.68	$20.82	*$ 1.14*	$20.84	*$ 1.17*	$35.28	*$ 15.60*	$45.98	*$ 26.30*	$20.86	*$ 1.19*	$35.28	*$ 15.60*
3	$23.20	$24.15	*$ 0.95*	$24.19	*$ 0.99*	$35.28	*$ 12.08*	$46.35	*$ 23.15*	$24.21	*$ 1.01*	$35.28	*$ 12.08*
4	$26.72	$27.48	*$ 0.76*	$27.53	*$ 0.81*	$35.28	*$ 8.56*	$46.72	*$ 20.00*	$27.56	*$ 0.84*	$35.28	*$ 8.56*
5	$30.25	$30.81	*$ 0.57*	$30.87	*$ 0.63*	$35.28	*$ 5.04*	$47.10	*$ 16.86*	$30.91	*$ 0.67*	$35.28	*$ 5.04*
6	$33.77	$34.14	*$ 0.37*	$34.21	*$ 0.45*	$35.28	*$ 1.51*	$47.47	*$ 13.70*	$34.27	*$ 0.50*	$35.28	*$ 1.51*
7	$37.29	$37.47	*$ 0.18*	$37.56	*$ 0.27*	$35.28	*$ (2.01)*	$47.84	*$ 10.55*	$37.62	*$ 0.33*	$35.28	*$ (2.01)*
8	$40.81	$40.80	*$ (0.01)*	$40.90	*$ 0.09*	$35.28	*$ (5.53)*	$48.21	*$ 7.40*	$40.97	*$ 0.15*	$35.28	*$ (5.53)*
9	$44.34	$44.13	*$ (0.20)*	$44.24	*$ (0.09)*	$35.28	*$ (9.06)*	$48.59	*$ 4.25*	$44.32	*$ (0.02)*	$35.28	*$ (9.06)*
10	$47.86	$47.46	*$ (0.40)*	$47.59	*$ (0.27)*	$35.28	*$ (12.58)*	$48.96	*$ 1.10*	$47.67	*$ (0.19)*	$35.28	*$ (12.58)*
15	$65.48	$64.12	*$ (1.36)*	$64.30	*$ (1.18)*	$35.28	*$ (30.20)*	$50.82	*$ (14.66)*	$64.42	*$ (1.05)*	$35.28	*$ (30.20)*
20	$83.09	$80.77	*$ (2.32)*	$81.01	*$ (2.08)*	$35.28	*$ (47.81)*	$52.68	*$ (30.41)*	$81.18	*$ (1.91)*	$35.28	*$ (47.81)*

Similarly, customer impacts were evaluated for non-residential customers and presented at an average level of demand for each class (see **Exhibit 1.7**). It should be noted that commercial and industrial customers exhibit wide ranges of monthly consumption. For example, there are many commercial customers with lower levels of consumption more commensurate with residential customers. The monthly dollar impact on these customers would be much lower.

Exhibit 1.7: Monthly Non-Residential Bill Impacts

Class	Average Volume [Ccf]	Current Bill	Alternative 1	$ Change	Alternative 2	$ Change	Alternative 3	$ Change	Alternative 4	$ Change	Alternative 5	$ Change	Alternative 6	$ Change
Commercial														
Commercial regular	41.9	$160.10	$175.89	*$15.79*	$176.55	*$16.45*	$175.88	*$15.78*	$63.25	*-$96.85*	$185.60	*$25.50*	$185.58	*$25.48*
Commercial HS/Industrial														
SA - Auto Body and Fender Repair	11.6	$98.27	$58.88	*-$39.39*	$59.06	*-$39.21*	$58.92	*-$39.35*	$50.25	*-$48.02*	$61.57	*-$36.70*	$61.55	*-$36.72*
SB - Mortuary	13.5	$64.54	$66.39	*$1.85*	$66.60	*$2.06*	$66.32	*$1.78*	$51.08	*-$13.46*	$69.52	*$4.98*	$69.50	*$4.96*
SC - Laundromat	122.0	$481.11	$485.52	*$4.41*	$487.44	*$6.33*	$470.91	*-$10.20*	$97.98	*-$383.13*	$513.81	*$32.71*	$513.79	*$32.69*
SD - Pet Clinic	14.5	$73.74	$70.00	*-$3.73*	$70.23	*-$3.50*	$69.93	*-$3.81*	$51.48	*-$22.26*	$73.36	*-$0.38*	$73.34	*-$0.40*
SG - Car wash, self-service	98.0	$423.36	$392.69	*-$30.67*	$394.23	*-$29.13*	$392.31	*-$31.05*	$87.60	*-$335.76*	$415.41	*-$7.95*	$415.39	*-$7.97*
SH - Car wash, full-service	157.4	$694.52	$622.15	*-$72.37*	$624.63	*-$69.89*	$621.56	*-$72.96*	$113.28	*-$581.24*	$658.65	*-$35.87*	$658.63	*-$35.89*
SJ - Printing, copying	16.3	$70.58	$77.08	*$6.50*	$77.34	*$6.76*	$77.00	*$6.42*	$52.27	*-$18.31*	$80.86	*$10.28*	$80.84	*$10.26*
SK - Electric component manufacturer	82.7	$344.89	$333.80	*-$11.09*	$335.10	*-$9.79*	$333.48	*-$11.41*	$81.01	*-$263.88*	$352.99	*$8.10*	$352.97	*$8.08*
SL - Industrial laundry	398.3	$1,499.97	$1,553.00	*$53.03*	$1,559.28	*$59.31*	$1,537.37	*$37.40*	$217.45	*-$1,282.52*	$1,645.37	*$145.40*	$1,645.35	*$145.38*
SO - Chemical, pharmaceutical	258.0	$1,148.73	$1,010.93	*-$137.80*	$1,015.00	*-$133.73*	$995.82	*-$152.91*	$156.79	*-$991.94*	$1,070.76	*-$77.96*	$1,070.74	*-$77.98*
SF - Restaurant, fast food	28.9	$249.19	$235.88	*-$13.31*	$154.51	*-$94.68*	$139.50	*-$109.69*	$60.88	*-$188.31*	$132.70	*-$116.49*	$132.68	*-$116.51*
SN - Miscellaneous food processor	23.2	$203.46	$192.25	*-$11.21*	$126.89	*-$76.57*	$126.19	*-$77.27*	$57.80	*-$145.66*	$109.37	*-$94.09*	$109.35	*-$94.11*
SE - Restaurant, with seating	56.2	$414.45	$444.58	*$30.13*	$444.46	*$30.01*	$441.71	*$27.26*	$93.19	*-$321.26*	$244.27	*-$170.18*	$244.25	*-$170.20*
SI - Bottling company	180.1	$1,078.40	$1,393.64	*$315.24*	$1,393.24	*$314.84*	$1,370.33	*$291.93*	$198.95	*-$879.45*	$751.66	*-$326.74*	$751.64	*-$326.76*
SM - Bakery	9.3	$120.54	$85.26	*-$35.28*	$113.49	*-$7.05*	$112.90	*-$7.64*	$56.30	*-$64.24*	$52.18	*-$68.37*	$52.16	*-$68.39*
SP - Meat packing	74.0	$632.71	$580.70	*-$52.01*	$805.60	*$172.89*	$801.50	*$168.79*	$133.50	*-$499.21*	$317.05	*-$315.67*	$317.03	*-$315.69*

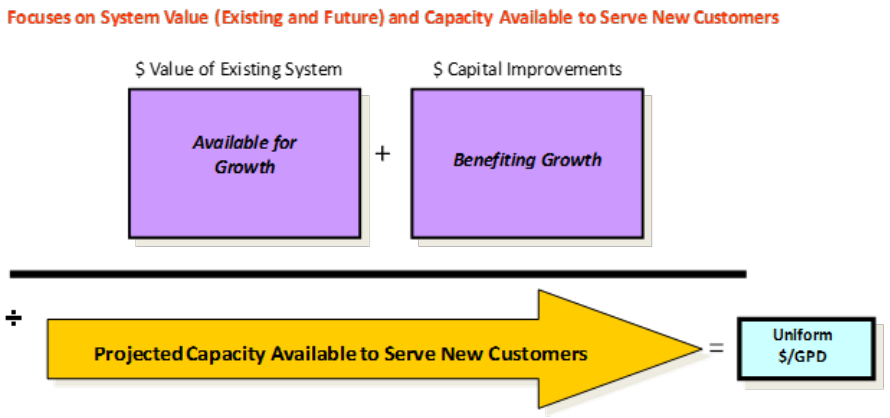
1.7 EVALUATION OF ALTERNATIVES

Alternative rate structures were developed to address the pricing objectives identified at the beginning of the Study. The first two alternatives provide improved revenue stability, are simple to understand and update, and consistent with cost of service principles. They also provide consideration for affordability as the impacts on residential customers are low. Alternative 3 improves revenue stability significantly, is simple to understand and update and consistent with cost of service principles, but there are higher impacts on low-volume residential customers. Alternative 4 provides the most revenue stability, but it is not consistent with cost of service principles as both commercial and industrial customers would be subsidized by residential customers. Both Alternatives 5 and 6 incorporate additional simplicity into the volumetric rates by further reducing the number of customer classes.

1.8 CONNECTION FEE UPDATE

As part of this Study, RFC updated PCRWRD's connection fees based on current data. Connection fees are a capacity use charge designed to recover the cost of providing wastewater treatment and conveyance capacity, and are assessed upfront to customers when they connect to the system or increase water meter size. The fees are based on the user's potential, rather than actual, discharge rate to ensure sufficient capacity exists in the system to convey and treat the wastewater. PCRWRD's connection fees are calculated using a hybrid approach based on a combination of the industry accepted methodologies including the system buy-in and the marginal incremental approaches. The buy-in approach incorporates existing assets and available capacity. The marginal incremental approach incorporates expansion of the system and is tied to the utility's Capital Improvement Plan (CIP). The hybrid approach, which supports PCRWRD's connection fee, is called the System Average Cost Approach (see **Exhibit 1.8**).

Exhibit 1.8: System Average Cost Approach



PCRWRD's connection fees reflect only the cost of capacity associated with core, or "trunk", system capacity that is available to serve new customers. Key factors used to allocate costs are:

- Available capacity – PCRWRD's current treatment capacity amongst its facilities is 91.55 million gallons per day (MGD). Of this amount, PCRWRD experienced annual wastewater plant flows of 59.48 MGD in 2016, resulting in available treatment capacity of 32.07 MGD, or 35.0% of the system.
- Piping infrastructure – an updated review of PCRWRD's piping infrastructure determined that 62.4% is associated with the wastewater collection system and 37.6% is associated with the wastewater conveyance system.

Costs included in the calculation are:

- Capital Improvement Plan – Of PCRWRD's more than $300 million CIP, $120.5 million is allocated for expansion or available capacity.
- Fixed Assets in Service – PCRWRD's updated fixed assets were functionalized, and based on core system assets, such as wastewater conveyance and wastewater treatment, $356.4 million (replacement cost new less depreciation values) of assets are associated with capacity available to serve new customers.
- Reserves – PCRWRD's unrestricted cash and cash equivalents for FY 2016 was $143.3 million. Of this amount, $50.1 million, or 35.0%, is identified as a core asset and included in the connection fee calculation.

As shown in **Exhibit 1.9**, the results of the updated calculation of PCRWRD's cost of capacity is $16.44 per gallon per day (gpd).

Exhibit 1.9: Cost of Capacity (gallons per day)

	Capital Costs (1)	Capacity (MGD) (2)	Cost per GPD
Cost of Capacity Per Gallon Per Day (gpd)			
Land	$ 5,294,381	32.07	$ 0.17
Conveyance and Pumping	219,720,487	32.07	$ 6.85
Wastewater Treatment	251,910,106	32.07	$ 7.86
Reserves (3)	50,143,104	32.07	$ 1.56
Cost of Capacity (per gpd) (4)	**$ 527,068,078**		**$ 16.44**

Notes:
(1) Represents the portion of system capital costs available to serve new customers.
(2) Represents the portion of total projected system capacity available to serve new customers.
(3) Includes only the related portion of unrestricted cash and cash equivalents (current assets), emergency reserve, and 60 days of the 90 day O&M reserve identified in the County's FY 2015/16 financial statements for the wastewater enterprise system.
(4) Rounded up.

Using $16.44 per gpd and an estimated design flow per customer per day of 253.8 gpd, which is consistent with PCRWRD's most recent connection fee calculation, the revised connection fee is $4,172 for a residential customer; this is a 2.6% increase above the existing connection fee. Using the residential charge as the basis for calculation, the connection fees for larger meter sizes are computed from a scale of factors reflecting customer demand by meter size relative to the average demand of 5/8-inch customer. The results are summarized in **Exhibit 1.10**.

Exhibit 1.10: Calculated Connections Fees by Meter Size

Meter Size	Current	Calculated	*% Change*
Residential			
5/8", 3/4", or 1"	$4,066	$4,172	*2.6%*
Commercial/Industrial/Multi-Family			
1"	$8,480	$8,700	*2.6%*
1 1/2"	$27,030	$27,733	*2.6%*
2"	$69,790	$71,605	*2.6%*
3"	$162,510	$166,735	*2.6%*
4"	$363,690	$373,146	*2.6%*

2. INTRODUCTION AND STUDY OBJECTIVES

2.1 BACKGROUND

PCRWRD serves over 265,000 wastewater customer accounts within its service area. Periodically, PCRWRD conducts rate structure analyses and cost of service studies to ensure equitable revenue recovery from its customers and customer classes. Additionally, the rate structure is evaluated against PCRWRD stakeholder's current pricing objectives.

2.2 STUDY OBJECTIVES

The primary objectives of the Study are:

1) Identify and prioritize PCRWRD's pricing objectives associated with the provision of wastewater services;
2) Identify the cost of service for PCRWRD's customer classes including an assessment of fixed and variable costs;
    a. Customer classes
    b. Fixed cost versus fixed revenue recovery
3) Evaluate the strengths and weaknesses of PCRWRD's current wastewater rate structure;
4) Develop and evaluate alternative rate structures that align with PCRWRD's most important pricing objectives; and
5) Examine and update PCRWRD's connection fees.

Additional discussion and background information on certain elements of these objectives are provided below.

2.2.1 Customer Classes

PCRWRD currently has nineteen customer classes. In addition to single-family residential, multi-family residential and commercial, PCRWRD has sixteen specific commercial/industrial customer classes that have unique volumetric user rates to reflect the higher cost of treating wastewater with stronger pollutants. This higher cost of wastewater treatment is recovered through high strength factors (hsf) applied to the volumetric rate. These factors were based on wastewater sampling and loading data developed several years ago. PCRWRD conducts ongoing, periodic sampling and testing to analyze if existing factors for the high strength classes are still appropriate.

Water service for PCRWRD's customers is provided by several utility agencies, such as Tucson Water and Metro Water District. PCRWRD relies upon these agencies for billing data and customer identification. When premises change customer type, such as an office to a restaurant, their billing rate should change. At times, this transition is not captured immediately, and there is a potential for customer misclassification until the change is recognized. As such, PCRWRD would like to explore approaches to simplify their rate structure to lessen the administrative burden, improve customer understanding and acceptance, and effectively reduce or eliminate customer misclassifications.

2.2.2 Fixed Costs

In addition to evaluating customer classes, PCRWRD has seen its fixed costs continue to be a significant portion of their budget, like its peers around the water and wastewater industry. And like most of its peers, PCRWRD collects most of its revenue through volumetric charges, which can be highly variable based on customer demand behaviors. Due to this imbalance between utility cost incurrence and revenue recovery, PCRWRD would like to examine options to increase its fixed cost recovery that will help ensure the utility's long-term utility financial sustainability.

2.2.3 Update Connection Fee

As part of this Study, PCRWRD would like to review and update the connection fees assessed to new customers. Connection fees were most recently updated in 2011, and it is reasonable and consistent with industry best practices to update these fees periodically based on current data and system characteristics.

2.3 PRICING OBJECTIVES RESULTS

RFC used a systematic approach to conduct this Study, designed around a process tailored specifically to PCRWRD's goals and objectives. The approach began with meetings, workshops, and interactive discussions with PCF & RM staff and PCRWRAC representatives to provide a foundation for identifying and prioritizing PCRWRD's most important objectives in pricing wastewater services. As part of this process, RFC conducted an exercise with executive staff and PCRWRAC representatives to determine the relative level of importance of potential objectives or drivers for rate structure design study. **Exhibit 2.1** below provides a list and definitions of the pricing objectives considered during this exercise.

Exhibit 2.1: Pricing Objectives

Pricing Objective	Description
Demand Management	The rate structure should assist in managing system demand.
Rate Stability	The rate structure should minimize dramatic rate increases over the planning period.
Revenue Stability	The rate structure should provide for a steady and predictable stream of revenues.
Simple to Understand and Update	The rate structure should be easy for customers to understand. In addition, the rate structure should be able to be effectively maintained by staff in future years.

Affordability	The rate structure should provide assistance to economically disadvantaged customers.
Cost of Service Based Allocations	The rate structure should ensure that each customer class is contributing equitably towards revenue requirements based upon the costs of providing service to each customer class.
Minimization of Customer Impacts	The rate structure should be developed such that adverse rate impacts on each customer class are minimized.
Ease of Implementation	The rate structure should be compatible with the existing billing system and not take significant employee time to implement.
Economic Development	The rate structure should incorporate a preferential rate that may be used to attract economic development.

Executive staff were provided a worksheet with these pricing objectives and asked to rank each objective as "Essential", "Very Important", "Important", or "Least Important". After the exercise was completed, RFC staff combined and scored the responses, and the results are provided in **Exhibit 2.2**. These results were discussed for validity, and executive staff confirmed that these items will represent the most important drivers during the consideration of alternative rate structures.

Exhibit 2.2: Pricing Objectives Exercise Results

Classification	Rank	Objective
Essential	1	Revenue Stability
	2	Rate Stability
	2	Cost of Service Based Allocations
Very Important	4	Simple to Understand and Update
	4	Affordability

3. REVENUE REQUIREMENTS OVERVIEW

3.1 PCRWRD FINANCIAL PLAN REVENUE REQUIREMENTS

The general objective of identifying revenue requirements, or costs, in a rate structure and cost of service analysis is to arrive at the level of wastewater revenue required to ensure the utility's financial sustainability for a "test" year. The test year in this Study was FY 2016-17. This level of revenue enables PCRWRD to meet all the operating and maintenance (O&M) expenses associated with providing service to customers. Additionally, it provides the resources to pay for capital expenditures, including debt service and debt service coverage requirements.

It is important to note this Study **did not**, nor was it intended to, determine the level of revenue required for FY 2016-17; this is the purpose of PCRWRD's Financial Plan prepared by the Finance and Risk Management Department. The revenue requirements used in this Study of approximately $158.5 million, provided in more detail below, are based on information provided in PCRWRD's Financial Plan dated August 23, 2016 assuming the wastewater user rates and charges in place at the beginning of fiscal year (FY) 2016-17.

The two primary components of revenue requirements are O&M expenses and capital expenditures, in this case primarily debt service. Non-rate revenue from connection fees and miscellaneous charges offset the total revenue requirements. The final component is incorporating the portion of transfers out to meet the revenue required for sewer utility services as identified in the Financial Plan.

3.1.1 Operation and Maintenance Expenses

Exhibit 3.1 below summarizes the test year O&M. The total level of O&M expenses is forecast to be $84.6 Million in FY 2016-17.

Exhibit 3.1: O&M Expenses

Description	FY 2017 Budget
Personnel Expenses	$ 33,627,611
Supplies & Services Expenses	$ 49,411,598
Capital Equipment Purchases > $5,000	$ 1,524,598
Total: O&M Expenses	**$ 84,563,807**

3.1.2 Capital Expenditures

PCRWRD has debt obligations in three different forms: Sewer Revenue Obligations (SRO), Sewer Revenue Bonds (SRB) and Water Infrastructure Finance Authority debts (WIFA). PCRWRD has used these debt instruments historically to finance capital projects including its recent Regional

Optimization Master Plan (ROMP). For FY 2016-17, these obligations total $75.4 million, as shown in Exhibit 3.2.

Exhibit 3.2: Debt Obligations

Description	FY 2017 Budget
Sewer Revenue Obligations	$ 60,737,796
Sewer Revenue Bonds	$ 12,521,463
Water Infrastructure Finance Authority Debts	$ 2,134,085
Total: Debt Obligations	**$ 75,393,344**

3.1.3 Other Revenue

PCRWRD expects to generate a total of $13.4 million of revenue from other sources during FY 2016-17. These sources include, for example, connection fees, interest earnings, and other miscellaneous revenues. Each of the items included in the non-rate revenue are displayed in Exhibit 3.3.

Exhibit 3.3: Other Revenue

Type	FY 2017 Budget
General Government Fees	$ 120,000
Sanitation Fees	$ 310,000
Interdepartmental Revenue	$ 20,000
License & Permits	$ 20,000
Other Fines	$ 5,000
Rent and Royalties	$ 934
Interest Non Operating	$ 201,000
Interest Revenue Pooled Investments Non Operating	$ 530,000
Other Misc. Revenue Non Operating	$ 553,670
Market Adjustments Non Operating	$ 50,000
Late Fees and Interest Charges on Overdue Receivable	$ 250
Connection Fee Revenue	$ 11,572,094
Total: Other Revenue	**$ 13,382,948**

3.1.4 Adjustment to Revenue Requirements

The final component of the development of revenue requirements is incorporating the portion of transfers out to meet the revenue required for sewer utility services as identified in the PCRWRD Financial Plan. It is assumed these revenue requirements are related to payments on Certificates of Participation, and have been included as capital expenditures. For FY 2016-17, this total is $11.9 million.

3.1.5 Summary of Revenue Requirements (FY 2016-17)

Revenue requirements for the test year of 2016-17 are shown below. After combining net operating expenses and capital expenditures, PCRWRD's net revenue requirements from user rates and charges is $158.5 million. This amount served as the basis for the cost of service analysis discussed in Section 4.

Exhibit 3.4: Summary of Revenue Requirements

FY2017	Operating	Capital	Total
GROSS REVENUE REQUIREMENTS			
Total O&M	$ 84,563,807	$ -	$ 84,563,807
Total Debt Service	$ -	$ 75,399,344	$ 75,399,344
Total Gross Revenue Requirements	**$ 84,563,807**	**$ 75,399,344**	**$ 159,963,151**
OTHER REVENUE			
Connection Fee Revenue	$ -	$ (11,572,094)	$ (11,572,094)
Non-Rate Revenue	$ (1,810,854)	$ -	$ (1,810,854)
Total Other Revenue	**$ (1,810,854)**	**$ (11,572,094)**	**$ (13,382,948)**
Transfers for Purpose of Determining Rate Revenue Requirements	**$ -**	**$ 11,904,396**	**$ 11,904,396**
Net Revenue Requirements	**$ 82,752,953**	**$ 75,731,646**	**$ 158,484,599**

4. COST OF SERVICE OVERVIEW

The financial planning process determines the overall level of net revenue requirements, or net rate revenue, necessary to fund utility operations, and the cost of service (COS) analysis determines how much of that revenue should be recovered from each of PCRWRD's customer classes. The proceeding section provides an overview of the cost of service process and results.

4.1 ALLOCATION PROCESS

RFC utilized the "functional cost methodology" described in the Water Environment Federations (WEF) publication, "Manual of Practice M27, Financing and Charges for Wastewater Systems." Once the revenue requirements have been established (Section 3), costs were allocated to categories which relate to functions performed by the wastewater utility. The functional allocation process was completed collaboratively by both RFC and PCRWRD staff. The functional categories include:

- Wastewater Collection
- Wastewater Conveyance
- Wastewater Treatment
- Laboratory
- Account/Customer
- General and Administration

RFC, PCF & RM and PCRWRD staff went through an extensive cost allocation exercise to allocate O&M expenses to the appropriate functional categories. Fixed assets were provided to RFC with functional categories assigned. Piping infrastructure was allocated to collection and conveyance based on size and length.

In the functional cost methodology, functionalized costs and assets are then allocated to cost drivers, or demand parameters, including account, volume, and strength components. Account costs include customer service and related costs and a portion of debt service; volume costs are associated with volumetric throughput, or the annual flow from customers, and strength costs reflect the treatment of pollutants within wastewater in the form of total suspended solids (TSS), chemical oxygen demand (COD), and total nitrogen (TN).

Within the functionalized treatment cost category, an extensive exercise was conducted by RFC and PCRWRD staff to allocate costs to treatment process sub functional categories (e.g. primary treatment, secondary treatment, nutrient removal), which enabled a more appropriate and accurate allocation to the volume and strength demand parameters. Additional detail on these allocations is provided in the attached Appendix.

4.2 REVENUE REQUIREMENTS FROM RATES

Exhibit 4.1 summarizes the revenue requirements for all wastewater customers, as developed in Section 3. The net revenue requirement is $158.5 Million in FY 2016-17; this serves as the test year.

Exhibit 4.1 Test Year Revenue Requirements

FY2017	Operating	Capital	Total
GROSS REVENUE REQUIREMENTS			
Total O&M	$ 84,563,807	$ -	$ 84,563,807
Total Debt Service	$ -	$ 75,399,344	$ 75,399,344
Total Gross Revenue Requirements	**$ 84,563,807**	**$ 75,399,344**	**$ 159,963,151**
OTHER REVENUE			
Connection Fee Revenue	$ -	$ (11,572,094)	$ (11,572,094)
Non-Rate Revenue	$ (1,810,854)	$ -	$ (1,810,854)
Total Other Revenue	**$ (1,810,854)**	**$ (11,572,094)**	**$ (13,382,948)**
Transfers for Purpose of Determining Rate Revenue Requirements	**$ -**	**$ 11,904,396**	**$ 11,904,396**
Net Revenue Requirements	**$ 82,752,953**	**$ 75,731,646**	**$ 158,484,599**

4.3 COST OF SERVICE RESULTS

The summarized results of the multi-step allocation process are provided below. Additional detail is provided in the attached Appendix.

4.3.1 Cost Functionalization

The first step in determining revenue requirements by customer class involves the allocation of wastewater utility O&M expenses and capital expenditures to functional categories. These categories relate to the various functions performed for the wastewater utility system to provide service to PCRWRD customers. For this Study the functions are: Collection, Conveyance, Treatment, Lab, Account/Customer, and General & Administration.

Allocation of O&M to Functional Categories

Exhibit 4.2 below summarizes the functional allocation of PCRWRD's test year O&M revenue requirement. These allocations relate to the proportion of expenses in each major cost center that is associated with performing each function. Each cost center has several sub-items that were assigned a percentage so each center's overall budget would be assigned proportionally to each function. For example, each item under treatment was assigned a 100% value for the treatment function. For

conveyance costs, an analysis of the piping infrastructure determined that 62.4% of piping is related to collection and 37.6% is related to conveyance.

Exhibit 4.2 O&M Functionalization

			Flow Functions				Fixed Functions	Proportional
Operating Expenses		**FY 2017**	**Collection**	**Conveyance**	**Treatment**	**Lab**	**Customer**	**General & Admin**
Planning		$ 5,688,938	$ -	$ -	$ -	$ -	$ -	$ 5,688,938
Conveyance		$ 16,022,246	$ 9,997,502	$ 6,024,744	$ -	$ -	$ -	$ -
Treatment		$ 35,179,313	$ -	$ -	$ 35,179,313	$ -	$ -	$ -
Admin	*(Less Laboratory)	$ 20,236,388	$ -	$ -	$ -	$ -	$ 6,860,557	$ 13,375,831
Laboratory		$ 7,436,922	$ -	$ -	$ -	$ 7,436,922	$ -	$ -
Total: Operating Expenses		**$ 84,563,807**	**$ 9,997,502**	**$ 6,024,744**	**$ 35,179,313**	**$ 7,436,922**	**$ 6,860,557**	**$ 19,064,769**
			12%	*7%*	*42%*	*9%*	*8%*	*23%*

Allocation of Assets to Functional Categories

To allocate capital expenditures, such as debt, the first step is to identify and allocate the system assets to the functional categories. The proportional distribution of assets to these functional categories will then be used to allocate capital expenditures.

A complete list of system assets was provided by PCRWRD, and the assets were grouped into eight asset types. The breakdown by asset type is displayed in **Exhibit 4.3**.

Exhibit 4.3 Net Book Value of Assets by Type

Asset Type	**Net Book Value**
Building	$ 542,760,174
Equipment and Machinery	76,049,758
Intangible Equipment and Software	12,178,335
Land	9,864,406
Other Improvements	37,894,585
Rights of Way and Easements	2,366,925
Sewage Conveyance Systems	470,570,997
Vehicles	1,522,984
Grand Total	**$ 1,153,208,165**

Next, the types of assets were allocated to functional categories based on their use in the system, as shown in **Exhibit 4.4**.

Exhibit 4.4: Allocation of Assets to Functions

		Flow Functions				Fixed Functions	Proportional
Sewer System Assets	**FY 2017**	**Collection**	**Conveyance**	**Treatment**	**Lab**	**Customer**	**General & Admin**
Building	$ 542,760,174	$ -	$ -	$ 488,484,157	$ -	$ -	$ 54,276,017
Equipment and Machinery	76,049,758	19,012,440	19,012,440	19,012,440	-	-	19,012,440
Intangible Equipment and Software	12,178,335	-	-	-	-	-	12,178,335
Land	9,864,406	-	-	9,864,406	-	-	-
Other Improvements	37,894,585	-	-	-	-	-	37,894,585
Rights of Way and Easements	2,366,925	1,476,905	890,020	-	-	-	-
Sewage Conveyance Systems	470,570,997	293,625,158	176,945,839	-	-	-	-
Vehicles	1,522,984	-	-	-	-	-	1,522,984
Total: Sewer System Assets	$ 1,153,208,165	$ 314,114,503	$ 196,848,298	$ 517,361,003	$ -	$ -	$ 124,884,361
		27%	*17%*	*45%*	*0%*	*0%*	*11%*

4.3.2 Allocation of O&M expenses, Capital Expenditures, and Non-Rate Revenue to Cost Drivers

Once O&M expenses and capital assets have been allocated to functional categories, the next step is to allocate the functional categories to cost drivers. The cost drivers can be generalized as pertaining to volumetric (flow drivers) or account/customer related (fixed drivers).

The volumetric cost drivers are: volume, which relates to the costs of handling the base wastewater discharge of PCRWRD customers (regardless of strength), and wastewater strength, which relates to the concentration of pollutants which must be removed via the wastewater treatment process. In this Study strength costs were allocated based on TSS, COD, and TN. The process used to allocate wastewater treatment and related costs to volume and strength components involved extensive discussions with PCRWRD staff and was based on PCRWRD's wastewater treatment plant processes.

The customer service related cost drivers are classified as account related. Given PCRWRD is a wastewater only utility and has a service fee that is uniform regardless of meter size, all customer related costs are allocated to the account cost driver. Most of the costs included in this category are associated with monies paid to various billing providers for meter reading and billing and collection services.

General and administrative costs were distributed proportionately to each cost driver based on a composite allocation of all other costs. This is a standard approach used in the cost allocation process for allocating overhead related costs proportionately to the cost drivers based on a pro-rata share.

Allocation of O&M Costs to Cost Drivers

Exhibit 4.5 below summarizes the allocation of each of the functionalized O&M expenses to each of the cost drivers. Costs associated with the volume and strength of wastewater are separated from fixed costs (account), which are incurred regardless of the amount of usage by customers.

Exhibit 4.5: O&M Allocation to Cost Drivers

Function	FY 2017	Flow Drivers				Fixed Drivers
		Volume	TSS	COD	TN	Account
Collection	$ 9,997,502	$ 9,997,502	$ -	$ -	$ -	$ -
Conveyance	6,024,744	6,024,744	-	-	-	-
Treatment	35,179,313	7,665,497	8,900,110	14,781,252	3,832,455	-
Laboratory	7,436,922	-	2,528,553	2,454,184	2,454,184	-
Meter	-	-	-	-	-	-
Customer	6,860,557	-	-	-	-	6,860,557
Total: Functional Charges	**$ 65,499,038**	**$ 23,687,743**	**$ 11,428,663**	**$ 17,235,436**	**$ 6,286,639**	**$ 6,860,557**
		36%	*17%*	*26%*	*10%*	*10%*
General & Admin (Allocation)	19,064,769	6,894,778	3,326,535	5,016,709	1,829,849	1,996,899
Total: Functional Charges	**$ 84,563,807**	**$ 30,582,521**	**$ 14,755,198**	**$ 22,252,145**	**$ 8,116,488**	**$ 8,857,456**

The General & Admin function, as shown above, is allocated to the cost drivers based on the proportional relationship of the direct costs by cost driver. For example, 36% of the General & Administrative costs are allocated to Volume based on the Volume related costs in proportion to total costs.

Non-rate revenues (excluding connection fees) of $1.8 million are applied proportionally amongst the cost drivers to arrive at net operating expenses to be recovered from wastewater user charges as identified in **Exhibit 4.6**.

Exhibit 4.6: Reallocation of O&M Expenses to Cost Drivers

Function	FY 2017	Flow Drivers				Fixed Drivers
		Volume	TSS	COD	TN	Account
Determination of Net Operating Revenue Requirements						
Total Operating Expenses	$ 84,563,807	$ 30,582,521	$ 14,755,198	$ 22,252,145	$ 8,116,488	$ 8,857,456
		36%	*17%*	*26%*	*10%*	*10%*
Less Other Revenue	$ (1,810,854)	$ (654,896)	$ (315,969)	$ (476,509)	$ (173,807)	$ (189,674)
Net Operating Expenses	**$ 82,752,953**	**$ 29,927,625**	**$ 14,439,229**	**$ 21,775,636**	**$ 7,942,681**	**$ 8,667,782**
From Sewer User Charges		*36%*	*17%*	*26%*	*10%*	*10%*

Allocation of Capital Costs to Cost Drivers

The functionalized capital assets were allocated to cost drivers in a similar process as O&M functionalized expenses to cost drivers. The results of this process are shown in **Exhibit 4.7**.

Exhibit 4.7: Allocation of Assets to Cost Drivers (1)

		Flow Drivers				Fixed Drivers
Sewer Asset Net Book Value	**Net Book Value**	**Volume**	**TSS**	**COD**	**TN**	**Account**
Collection	$ 314,114,503	$ 314,114,503	$ -	$ -	$ -	$ -
Conveyance	$ 196,848,298	$ 196,848,298	$ -	$ -	$ -	$ -
Treatment	$ 517,361,003	$ 93,059,113	$ 138,743,946	$ 209,238,156	$ 76,319,788	$ -
Lab	$ -	$ -	$ -	$ -	$ -	$ -
Meter	$ -	$ -	$ -	$ -	$ -	$ -
Customer	$ -	$ -	$ -	$ -	$ -	$ -
General & Admin	$ 124,884,361	$ 73,355,193	$ 16,849,701	$ 25,410,842	$ 9,268,625	$ -
Total	$ 1,153,208,165	$ 677,377,106	$ 155,593,648	$ 234,648,997	$ 85,588,413	$ -
		59%	*13%*	*20%*	*7%*	*0%*

(1) No assets were functionalized as lab or customer, and therefore, no costs related to assets or capital expenditures are allocated to cost drivers of these functions. Assets related to lab are categorized in Treatment and were functionalized and allocated within the Treatment cost of service allocation to cost driver.

At this point, the proportional breakdown of assets to cost drivers is used to allocate capital expenditures (including transfers) and connection fee offsetting revenue to cost drivers for net capital expenditures by cost driver.

Exhibit 4.8: Allocation of Capital Expenditures to Cost Drivers

		Flow Drivers				Fixed Drivers
Capital Cost	**FY 2017**	**Volume**	**TSS**	**COD**	**TN**	**Account**
Debt	$ 75,399,344	$ 44,288,439	$ 10,173,063	$ 15,341,879	$ 5,595,963	$ -
Transfers	$ 11,904,396	$ 6,992,463	$ 1,606,170	$ 2,422,247	$ 883,516	$ -
Less Other Revenue	$ (11,572,094)	$ (6,797,274)	$ (1,561,335)	$ (2,354,631)	$ (858,854)	$ -
Total Capital Costs	$ 75,731,646	$ 44,483,628	$ 10,217,898	$ 15,409,494	$ 5,620,626	$ -
		59%	13%	20%	7%	0%

The final step in determining the allocation of capital expenditures to cost drivers involves a reallocation of a specific level of debt service payments to the 'account' cost driver to be included in the service fee calculation. As noted previously, most of PCRWRD's costs are "fixed" in nature, with the only variable costs being commodity related (e.g. energy, chemicals, utilities). PCRWRD must staff and operate its facilities 24 hours a day, seven days a week, and 365 days a year regardless of whether a drop of wastewater is treated. Additionally, PCRWRD has issued a significant amount of debt to finance infrastructure investment to meet regulatory requirements and provide continued, safe, and reliable service to customers, and this debt is a fixed cost. As such, and in an effort to address PCRWRD's prioritized pricing objective of revenue stability, it was determined that approximately half of PCRWRD's test year debt service, or $37 million, was reallocated from the volumetric cost drivers to the fixed cost driver, which ultimately supports an increased service fee, shown in the next section. This amount was identified as it effectively creates a neutral impact on a typical residential customer billed for 7 Ccf of consumption. The reallocation of debt service is presented in **Exhibit 4.9**.

Exhibit 4.9: Reallocation of Debt Service

		Flow Drivers				Fixed Drivers
	FY 2017	Volume	TSS	COD	TN	Account
Total Capital Costs	$ 75,731,646	$ 44,483,628	$ 10,217,898	$ 15,409,494	$ 5,620,626	$ -
		59%	*13%*	*20%*	*7%*	*0%*
Debt Shift to Service Fee		$ (21,733,243)	$ (4,992,130)	$ (7,528,574)	$ (2,746,053)	$ 37,000,000
Revised Allocation	$ 75,731,646	$ 22,750,385	$ 5,225,768	$ 7,880,921	$ 2,874,572	$ 37,000,000

4.3.3 Summary of Costs by Cost Drivers

Exhibit 4.10 presents the allocation of net revenue requirements by cost driver.

Exhibit 4.10: Net Revenue Requirements by Cost Drivers

	FY 2017	Volume	TSS	COD	TN	Account
O&M	$ 82,752,953	$ 29,927,625	$ 14,439,229	$ 21,775,636	$ 7,942,681	$ 8,667,782
Capital	$ 75,731,646	$ 22,750,385	$ 5,225,768	$ 7,880,921	$ 2,874,572	$ 37,000,000
Total	$ 158,484,599	$ 52,678,010	$ 19,664,997	$ 29,656,557	$ 10,817,253	$ 45,667,782
		33%	*12%*	*19%*	*7%*	*29%*

4.3.4 Units of Service

PCRWRD staff provided customer billing information, or units of service, for the test year. In order to determine the amount of strength loadings for each customer class it is necessary to convert the amount of wastewater volume delivered to the amount of solids treated (as measured in lbs.) for each pollutant including TSS, COD, and TN. This conversation requires a mathematical formula that considers the density of pollutant strength within wastewater flow. As discussed in Section 5, PCRWRD monitors strength loading compositions for each customer class through ongoing sampling analyses (see Exhibit 5.3). The results of the sampling analysis are expressed as milligrams of pollutant per liter (mg/L), or parts per million, of wastewater treated. The weight of pollutants in each gallon can then be determined as 1 mg/L = 0.00000083540444320084 lbs. An example of the conversion formula applied to commercial class volume and strength loadings is provided below.

Conversion

1mg/L = 0.00000834540444320084 lbs./gallon

	COD	*TSS*	*TN*
Strength (mg/L) - Commercial (regular)	579	314	72
lbs./gallon	0.004832	0.002620	0.000601
Ccf (per year)	6,193,219	6,193,219	6,193,219
Gallons (per year)	4,632,527,833	4,632,527,833	4,632,527,833
lbs. removed	22,384,324	12,139,340	2,783,543

Exhibit 4.11 presents the estimated number of customer billed volume (Ccf), strength loadings (lbs.), and number of accounts (bills) by customer class for FY 2016-17.

Exhibit 4.11: Units of Service by Customer Class[1]

	Volume Units	Chemical Oxygen Demand	Total Suspended Solids	Total Nitrogen	Customer Units	
	Annual Billed Volume	*Total COD*	*Total TSS*	*Total TN*	*Bills*	Equivalent Bills
Units	(CCF)	(Lbs.)	(Lbs.)	(Lbs.)		(SOS Bills)
Residential						
R - Residential	18,504,916	65,727,691	20,446,048	5,741,065	2,961,819	2,961,819
MF - Multi-family	6,294,140	22,356,183	6,954,384	1,952,728	51,463	51,463
RA - SOS 75%	216,566	769,221	239,283	67,189	3,516	879
RB - SOS 50%	58,564	208,014	64,707	18,169	720	360
RC - SOS 25%	33,676	119,613	37,208	10,448	288	216
SV - Duplex/Triplex	-	-	-	-	-	-
R2 - Vacant Home	38,542	136,897	42,585	11,957	3,228	3,228
Commercial						
Commercial - regular	6,193,219	22,384,324	12,139,340	2,783,543	186,780	186,780
Commercial - large meter	1,728	6,247	3,388	777	144	144
Industrial						-
SA - Auto Body and Fender Repair	15,777	74,359	14,576	6,333	1,363	1,363
SB - Mortuary	3,001	16,186	2,173	1,040	222	222
SC - Laundromat	73,564	376,096	58,779	10,837	603	603
SD - Pet Clinic	12,835	54,082	18,829	5,432	888	888
SE - Restaurant, with seating	372,847	4,917,900	2,141,253	83,555	6,636	6,636
SF - Restaurant, fast food	158,114	1,551,572	224,050	48,265	5,463	5,463
SG - Car wash, self-service	66,424	227,639	34,498	1,824	678	678
SH - Car wash, full-service	73,960	231,304	112,651	3,232	470	470
SI - Bottling company	28,271	648,203	8,171	2,294	157	157
SJ - Printing, copying	8,485	63,984	9,799	1,298	521	521
SK - Electric component manufacturer	44,426	132,006	123,131	18,470	537	537
SL - Industrial laundry	36,642	186,188	55,353	25,252	92	92
SM - Bakery	1,810	66,515	2,813	250	195	195
SN - Miscellaneous food processor	4,324	39,192	4,292	1,371	186	186
SO - Chemical, pharmaceutical	32,764	92,241	40,087	19,880	127	127
SP - Meat packing	3,180	82,440	8,456	1,846	43	43
Builder/Contractor	3,637	-	-	-	2,724	2,724
Total Retail	**32,281,413**	**120,468,097**	**42,785,856**	**10,817,055**	**3,228,863**	**3,225,794**

4.3.5 Determination of Unit Cost of Service

Once each cost category of the test year revenue requirement (i.e. O&M and Capital) has been allocated to the various cost drivers (volume, strength, and account), the unit costs of service can be determined by dividing by the total system units by cost driver. **Exhibit 4.12** summarizes the determination of the unit costs of service.

[1] Equivalent bills are adjusted to account for customers receiving a service fee discount through the Sewer Outreach Subsidy program.

Exhibit 4.12: Unit Cost of Service

		Flow Drivers				Fixed Drivers
	FY 2017	Volume	TSS	COD	TN	Account
O&M	$ 82,752,953	$ 29,927,625	$ 14,439,229	$ 21,775,636	$ 7,942,681	$ 8,667,782
Capital	$ 75,731,646	$ 22,750,385	$ 5,225,768	$ 7,880,921	$ 2,874,572	$ 37,000,000
Total	$ 158,484,599	$ 52,678,010	$ 19,664,997	$ 29,656,557	$ 10,817,253	$ 45,667,782
Units of Service		32,281,413	42,785,856	120,468,097	10,817,055	3,225,794
Unit Cost		$ 1.63	$ 0.46	$ 0.25	$ 1.00	$ 14.16
		Ccf	*lbs.*	*lbs.*	*lbs.*	*Bill*

4.3.6 Determination of Revenue Requirements by Customer Class

Exhibit 4.13 summarizes the allocation of the test year revenue requirements to each of the customer classes. For each customer class, the cost allocation is the total unit cost of service multiplied by the units of service for that class.

Exhibit 4.13: Revenue Requirements by Customer Class

Class	Volume	TSS	COD	TN	Account	Total
Residential						
R - Residential	$ 30,197,011	$ 9,397,299	$ 16,180,691	$ 5,741,171	$ 41,930,671	$ 103,446,841
MF - Multi-family	10,271,012	3,196,335	5,503,593	1,952,764	728,565	$ 21,652,269
RA - SOS 75%	353,400	109,978	189,365	67,190	12,444	$ 732,377
RB - SOS 50%	95,567	29,740	51,208	18,170	5,097	$ 199,782
RC - SOS 25%	54,953	17,101	29,446	10,448	3,058	$ 115,006
SV - Duplex/Triplex	0	0	0	0	0	$ -
R2 - Vacant Home	62,894	19,573	33,701	11,958	45,699	$ 173,825
Commercial						
Commercial - regular	10,106,325	5,579,416	5,510,521	2,783,594	2,644,257	$ 26,624,113
Commercial - large meter	2,821	1,557	1,538	777	2,039	$ 8,731
Industrial						
SA - Auto Body and Fender Repair	25,746	6,699	18,305	6,333	19,296	$ 76,380
SB - Mortuary	4,897	999	3,985	1,040	3,143	$ 14,063
SC - Laundromat	120,044	27,016	92,586	10,838	8,537	$ 259,021
SD - Pet Clinic	20,945	8,654	13,314	5,432	12,571	$ 60,917
SE - Restaurant, with seating	608,426	984,151	1,210,677	83,557	93,946	$ 2,980,758
SF - Restaurant, fast food	258,016	102,977	381,962	48,265	77,340	$ 868,561
SG - Car wash, self-service	108,393	15,856	56,040	1,824	9,598	$ 191,712
SH - Car wash, full-service	120,691	51,776	56,942	3,232	6,654	$ 239,294
SI - Bottling company	46,134	3,755	159,573	2,294	2,223	$ 213,979
SJ - Printing, copying	13,846	4,504	15,751	1,298	7,376	$ 42,775
SK - Electric component manufacturer	72,496	56,593	32,497	18,470	7,602	$ 187,658
SL - Industrial laundry	59,794	25,441	45,835	25,253	1,302	$ 157,625
SM - Bakery	2,954	1,293	16,375	250	2,761	$ 23,632
SN - Miscellaneous food processor	7,056	1,973	9,648	1,371	2,633	$ 22,681
SO - Chemical, pharmaceutical	53,466	18,424	22,708	19,880	1,798	$ 116,276
SP - Meat packing	5,189	3,887	20,295	1,846	609	$ 31,826
Builder/Contractor	5,934	0	0	0	38,564	$ 44,498
Total: Cost of Service	**$ 52,678,010**	**$ 19,664,997**	**$ 29,656,557**	**$ 10,817,253**	**$ 45,667,782**	**$ 158,484,599**

5. RATE DESIGN

5.1 RATE SCENARIOS

The cost of service analysis determines the revenue required from each customer class, and rate design is the process of determining how each class should pay. As part of the rate design process, six rate structure alternatives were developed in addition to the existing structure to evaluate the most appropriate rate structure that aligns with current utility pricing objectives.

5.2 EXISTING RATE STRUCTURE

PCRWRD recovers the cost of operating the utility via volumetric rates and monthly fixed charges. **Exhibit 5.1** indicates the existing rate structure and current rates.

Exhibit 5.1: Existing User Charges

Rate Structure			
Class Name	Billing Class	Service Fee	Volumetric Rate
Residential	R	$12.63	$3.52
Income Reduced Residential	RA	3.16	0.88
Income Reduced Residential	RB	6.32	1.76
Income Reduced Residential	RC	9.47	2.64
Multi-Family	MF	12.63	3.52
Commercial	C	12.63	3.52
Industrial	SA - SP	12.63	3.52

The monthly service fee (fixed charge) is the same for customers of all meter sizes, except for the residential customers in the sewer outreach subsidy (SOS) program. These customers pay a charge that is set based on their income in relation to the Federal Poverty Level (FPL) structured around three levels of discount (25%, 50%, and 75%). The volumetric rate is uniform and based on a customer's metered water consumption. The consumption is currently limited to the average winter water usage, taken from the months of December, January, and February for all customers. Volumetric rates are then multiplied by a high strength factor for each customer class to account for wastewater strength. The current high strength factors are shown below in **Exhibit 5.2**.

Exhibit 5.2: FY 2016 High Strength Factors

CURRENT HIGH STRENGTH FACTOR (HSF)	
CLASSIFICATION	**HSF Current**
Single-Family Residential	**1.00**
Multi-Family Residential	**1.00**
Commercial	**1.00**
Printing; copying	**1.01**
Industrial laundry	**1.06**
Mortuary	**1.09**
Laundromat	**1.09**
Electrical component manufacturer	**1.14**
Car wash, self-service	**1.19**
Pet clinic	**1.20**
Car wash, full service	**1.23**
Chemical, pharmaceutical, paint manufacturing	**1.25**
Bottling company	**1.68**
Restaurant, with seating and china	**2.03**
Auto body and fender repair	**2.10**
Restaurant, fast food	**2.32**
Miscellaneous food processor	**2.33**
Meat packing; tallow processing	**2.38**
Bakery	**3.63**

For example, the bill calculation for both a bakery and pet clinic using an average of 7 ccf are as follows:

1. Bakery: $12.63 + (7ccf*$3.523*3.63) = $102.15
2. Pet clinic: $12.63 + (7ccf*$3.523*1.20) = $42.22

As noted previously, one of the elements of this Study was to identify and prioritize PCRWRD's most important objectives in pricing wastewater services, to determine whether its current rate structure meets these objectives or whether changes to the structure may be appropriate. Through discussions and workshops with PCF & RM staff and PCRWRD representatives, focus was placed on certain objectives including, in particular, revenue stability, simple to understand and update, consistency with cost of service principles, and affordability.

This existing rate structure has been in place for many years and is consistent with industry standards and practices. The addition of the SOS program has helped address affordability objectives by providing assistance to eligible customers with their utility bill. The service fee provides a certain level of revenue stability, but, as will be discussed in more detail in Section 5.3, PCRWRD would like to consider rate structure options that increase its fixed cost recovery to help address revenue recovery challenges associated with declining per capita consumption. While using average winter water consumption is common industry practice in approximating wastewater returned to the system for treatment, it limits a customer's control of their bill and can be contrary to conservation objectives for three-quarters of the year. An alternative for consideration is billing based on actual water consumption with a return factor (e.g. 80-90%), which recognizes not all water is returned to

the wastewater system but maintains a customer's ability to impact their bill through lower consumption the entire year. The current number of customer classes provides a significant level of granularity as it relates to cost equity. However, the existing structure's 16 separate classes for commercial high strength and industrial customers is complex and administratively burdensome, particularly as it relates to accurately maintaining appropriate customer classifications when account turnover occurs. As a result, PCRWRD would like to consider more simplified structures to improve customer understanding and acceptance and reduce billing complexity while maintaining consistency with cost of service principles.

5.2.1 Updated Sampling and High Strength Factors

PCRWRD continues to monitor strength loadings from customers, especially those that have a high strength surcharge (factor) applied. Recent sampling data conducted by PCRWRD staff in 2013 and 2015 along with the results of the cost of service analysis were used to update the wastewater high strength factors by customer class.

In 2015, PCRWRD staff conducted wastewater strength sampling on various types of commercial establishments including commercial plazas with no high strength users, commercial plazas with high strength users, indoor shopping malls, breweries, hospitals, hotels, and others. Of particular interest were commercial plazas with high strength users that are billed through a master meter. Currently, these customers are billed at the same volumetric rate as residential customers yet there can be many different types of commercial customers beyond the master meter, including restaurants, for example, that would currently be charged a high strength factor if they were an independently metered customer. This creates an economic equality issue among directly-competing business.

Sampling wastewater from commercial plazas or other types of commercial establishments can present challenges and produce results with significant variability due to the timing of the sample, level of flow, and other factors. The process used by PCRWRD staff identified certain commercial customers where a grab sample could be taken on three consecutive days. A three-day average was then used to determine the concentration of wastewater pollutants by category of strength. While the variability of the results and limited sample size did not produce statistically significant results, generally speaking, the results were consistent with the commonly accepted wastewater industry principle that commercial customers produce wastewater with higher concentrations of pollutants compared to residential customers, and higher strength wastewater is more expensive to treat. One of the primary reasons higher strength wastewater is more expensive to treat is due to the additional power and chemical costs incurred to remove higher concentrations, or lbs., of pollutants in wastewater during the treatment process. For example, power is used to pump oxygen in the aeration process to support bacteria in breaking down the organic matter in wastewater. Higher levels of organic matter require more oxygen (and power) to clean the wastewater. The following chart presents the results of PCRWRD staff's 2015 sampling based on the average strength of commercial plazas with no high strength users (commercial only), commercial plazas with high strength users (commercial mixed), and all customer samples (all inclusive).

Commercial Only (No High Strength Users) 38 Business Represented			
	COD	TSS	TN
Average	579	314	72

Commercial Mixed 50 Business Represented			
	COD	TSS	TN
Average	1,779	814	76

All Inclusive Commercial 500 – 1,000 Businesses Represented			
	COD	TSS	TN
Average	1,316	287	49

Through discussion with PCRWRD staff, and in recognition of the variability in the sampling results, it was determined that it was appropriate to use the most conservative (lowest) estimate of combined wastewater strength (COD, TSS, and TN) for the general commercial class, which is the sampling data excluding high strength users. As a result, the average strength of commercial plazas with no high strength users (commercial only) was used as a proxy for commercial wastewater strength.

Exhibit 5.3 provides wastewater strength sampling results from PCRWRD's most recent analysis and **Exhibit 5.4** shows the existing and revised (Calculated) high strength factors. The high strength factors are calculated by dividing the combined volume, COD, TSS, and TN revenue requirements, or volumetric revenue requirement, for each customer class by the billable volume for each customer class, respectively. The resulting unit cost is then divided by the residential unit cost, to calculate the high strength factor. For example, as seen in Exhibit 4.13, the volumetric revenue requirement for single-family residential customers is $61,516,170 ($103,446,841 - $41,930,671 = $61,516,170). This amount is then divided by single-family residential billable volume of 18,504,916 Ccf, which results in a unit cost of $3.32 per Ccf. The volumetric revenue requirement for commercial customers (regular) is $23,979,856 ($26,624,113 - $2,644,257 = $23,979,856). This amount is then divided by commercial (regular) volume of 6,193,219 Ccf, which results in a unit cost of $3.87 per Ccf. The ratio of the commercial unit cost to the single-family residential unit cost is 1.16 ($3.87 / $3.32 = 1.16) Additional detail is provided in the attached Appendix.

Exhibit 5.3: Wastewater Sampling Data

	COD	TSS	TN
Strength Assignments			
Residential	569	177	50
Commercial	579	314	72
SA - Auto Body and Fender Repair	755	148	64
SB - Mortuary	864	116	56
SC - Laundromat	819	128	24
SD - Pet Clinic	675	235	68
SE - Restaurant, with seating	2,113	920	36
SF - Restaurant, fast food	1,572	227	49
SG - Car wash, self-service	549	83	4
SH - Car wash, full-service	501	244	7
SI - Bottling company	3,673	46	13
SJ - Printing, copying	1,208	185	25
SK - Electric component manufacturer	476	444	67
SL - Industrial laundry	814	242	110
SM - Bakery	5,887	249	22
SN - Miscellaneous food processor	1,452	159	51
SO - Chemical, pharmaceutical	451	196	97
SP - Meat packing	4,153	426	93

Exhibit 5.4: High Strength Factor Analysis

				Caculation Detail			
Class	Current	Calculated	*% Difference*	Volumetric Revenue Requirement	Volume	Unit Cost	Caculated HSF
R - Single-Family Residential	1.00	1.00	*0.0%*	$ 61,516,170	18,504,916	$ 3.32	1.00
MF - Multi-Family Residential	1.00	1.00	*0.0%*	$ 20,923,704	6,294,140	$ 3.32	1.00
C - Commercial	1.00	1.16	*16.4%*	$ 23,979,856	6,193,219	$ 3.87	1.16
SA - Auto Body and Fender Repair	2.10	1.09	*-48.2%*	$ 57,084	15,777	$ 3.62	1.09
SB - Mortuary	1.09	1.09	*0.4%*	$ 10,920	3,001	$ 3.64	1.09
SC - Laundromat	1.09	1.02	*-6.0%*	$ 250,484	73,564	$ 3.40	1.02
SD - Pet Clinic	1.20	1.13	*-5.6%*	$ 48,345	12,835	$ 3.77	1.13
SE - Restaurant, with seating	2.03	2.33	*14.7%*	$ 2,886,811	372,847	$ 7.74	2.33
SF - Restaurant, fast food	2.32	1.51	*-35.1%*	$ 791,221	158,114	$ 5.00	1.51
SG - Car wash, self-service	1.19	0.82	*-30.7%*	$ 182,113	66,424	$ 2.74	0.82
SH - Car wash, full-service	1.23	0.95	*-23.1%*	$ 232,640	73,960	$ 3.15	0.95
SI - Bottling company	1.68	2.25	*34.1%*	$ 211,757	28,271	$ 7.49	2.25
SJ - Printing, copying	1.01	1.25	*24.3%*	$ 35,399	8,485	$ 4.17	1.25
SK - Electric component manufacturer	1.14	1.22	*6.9%*	$ 180,056	44,426	$ 4.05	1.22
SL - Industrial laundry	1.06	1.28	*21.1%*	$ 156,323	36,642	$ 4.27	1.28
SM - Bakery	3.63	3.47	*-4.4%*	$ 20,871	1,810	$ 11.53	3.47
SN - Miscellaneous food processor	2.33	1.39	*-40.1%*	$ 20,048	4,324	$ 4.64	1.39
SO - Chemical, pharmaceutical	1.25	1.05	*-15.9%*	$ 114,478	32,764	$ 3.49	1.05
SP - Meat packing	2.38	2.95	*24.1%*	$ 31,217	3,180	$ 9.82	2.95

As seen above, there are several changes in the calculated high strength factors based on more recent sampling data and updated cost allocations. In general, the calculated high strength factors show an increase for some customer classes and a decrease for other customer classes. Of particular note the calculated high strength factor for the commercial class of 1.16 is 16% higher than its current high

strength factor of 1.0. This suggests a higher cost of service for commercial customers when compared to residential customers.

The cost of service analysis used PCRWRD's most conservative wastewater sampling data for determining the strength of commercial wastewater. As a point of comparison, RFC in collaboration with the American Water Works Association (AWWA) has produced a bi-annual, national water and wastewater rate survey (Rate Survey) for more than 20 years. The Rate Survey has been used extensively by numerous utilities and other industry stakeholders in benchmarking utility rates, rate methodologies, and rate trends. **Exhibit 5.5** presents information taken from the 2016 Rate Survey showing a comparison of residential and commercial wastewater customers with a 5/8-inch meter billed for the same amount of consumption (3,000 cubic feet) for all wastewater utilities and two sub-groups of wastewater utilities in the western region of the United States. The commercial customer group represents customers categorized as non-manufacturing/commercial. Since the Rate Survey is self-reporting, and there is no breakdown of the specific types of customers included, it is possible similar high strength commercial customers (as defined by PCRWRD) could be categorized as non-manufacturing/commercial. However, the Rate Survey also includes a customer category of commercial/light industrial. If a responding utility identified high strength commercial customers, it is not unreasonable to assume they would be classified as commercial/light industrial. As seen below, although the results by individual utilities vary, which is due to rate structure differences, the sample data sets show that commercial customers pay on average approximately 20-40% more than comparable residential customers.

Exhibit 5.5: 2016 RFC Survey Data

	Wastewater Charge 5/8-Inch Meter		
	Residential 3,000 cf (22,440 gal)	Non-mfg./ Commercial 3,000 cf (22,440 gal)	Percent Difference of Commercial to Residential Customer Bill
All Wastewater Utilities			
Average	$106.38	$126.66	19.1%
Median	$94.78	$113.51	19.8%
Number of Systems	176	170	
Pima County, AZ (existing)	**$118.23**	**$118.23**	**0.0%**
California, Nevada and Arizona Utilities			
San Diego, CA	$123.28	$166.16	34.8%
Oakland, CA	$23.20	$43.73	88.5%
San Francisco, CA	$304.64	$174.23	-42.8%
Palo Alto, CA	$31.95	$184.80	478.4%
Henderson, NV	$25.78	$57.81	124.2%
Scottsdale, AZ	$62.02	$63.59	2.5%
Glendale, AZ	$89.09	$72.48	-18.6%
Santa Rosa, CA	$76.55	$322.54	321.3%
North Las Vegas, NV	$43.94	$119.91	172.9%
Palm Desert, CA	$24.50	$32.10	31.0%
Peoria, AZ	$55.55	$55.55	0.0%
Bellevue, WA	$165.33	$275.10	66.4%
Yuma, AZ	$34.45	$63.23	83.5%
Santa Barbara, CA	$45.36	$97.80	115.6%
Rio Rancho , NM	$230.30	$230.30	0.0%
South Lake Tahoe, CA	$35.34	$36.72	3.9%
Gallup, NM	$97.80	$97.80	0.0%
La Crescenta, CA	$33.75	$123.10	264.7%
Running Springs, CA	$63.28	$86.71	37.0%
Hollister, CA	$265.13	$364.20	37.4%
Average	$91.56	$133.39	45.7%
Median	$58.78	$97.80	66.4%
Number of Systems	20	20	

	Wastewater Charge 5/8-Inch Meter		
	Residential 3,000 cf (22,440 gal)	Non-mfg./ Commercial 3,000 cf (22,440 gal)	Percent Difference of Commerci to Residentia Customer Bi
Western Utilities			
San Diego, CA	$123.28	$166.16	34.8%
San Antonio, TX	$92.92	$86.07	-7.4%
Fort Worth, TX	$111.20	$136.10	22.4%
Austin , TX	$223.27	$218.09	-2.3%
El Paso, TX	$50.54	$56.50	11.8%
Oakland, CA	$23.20	$43.73	88.5%
San Francisco, CA	$304.64	$174.23	-42.8%
Salt Lake City, UT	$53.40	$96.00	79.8%
Palo Alto, CA	$31.95	$184.80	478.4%
Tacoma, WA	$151.79	$182.74	20.4%
Henderson, NV	$25.78	$57.81	124.2%
Plano, TX	$119.11	$119.11	0.0%
Scottsdale, AZ	$62.02	$63.59	2.5%
Irving, TX	$69.81	$71.82	2.9%
Glendale, AZ	$89.09	$72.48	-18.6%
Waco, TX	$87.29	$87.29	0.0%
Tyler, TX	$29.81	$56.22	88.6%
Santa Rosa, CA	$76.55	$322.54	321.3%
North Las Vegas, NV	$43.94	$119.91	172.9%
Round Rock, TX	$89.34	$89.34	0.0%
Palm Desert, CA	$24.50	$32.10	31.0%
Denton, TX	$100.71	$139.32	38.3%
Peoria, AZ	$55.55	$55.55	0.0%
Bellevue, WA	$165.33	$275.10	66.4%
Carrollton, TX	$52.55	$52.55	0.0%
Springfield, OR	$165.09	$184.02	11.5%
Yuma, AZ	$34.45	$63.23	83.5%
Santa Barbara, CA	$45.36	$97.80	115.6%
Longview, TX	$90.94	$90.94	0.0%
Cheyenne, WY	$55.52	$159.51	187.3%
Grants Pass, OR	$29.00	$97.35	235.7%
Bend, OR	$133.64	$174.94	30.9%
Kenmore, WA	$141.08	$185.78	31.7%
San Marcos, TX	$165.69	$165.69	0.0%
Rio Rancho , NM	$230.30	$230.30	0.0%
Albany, OR	$116.43	$227.15	95.1%
South Lake Tahoe, CA	$35.34	$36.72	3.9%
Southlake, TX	$56.16	$87.48	55.8%
Gallup, NM	$97.80	$97.80	0.0%
Benbrook, TX	$50.08	$147.58	194.7%
Milwaukie, OR	$118.81	$277.71	133.7%
La Crescenta, CA	$33.75	$123.10	264.7%
Mukilteo, WA	$61.86	$190.17	207.4%
Canyon , TX	$26.30	$105.50	301.1%
Running Springs, CA	$63.28	$86.71	37.0%
Hollister, CA	$265.13	$364.20	37.4%
Average	$92.90	$133.76	44.0%
Median	$73.18	$112.31	53.5%
Number of Systems	46	46	

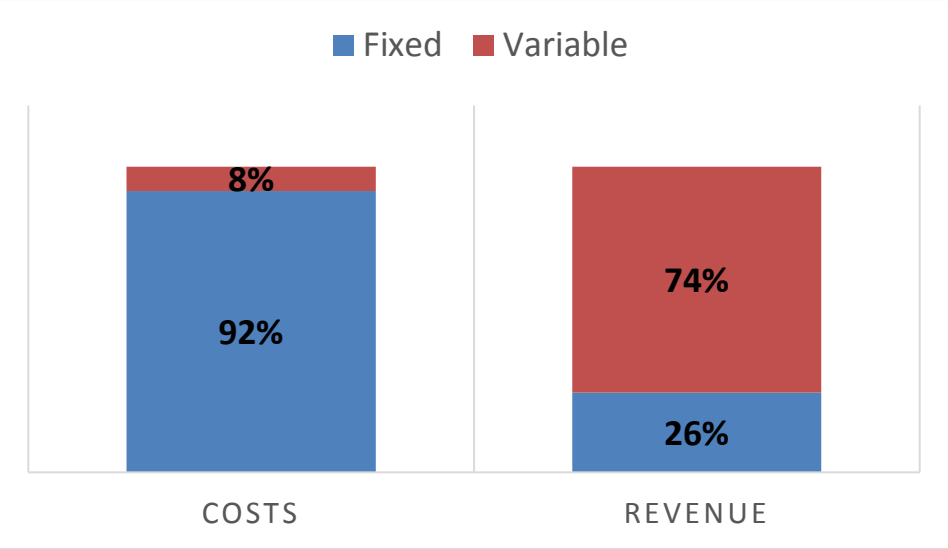
5.3 CONCEPTUAL DESIGN OF ALTERNATIVE RATE STRUCTURES

Alternative rate structures were developed to modify the existing rate structure to address PCRWRD's primary pricing objectives, such as revenue stability, simple to understand and update, and consistency with cost of service principles.

5.3.1 Revenue Stability

One of the key issues for PCRWRD is revenue stability. PCRWRD's costs are primarily fixed, and yet revenue is recovered predominantly through volumetric rates. Based on a high-level review by RFC staff, **Exhibit 5.6** indicates PCRWRD's approximate fixed and variable costs and fixed and variable revenue recovery. As shown, most utility costs are fixed (e.g. debt service and personnel expenditures), while only a few vary with the amount of water consumed and wastewater discharged (e.g. chemicals and power)[2]. The wastewater utility must function 24 hours a day, 7 days a week, and 365 days a year regardless of the amount of wastewater delivered. However, like most wastewater utilities, the majority of PCRWRD's revenues are recovered volumetrically, which creates an imbalance between utility cost incurrence and revenue recovery. Thus, the wastewater industry is moving toward higher fixed fees to increase revenue stability, especially as per capita usage declines, utilities become more leveraged, and debt service becomes a larger portion of annual costs. To help address this issue, PCRWRD requested rate structure options that increased fixed cost recovery through the service fee in a transition to bring more balance to revenue recovery and increase, or enhance, revenue stability. Each of the six alternative rate structures in this study increase fixed revenue recovery.

Exhibit 5.6: Fixed versus Variable Analysis



[2] For the purpose of this analysis, variable costs include chemicals, utilities, energy, waste disposal, and recycling.

5.3.2 Simple to Understand and Consistent with Cost of Service Principles

The existing rate structure with 16 separate classes for commercial high strength and industrial customers is complex, administratively burdensome, significantly problematic from a billing standpoint, and creates challenges in communication with customers. PCRWRD requested options that consolidated the number of classes to improve customer understanding and acceptance and reduce billing complexity, while still maintaining consistency with cost of service principles by recognizing the additional cost of treating higher strength wastewater. This is modeled in all the alternatives.

5.4 ALTERNATIVE RATE DESIGN

Six alternatives were developed based on current pricing objectives and staff recommendations.

5.4.1 Alternative 1

Alternative 1 incorporates a re-allocation of costs previously recovered by volumetric rates to recovery by service fees to improve revenue stability. For the volumetric rates, single-family and multi-family residential customers would be charged the same rate, while commercial and industrial customers would be consolidated into two different subclasses, with the goal of simplifying the volumetric rate structure.

5.4.2 Alternative 2

Alternative 2 was developed based on similar reasoning as alternative 1, with one notable exception: commercial and industrial customers are split into four categories rather than two. The categories are based on new sampling data and re-calculated high strength factors and represent an average wastewater strength for various customer groupings. This alternative provides slightly more granularity in classifying commercial and industrial customers when compared to alternative 1. The same approach to developing the service fee would be applied in this alternative as alternative 1.

5.4.3 Alternative 3

Alternative 3 was designed to recover 100% of costs allocated to the single-family residential customer class through a flat monthly fixed fee. For multi-family residential and non-residential customers, the same approach and structure as alternative 2 was applied, including the service fee and the four volumetric subclasses.

5.4.4 Alternative 4

Alternative 4 was developed to recover 100% of the utility's fixed costs through the monthly service fee, uniform for all classes, which would raise the monthly service to $45.23. A small volumetric rate would be applied to customer class demand in this rate structure, which would be implemented in the same manner as alternative 2. This option is for demonstration purposes and is not a RFC recommendation.

5.4.5 *Alternative 5*

Alternative 5 is a hybrid of alternative 1. The only difference is rather than having two volumetric rates for commercial and high strength commercial/industrial classes, these two were consolidated into one class and one volumetric rate. Single-family residential and multi-family residential would be charged the same rate. The same approach to developing the service fee for increased fixed revenue recovery would be applied in this alternative as alternative 1.

5.4.6 *Alternative 6*

Alternative 6 is a hybrid of Alternative 3. Single-family residential customers would pay a flat monthly fixed fee, but all the commercial and high strength commercial/ industrial classes are consolidated into one class with one uniform volumetric rate. Additionally, multi-family residential would have a separate volumetric rate that would reflect a lower strength loading than the commercial/industrial class.

5.5 SUMMARY OF ALTERNATIVES

5.5.1 *Alternative Rates*

Based on the COS results in Section 4 and the rate design features detailed above, service fees and volumetric rates were calculated for each of the alternatives. These fees, rates, and corresponding high strength factors are provided in **Exhibit 5.7**. For illustrative purposes, the consolidation of commercial and high strength customer classes is illustrated using color-coding.

Exhibit 5.7: Rate Design Scenarios

Service Fee	Current	Calculated	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
R - Residential	$12.63	$14.16	$14.16	$14.16	$35.28	$45.23	$14.16	$35.28
All Other Classes	$12.63	$14.16	$14.16	$14.16	$14.14	$45.23	$14.16	$14.14

Volumetric Rate (Ccf)								
R - Residential	$3.52	$3.34	$3.33	$3.34	*NA*	$0.37	$3.35	*NA*
MF - Multi-Family Residential	$3.52	$3.34	$3.33	$3.34	$3.33	$0.37	$3.35	$3.32
C - Commercial	$3.52	$3.89	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SA - Auto Body and Fender Repair	$7.40	$3.64	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SB - Mortuary	$3.84	$3.66	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SC - Laundromat	$3.84	$3.42	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SD - Pet Clinic	$4.23	$3.79	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SG - Car wash, self-service	$4.19	$3.34	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SH - Car wash, full-service	$4.33	$3.34	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SJ - Printing, copying	$3.56	$4.07	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SK - Electric component manufacturer	$4.02	$4.07	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SL - Industrial laundry	$3.73	$4.29	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SO - Chemical, pharmaceutical	$4.40	$3.51	$3.86	$3.88	$3.86	$0.43	$4.10	$4.10
SF - Restaurant, fast food	$8.17	$5.03	$7.66	$4.85	$4.82	$0.54	$4.10	$4.10
SN - Miscellaneous food processor	$8.21	$4.66	$7.66	$4.85	$4.82	$0.54	$4.10	$4.10
SE - Restaurant, with seating	$7.15	$7.77	$7.66	$7.66	$7.61	$0.85	$4.10	$4.10
SI - Bottling company	$5.92	$7.52	$7.66	$7.66	$7.61	$0.85	$4.10	$4.10
SM - Bakery	$11.63	$11.57	$7.66	$10.70	$10.64	$1.19	$4.10	$4.10
SP - Meat packing	$8.38	$9.85	$7.66	$10.70	$10.64	$1.19	$4.10	$4.10

Class	Current	Calculated	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
R - Single-Family Residential	1.00	1.00	1.00	1.00	NA	1.00	1.00	NA
MF - Multi-Family Residential	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C - Commercial	1.00	1.16	1.16	1.16	1.16	1.16	1.22	1.23
SA - Auto Body and Fender Repair	2.10	1.09	1.16	1.16	1.16	1.16	1.22	1.23
SB - Mortuary	1.09	1.09	1.16	1.16	1.16	1.16	1.22	1.23
SC - Laundromat	1.09	1.02	1.16	1.16	1.16	1.16	1.22	1.23
SD - Pet Clinic	1.20	1.13	1.16	1.16	1.16	1.16	1.22	1.23
SG - Car wash, self-service	1.19	1.00	1.16	1.16	1.16	1.16	1.22	1.23
SH - Car wash, full-service	1.23	1.00	1.16	1.16	1.16	1.16	1.22	1.23
SJ - Printing, copying	1.01	1.22	1.16	1.16	1.16	1.16	1.22	1.23
SK - Electric component manufacturer	1.14	1.22	1.16	1.16	1.16	1.16	1.22	1.23
SL - Industrial laundry	1.06	1.28	1.16	1.16	1.16	1.16	1.22	1.23
SO - Chemical, pharmaceutical	1.25	1.05	1.16	1.16	1.16	1.16	1.22	1.23
SF - Restaurant, fast food	2.32	1.50	2.30	1.45	1.45	1.45	1.22	1.23
SN - Miscellaneous food processor	2.33	1.39	2.30	1.45	1.45	1.45	1.22	1.23
SE - Restaurant, with seating	2.03	2.33	2.30	2.29	2.29	2.29	1.22	1.23
SI - Bottling company	1.68	2.25	2.30	2.29	2.29	2.29	1.22	1.23
SM - Bakery	3.63	3.46	2.30	3.20	3.20	3.20	1.22	1.23
SP - Meat packing	2.38	2.95	2.30	3.20	3.20	3.20	1.22	1.23

5.5.2 Residential Bill Impacts

Exhibit 5.8 presents the residential customer monthly bill comparison for the six alternatives, assuming a customer with a 5/8" meter at various levels of winter-average consumption. The impacts are expressed in percentage terms.

Exhibit 5.8: Residential Monthly Bill Impacts: Percentage Change

Volume (Ccf)	Current Bill	Alternative 1	*% Change*	Alternative 2	*% Change*	Alternative 3	*% Change*	Alternative 4	*% Change*	Alternative 5	*% Change*	Alternative 6	*% Change*
0	$12.63	$14.16	*12%*	$14.16	*12%*	$35.28	*179%*	$45.23	*258%*	$14.16	*12%*	$35.28	*179%*
1	$16.15	$17.49	*8%*	$17.50	*8%*	$35.28	*118%*	$45.60	*182%*	$17.51	*8%*	$35.28	*118%*
2	$19.68	$20.82	*6%*	$20.84	*6%*	$35.28	*79%*	$45.98	*134%*	$20.86	*6%*	$35.28	*79%*
3	$23.20	$24.15	*4%*	$24.19	*4%*	$35.28	*52%*	$46.35	*100%*	$24.21	*4%*	$35.28	*52%*
4	$26.72	$27.48	*3%*	$27.53	*3%*	$35.28	*32%*	$46.72	*75%*	$27.56	*3%*	$35.28	*32%*
5	$30.25	$30.81	*2%*	$30.87	*2%*	$35.28	*17%*	$47.10	*56%*	$30.91	*2%*	$35.28	*17%*
6	$33.77	$34.14	*1%*	$34.21	*1%*	$35.28	*4%*	$47.47	*41%*	$34.27	*1%*	$35.28	*4%*
7	$37.29	$37.47	*0%*	$37.56	*1%*	$35.28	*-5%*	$47.84	*28%*	$37.62	*1%*	$35.28	*-5%*
8	$40.81	$40.80	*0%*	$40.90	*0%*	$35.28	*-14%*	$48.21	*18%*	$40.97	*0%*	$35.28	*-14%*
9	$44.34	$44.13	*0%*	$44.24	*0%*	$35.28	*-20%*	$48.59	*10%*	$44.32	*0%*	$35.28	*-20%*
10	$47.86	$47.46	*-1%*	$47.59	*-1%*	$35.28	*-26%*	$48.96	*2%*	$47.67	*0%*	$35.28	*-26%*
15	$65.48	$64.12	*-2%*	$64.30	*-2%*	$35.28	*-46%*	$50.82	*-22%*	$64.42	*-2%*	$35.28	*-46%*
20	$83.09	$80.77	*-3%*	$81.01	*-2%*	$35.28	*-58%*	$52.68	*-37%*	$81.18	*-2%*	$35.28	*-58%*

In **Exhibit 5.9**, the impacts of the same monthly bills for the six alternatives are expressed in dollar terms.

Exhibit 5.8=9: Residential Monthly Bill Impacts: Dollar Change

Volume (Ccf)	Current Bill	Alternative 1	$ Change	Alternative 2	$ Change	Alternative 3	$ Change	Alternative 4	$ Change	Alternative 5	$ Change	Alternative 6	$ Change
0	$12.63	$14.16	$ 1.53	$14.16	$ 1.53	$35.28	$ 22.65	$45.23	$ 32.60	$14.16	$ 1.53	$35.28	$ 22.65
1	$16.15	$17.49	$ 1.33	$17.50	$ 1.35	$35.28	$ 19.13	$45.60	$ 29.45	$17.51	$ 1.36	$35.28	$ 19.13
2	$19.68	$20.82	$ 1.14	$20.84	$ 1.17	$35.28	$ 15.60	$45.98	$ 26.30	$20.86	$ 1.19	$35.28	$ 15.60
3	$23.20	$24.15	$ 0.95	$24.19	$ 0.99	$35.28	$ 12.08	$46.35	$ 23.15	$24.21	$ 1.01	$35.28	$ 12.08
4	$26.72	$27.48	$ 0.76	$27.53	$ 0.81	$35.28	$ 8.56	$46.72	$ 20.00	$27.56	$ 0.84	$35.28	$ 8.56
5	$30.25	$30.81	$ 0.57	$30.87	$ 0.63	$35.28	$ 5.04	$47.10	$ 16.86	$30.91	$ 0.67	$35.28	$ 5.04
6	$33.77	$34.14	$ 0.37	$34.21	$ 0.45	$35.28	$ 1.51	$47.47	$ 13.70	$34.27	$ 0.50	$35.28	$ 1.51
7	$37.29	$37.47	$ 0.18	$37.56	$ 0.27	$35.28	$ (2.01)	$47.84	$ 10.55	$37.62	$ 0.33	$35.28	$ (2.01)
8	$40.81	$40.80	$ (0.01)	$40.90	$ 0.09	$35.28	$ (5.53)	$48.21	$ 7.40	$40.97	$ 0.15	$35.28	$ (5.53)
9	$44.34	$44.13	$ (0.20)	$44.24	$ (0.09)	$35.28	$ (9.06)	$48.59	$ 4.25	$44.32	$ (0.02)	$35.28	$ (9.06)
10	$47.86	$47.46	$ (0.40)	$47.59	$ (0.27)	$35.28	$ (12.58)	$48.96	$ 1.10	$47.67	$ (0.19)	$35.28	$ (12.58)
15	$65.48	$64.12	$ (1.36)	$64.30	$ (1.18)	$35.28	$ (30.20)	$50.82	$ (14.66)	$64.42	$ (1.05)	$35.28	$ (30.20)
20	$83.09	$80.77	$ (2.32)	$81.01	$ (2.08)	$35.28	$ (47.81)	$52.68	$ (30.41)	$81.18	$ (1.91)	$35.28	$ (47.81)

5.5.3 Non-Residential Bill Impacts

Exhibit 5.9=10 presents the non-residential customer monthly bill comparison for the six alternatives, assuming customer monthly bills at the average level of metered water consumption for the respective class of commercial customers. It should be noted that commercial and industrial customers exhibit wide ranges of monthly consumption. For example, there are many commercial customers with lower levels of consumption more commensurate with residential customers. The impacts are expressed in percentage terms.

Exhibit 5.10: Commercial Monthly Bill Impacts: Percentage Change

Class	Average Volume [Ccf]	Current Bill	Alternative 1	% Change	Alternative 2	% Change	Alternative 3	% Change	Alternative 4	% Change	Alternative 5	% Change	Alternative 6	% Change
Commercial														
Commercial - regular	41.9	$160.10	$175.89	10%	$176.55	10%	$175.88	10%	$63.25	-60%	$185.60	16%	$185.58	16%
Commercial HS/Industrial														
SA - Auto Body and Fender Repair	11.6	$98.27	$58.88	-40%	$59.06	-40%	$58.92	-40%	$50.25	-49%	$61.57	-37%	$61.55	-37%
SB - Mortuary	13.5	$64.54	$66.39	3%	$66.60	3%	$66.32	3%	$51.08	-21%	$69.52	8%	$69.50	8%
SC - Laundromat	122.0	$481.11	$485.52	1%	$487.44	1%	$470.91	-2%	$97.98	-80%	$513.81	7%	$513.79	7%
SD - Pet Clinic	14.5	$73.74	$70.00	-5%	$70.23	-5%	$69.93	-5%	$51.48	-30%	$73.36	-1%	$73.34	-1%
SG - Car wash, self-service	98.0	$423.36	$392.69	-7%	$394.23	-7%	$392.31	-7%	$87.60	-79%	$415.41	-2%	$415.39	-2%
SH - Car wash, full-service	157.4	$694.52	$622.15	-10%	$624.63	-10%	$621.56	-11%	$113.28	-84%	$658.65	-5%	$658.63	-5%
SJ - Printing, copying	16.3	$70.58	$77.08	9%	$77.34	10%	$77.00	9%	$52.27	-26%	$80.86	15%	$80.84	15%
SK - Electric component manufacturer	82.7	$344.89	$333.80	-3%	$335.10	-3%	$333.48	-3%	$81.01	-77%	$352.99	2%	$352.97	2%
SL - Industrial laundry	398.3	$1,499.97	$1,553.00	4%	$1,559.28	4%	$1,537.37	2%	$217.45	-86%	$1,645.37	10%	$1,645.35	10%
SO - Chemical, pharmaceutical	258.0	$1,148.73	$1,010.93	-12%	$1,015.00	-12%	$995.82	-13%	$156.79	-86%	$1,070.76	-7%	$1,070.74	-7%
SF - Restaurant, fast food	28.9	$249.19	$235.88	-5%	$154.51	-38%	$139.50	-44%	$60.88	-76%	$132.70	-47%	$132.68	-47%
SN - Miscellaneous food processor	23.2	$203.46	$192.25	-6%	$126.89	-38%	$126.19	-38%	$57.80	-72%	$109.37	-46%	$109.35	-46%
SE - Restaurant, with seating	56.2	$414.45	$444.58	7%	$444.46	7%	$441.71	7%	$93.19	-78%	$244.27	-41%	$244.25	-41%
SI - Bottling company	180.1	$1,078.40	$1,393.64	29%	$1,393.24	29%	$1,370.33	27%	$198.95	-82%	$751.66	-30%	$751.64	-30%
SM - Bakery	9.3	$120.54	$85.26	-29%	$113.49	-6%	$112.90	-6%	$56.30	-53%	$52.18	-57%	$52.16	-57%
SP - Meat packing	74.0	$632.71	$580.70	-8%	$805.60	27%	$801.50	27%	$133.50	-79%	$317.05	-50%	$317.03	-50%

As one might expect when consolidating classes of commercial and industrial customers, the customer impacts vary widely relative to the residential analysis. In **Exhibit 5.11**, the impacts of the same monthly bills for the six alternatives are expressed in dollar terms.

Exhibit 5.11: Commercial Monthly Bill Impacts: Dollar Change

Class	Average Volume [Ccf]	Current Bill	Alternative 1	$ Change	Alternative 2	$ Change	Alternative 3	$ Change	Alternative 4	$ Change	Alternative 5	$ Change	Alternative 6	$ Change
Commercial														
Commercial regular	41.9	$160.10	$175.89	*$15.79*	$176.55	*$16.45*	$175.88	*$15.78*	$63.25	*-$96.85*	$185.60	*$25.50*	$185.58	*$25.48*
Commercial HS/Industrial														
SA - Auto Body and Fender Repair	11.6	$98.27	$58.88	*-$39.39*	$59.06	*-$39.21*	$58.92	*-$39.35*	$50.25	*-$48.02*	$61.57	*-$36.70*	$61.55	*-$36.72*
SB - Mortuary	13.5	$64.54	$66.39	*$1.85*	$66.60	*$2.06*	$66.32	*$1.78*	$51.08	*-$13.46*	$69.52	*$4.98*	$69.50	*$4.96*
SC - Laundromat	122.0	$481.11	$485.52	*$4.41*	$487.44	*$6.33*	$470.91	*-$10.20*	$97.98	*-$383.13*	$513.81	*$32.71*	$513.79	*$32.69*
SD - Pet Clinic	14.5	$73.74	$70.00	*-$3.73*	$70.23	*-$3.50*	$69.93	*-$3.81*	$51.48	*-$22.26*	$73.36	*-$0.38*	$73.34	*-$0.40*
SG - Car wash, self-service	98.0	$423.36	$392.69	*-$30.67*	$394.23	*-$29.13*	$392.31	*-$31.05*	$87.60	*-$335.76*	$415.41	*-$7.95*	$415.39	*-$7.97*
SH - Car wash, full-service	157.4	$694.52	$622.15	*-$72.37*	$624.63	*-$69.89*	$621.56	*-$72.96*	$113.28	*-$581.24*	$658.65	*-$35.87*	$658.63	*-$35.89*
SJ - Printing, copying	16.3	$70.58	$77.08	*$6.50*	$77.34	*$6.76*	$77.00	*$6.42*	$52.27	*-$18.31*	$80.86	*$10.28*	$80.84	*$10.26*
SK - Electric component manufacturer	82.7	$344.89	$333.80	*-$11.09*	$335.10	*-$9.79*	$333.48	*-$11.41*	$81.01	*-$263.88*	$352.99	*$8.10*	$352.97	*$8.08*
SL - Industrial laundry	398.3	$1,499.97	$1,553.00	*$53.03*	$1,559.28	*$59.31*	$1,537.37	*$37.40*	$217.45	*-$1,282.52*	$1,645.37	*$145.40*	$1,645.35	*$145.38*
SO - Chemical, pharmaceutical	258.0	$1,148.73	$1,010.93	*-$137.80*	$1,015.00	*-$133.73*	$995.82	*-$152.91*	$156.79	*-$991.94*	$1,070.76	*-$77.96*	$1,070.74	*-$77.98*
SF - Restaurant, fast food	28.9	$249.19	$235.88	*-$13.31*	$154.51	*-$94.68*	$139.50	*-$109.69*	$60.88	*-$188.31*	$132.70	*-$116.49*	$132.68	*-$116.51*
SN - Miscellaneous food processor	23.2	$203.46	$192.25	*-$11.21*	$126.89	*-$76.57*	$126.19	*-$77.27*	$57.80	*-$145.66*	$109.37	*-$94.09*	$109.35	*-$94.11*
SE - Restaurant, with seating	56.2	$414.45	$444.58	*$30.13*	$444.46	*$30.01*	$441.71	*$27.26*	$93.19	*-$321.26*	$244.27	*-$170.18*	$244.25	*-$170.20*
SI - Bottling company	180.1	$1,078.40	$1,393.64	*$315.24*	$1,393.24	*$314.84*	$1,370.33	*$291.93*	$198.95	*-$879.45*	$751.66	*-$326.74*	$751.64	*-$326.76*
SM - Bakery	9.3	$120.54	$85.26	*-$35.28*	$113.49	*-$7.05*	$112.90	*-$7.64*	$56.30	*-$64.24*	$52.18	*-$68.37*	$52.16	*-$68.39*
SP - Meat packing	74.0	$632.71	$580.70	*-$52.01*	$805.60	*$172.89*	$801.50	*$168.79*	$133.50	*-$499.21*	$317.05	*-$315.67*	$317.03	*-$315.69*

5.6 EVALUATION OF ALTERNATIVES

Alternative rate structures were developed to address the pricing objectives identified at the beginning of the Study. The first two alternatives provide improved revenue stability, are simple to understand and update, and consistent with cost of service principles. They also provide consideration for affordability as the impacts on residential customers are low. Alternative 3 improves revenue stability significantly, is simple to understand and update and consistent with cost of service principles, but there are higher impacts on low-volume residential customers. Alternative 4 provides the most revenue stability, but it is not consistent with cost of service principles as both commercial and industrial customers would be subsidized by residential customers. Alternative 5, which is similar to the first two alternatives, would further improve customer understanding related to implementation and ongoing oversight. Alternative 6, which is similar to Alternative 3, would also further improve customer understanding.

As of the date of this report, PCRWRD has not yet taken any action regarding modifying the existing rate structure.

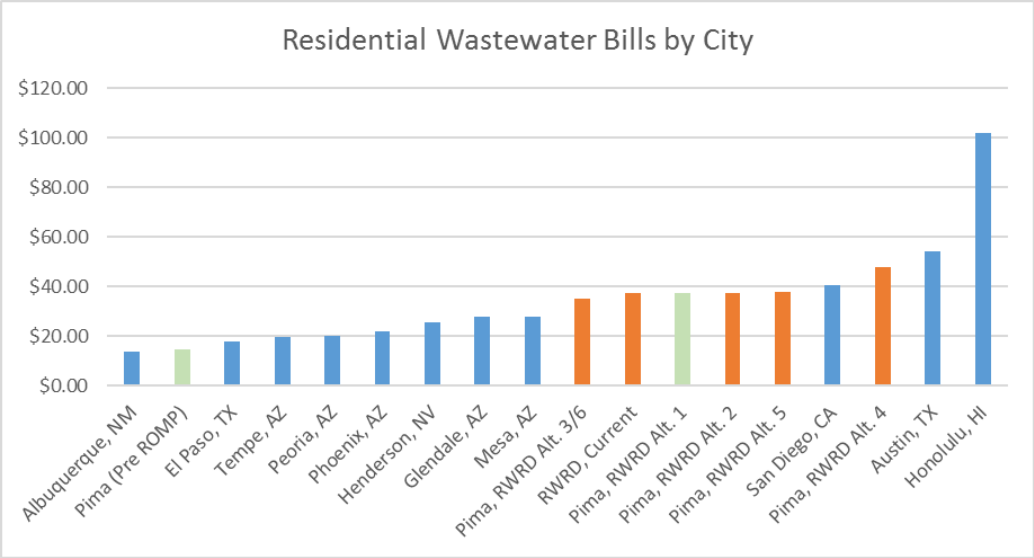
5.7 BENCHMARKING

Exhibit 5.12 shows how each of the developed alternatives compare to customer bills of other wastewater utilities. Current PCRWRD and Pre-ROMP calculated bills are shown in green. Each residential customer monthly bill was calculated at a usage of 7 Ccf and 5/8" meter.

It is important to note that direct comparisons of rates are impossible to demonstrate because circumstances at utilities differ, sometimes widely, based on executive decisions, demographics, capital reinvestment, political climate and many other variables. Therefore, higher bills are not always a negative assessment of a system as they can demonstrate that a utility has utilized prudent management to invest in the system.

Additionally, recent survey data from the 2016 national *Water and Wastewater Rate Survey* suggests that the average rate increase for wastewater bills for participants from 2014 to 2016 was approximately 5.2% annually.

Exhibit 5.12: Benchmarking Residential Monthly Bills (5/8" meter and 7 Ccf)



5.8 AFFORDABILITY

Affordability for low- or fixed income customers can be a concern for many wastewater utilities. In an effort to help alleviate some of the impacts on low-income customers, PCRWRD has implemented an affordability program that provides discounts of 25%, 50%, and 75% of rates and charges based on the relative income of the customer to the federal poverty level. It should be noted that all of the rate structure alternatives identified in this report could incorporate PCRWRD's affordability program discounts.

It is often assumed that low- or fixed income customers are low volume users. However, when examining the billing data, this is often not the case. **Exhibit 5.13** shows the distribution of low income customers participating in the customer assistance program over various levels of winter-period water consumption. This data was provided by Tucson Water, for the Tucson Water overlapping service area only. The table shows that nearly 50% of participants use 5 Ccf or higher per month, and the range of consumption is fairly similar to customers not participating in the customer assistance program. This provides difficulty for utilities when structuring affordability programs as the range of potential impacts from changes to the rate structure will vary widely.

Exhibit 5.13: Customer Affordability Profile[3]

Volume (Ccf)	# on Low Income Program*	% Total	# of Regular*	% Total
0	357	6.4%	9,086	4.3%
1	688	12.3%	11,977	5.6%
2	795	14.3%	17,892	8.4%
3	672	12.0%	21,562	10.2%
4	534	9.6%	22,945	10.8%
5	465	8.3%	22,159	10.4%
6	375	6.7%	20,453	9.6%
7	348	6.2%	17,298	8.2%
8	303	5.4%	14,289	6.7%
9	260	4.7%	11,402	5.4%
10	171	3.1%	8,890	4.2%
15	457	8.2%	22,566	10.6%
20	152	2.7%	11,714	5.5%

It can also be helpful to understand more clearly how customers use water (and returned wastewater) across the service area. As part of this Study, RFC analyzed detailed billing information provided by Tucson Water, for the Tucson Water overlapping service area only, which includes the majority of PCRWRD's customers, at an individual bill level. Individual bills were calculated for each customer and distributed by zip code. Average monthly consumption and annual bills were then calculated and compared to median household income (MHI) by zip code. The results of the analysis suggested that consumption in lower income zip codes across PCRWRD's service area also served by Tucson Water is slightly less than the residential average of 7 Ccf. Additionally, the average bill in each zip code is not above 2.0% of the zip code MHI (except for a small number of zip codes in Alternative 4), which is a general threshold used in the industry as a measure of affordability. **Exhibit 5.14** presents the results of the detailed affordability analysis by zip code.

[3] Estimated based on number of residential customers provided by Tucson Water as of 1/19/17 (for calendar year 2016). Based on winter quarter average rounded down to the nearest unit.

Exhibit 5.14: Affordability Zip Code Level Analysis

Zip Code	Average Monthly Consumption	Median Household Income [MHI]	Current Annual Bill	Current % of MHI	Alternative 1	Alt 1 % of MHI	Alternative 2	Alt 2 % of MHI	Alternative 3	Alt 3 % of MHI	Alternative 4	Alt 4 % of MHI
85714	6.21	$ 25,106	$ 414.02	1.65%	$ 418.02	1.67%	$ 419.03	1.67%	$ 423.36	1.69%	$ 570.53	2.27%
85705	5.36	$ 24,188	$ 378.05	1.56%	$ 384.02	1.59%	$ 384.89	1.59%	$ 423.36	1.75%	$ 566.72	2.34%
85706	6.61	$ 30,550	$ 431.16	1.41%	$ 434.23	1.42%	$ 435.31	1.42%	$ 423.36	1.39%	$ 572.34	1.87%
85719	6.14	$ 29,813	$ 411.11	1.38%	$ 415.27	1.39%	$ 416.27	1.40%	$ 423.36	1.42%	$ 570.22	1.91%
85716	6.30	$ 33,075	$ 418.08	1.26%	$ 421.87	1.28%	$ 422.89	1.28%	$ 423.36	1.28%	$ 570.96	1.73%
85711	6.25	$ 33,279	$ 415.98	1.25%	$ 419.88	1.26%	$ 420.90	1.26%	$ 423.36	1.27%	$ 570.74	1.72%
85712	5.79	$ 32,240	$ 396.42	1.23%	$ 401.39	1.24%	$ 402.33	1.25%	$ 423.36	1.31%	$ 568.67	1.76%
85713	5.67	$ 32,892	$ 391.41	1.19%	$ 396.64	1.21%	$ 397.57	1.21%	$ 423.36	1.29%	$ 568.14	1.73%
85746	7.18	$ 39,669	$ 454.92	1.15%	$ 456.70	1.15%	$ 457.87	1.15%	$ 423.36	1.07%	$ 574.86	1.45%
85736	6.31	$ 39,597	$ 418.45	1.06%	$ 422.22	1.07%	$ 423.25	1.07%	$ 423.36	1.07%	$ 571.00	1.44%
85710	6.37	$ 41,845	$ 420.94	1.01%	$ 424.57	1.01%	$ 425.60	1.02%	$ 423.36	1.01%	$ 571.26	1.37%
85701	5.44	$ 40,059	$ 381.53	0.95%	$ 387.31	0.97%	$ 388.20	0.97%	$ 423.36	1.06%	$ 567.09	1.42%
85745	7.00	$ 47,841	$ 447.42	0.94%	$ 449.60	0.94%	$ 450.74	0.94%	$ 423.36	0.88%	$ 574.06	1.20%
85735	6.30	$ 46,476	$ 417.90	0.90%	$ 421.69	0.91%	$ 422.72	0.91%	$ 423.36	0.91%	$ 570.94	1.23%
85730	6.15	$ 45,873	$ 411.35	0.90%	$ 415.50	0.91%	$ 416.51	0.91%	$ 423.36	0.92%	$ 570.25	1.24%
85704	7.34	$ 51,971	$ 461.68	0.89%	$ 463.09	0.89%	$ 464.28	0.89%	$ 423.36	0.81%	$ 575.57	1.11%
85718	12.19	$ 76,853	$ 667.10	0.87%	$ 657.29	0.86%	$ 659.28	0.86%	$ 423.36	0.55%	$ 597.31	0.78%
85756	5.17	$ 43,658	$ 370.14	0.85%	$ 376.54	0.86%	$ 377.38	0.86%	$ 423.36	0.97%	$ 565.89	1.30%
85741	6.56	$ 51,614	$ 428.87	0.83%	$ 432.06	0.84%	$ 433.13	0.84%	$ 423.36	0.82%	$ 572.10	1.11%
85715	7.09	$ 55,238	$ 451.10	0.82%	$ 453.08	0.82%	$ 454.23	0.82%	$ 423.36	0.77%	$ 574.45	1.04%
85757	6.38	$ 54,199	$ 421.26	0.78%	$ 424.87	0.78%	$ 425.91	0.79%	$ 423.36	0.78%	$ 571.30	1.05%
85750	9.66	$ 72,431	$ 560.15	0.77%	$ 556.18	0.77%	$ 557.75	0.77%	$ 423.36	0.58%	$ 585.99	0.81%
85653	6.61	$ 56,721	$ 431.16	0.76%	$ 434.23	0.77%	$ 435.31	0.77%	$ 423.36	0.75%	$ 572.34	1.01%
85748	7.54	$ 64,814	$ 470.41	0.73%	$ 471.34	0.73%	$ 472.57	0.73%	$ 423.36	0.65%	$ 576.50	0.89%
85742	7.61	$ 69,395	$ 473.43	0.68%	$ 474.19	0.68%	$ 475.43	0.69%	$ 423.36	0.61%	$ 576.82	0.83%
85749	9.87	$ 84,583	$ 568.92	0.67%	$ 564.47	0.67%	$ 566.08	0.67%	$ 423.36	0.50%	$ 586.92	0.69%
85739	5.90	$ 62,063	$ 401.17	0.65%	$ 405.88	0.65%	$ 406.84	0.66%	$ 423.36	0.68%	$ 569.17	0.92%
85743	6.75	$ 68,945	$ 436.85	0.63%	$ 439.61	0.64%	$ 440.71	0.64%	$ 423.36	0.61%	$ 572.95	0.83%
85737	7.78	$ 80,571	$ 480.52	0.60%	$ 480.90	0.60%	$ 482.17	0.60%	$ 423.36	0.53%	$ 577.57	0.72%
85641	6.72	$ 82,808	$ 435.72	0.53%	$ 438.54	0.53%	$ 439.63	0.53%	$ 423.36	0.51%	$ 572.83	0.69%
85658	6.48	$ 81,027	$ 425.54	0.53%	$ 428.92	0.53%	$ 429.97	0.53%	$ 423.36	0.52%	$ 571.75	0.71%
85747	6.49	$ 82,024	$ 425.91	0.52%	$ 429.27	0.52%	$ 430.33	0.52%	$ 423.36	0.52%	$ 571.79	0.70%

(1) Alternatives 5 and 6 would have similar affordability results as alternatives 1 and 3, respectively, since the residential rate and service fee components for alternatives 5 and 6 were modeled similar to these two alternatives.

5.9 RATE STRUCTURES TO PROMOTE ECONOMIC DEVELOPMENT

At times, utilities may wish to consider approaches to encourage or promote economic development in their service area. While opinions may differ on the role utilities play in attracting new customers, there are a few pricing considerations that will impact the customer.

5.9.1 Fixed Charge

Rate structures have two primary components: 1) the fixed charge and 2) the volumetric rate(s). The fixed charge is assessed to the customer regardless of monthly demand. One approach for utilities in assessing the fixed charge is to assess the same fixed charge to all customers of all classes regardless of meter size. PCRWRD has a fixed charge called the service fee, which is implemented under this approach. Similarly, Austin Water (TX) currently assess a uniform fixed fee to residential and commercial customers of $10.30, regardless of the customer's meter size.

Another approach is to assess fixed charges that scale up, or increase, based on the size of the customer's water meter. It is very common for water utilities to assess fixed charges in this way because there is a direct link between the size of the meter and the level of water consumption used by the customer. Wastewater utilities including, for example, El Paso Water (TX) and the cities of Tempe (AZ) and Peoria (AZ), also structure their fixed charges in this manner.

The approach to assessing all customers of all meter sizes the same fee, such as PCRWRD does, is actually advantageous for commercial and industrial customers. This means that for commercial customers, a smaller portion of their monthly bill is fixed and results in more control for the customer.

5.9.2 Volumetric Rates

There are several approaches to setting volumetric rates. The three most common in the industry are:

- Uniform Rate – one rate is applied to all units of demand, such as Ccf. PCRWRD implements this type of rate structure as does the cities of Peoria (AZ) and San Diego (CA).
- Inclining Block Rate – a set of rates where the unit rate increases with higher levels of customer demand, meaning the more demand, the more the customer pays per unit. The city of Mesa (AZ) implements an inclining block rate structure for wastewater billing.
- Declining Block Rate – a set of rates where the unit rate decreases with higher levels of customer demand, meaning the more demand, the less the customer pays per unit. This rate structure is less common than the other two and appears to be slowly phasing out of use. Based on biennial results from the 2006 and 2016 editions of the national *Water and Wastewater Rate Survey*, declining block rate structures were used by 10% of participants in 2006 and decreased to only 6% in use by 2016.

High volume commercial and industrial customers would favor uniform or declining block rate structures because their monthly bills would be considerably more dependent on the level of demand, whereas low volume commercial customers would prefer uniform or inclining block rate structures because their unit rate would likely be less than under a declining block rate structure.

As illustrated, it is important to note that when considering volumetric rate structures, the objectives of economic development are often competing for different types of commercial customers, most notably, low volume and high volume customers.

5.9.3 Contract Rates

Another consideration for a utility to promote economic development is the determination of agreeing to a contract rate for a particular customer, typically a large volume customer. This may hinder the utility when increasing the rates in the future to account for increased revenue requirements, but it also shows the industrial customer that the utility is willing to work to keep costs low and commit to a long-term service agreement. This type of policy-based decision is often used in the industry for very large customers.

5.9.4 Developer Agreements

Many utilities in Arizona utilize developer agreements to address issues surrounding economic development. For example, a municipality may establish a Community Facilities District (CFD) which effectively draws a boundary around a specific development. Typically, CFD's have separate utility systems that can be financed through the issuance of debt, with repayment coming from a specific property tax or assessment to customers within the CFD. This type of approach may prove beneficial if a development will cause a utility to incur additional, unplanned capital costs, as it can serve as a mechanism to recover these costs from certain customers rather than recovering from the utility rate base.

Municipalities may also waive a connection fee for a specific development to attract a large customer. However, by waiving the connection fee a customer will not pay the Enterprise Fund upfront for its share of core system capacity necessary to provide utility services. As such, Arizona law requires the municipality to make up the difference by contributing monies from the General Fund. The City of Avondale (AZ) utilizes this type of program for its impact fees.

Developer agreements can also be used to stipulate each party's obligations as it relates to the payment and upkeep of capital assets and operating expenses. The overall intent of these types of developer agreements are to ensure extra capacity and other capital costs related to serving a specific customer are identified, and it is clear who is responsible for financing these assets. For example, Chandler (AZ) has used various developer agreements with a large industry that have been updated as the industry expanded its facility over the years. In general, the industry has paid for a large majority of capital costs built specifically for them, and these assets are then donated to the City. When infrastructure is constructed that benefits both the City and the industrial customer, allocation percentages are used to distribute costs between the industrial customer and the rate base. Claw-back provisions may also be used in development agreements to mitigate risks associated with stranded capital. If a developer fails to meet certain criteria, the agreement may stipulate consequences including, for example, the repayment of capital investments. Surprise (AZ) has used a similar approach which can help address concerns related to financing unplanned capital expenditures.

The amount of flexibility and incentives used by utilities to promote economic development typically depends on the goals and objectives of the governmental entity and other structure issues, particularly the amount of leverage a potential customer may have. If a large customer has options on where to locate, the governmental entity may be more inclined to provide numerous incentives to attract the customer, such as absorbing incremental utility capital costs, as it is perceived the long-term benefits are greater than the short-term costs. Conversely, if a potential customer's options are more limited, the governmental entity may be less inclined to provide incentives. For example, DC Water, which has a largely built-out retail service area, requires all new developments to finance any necessary infrastructure improvements needed to provide adequate service.

6. CONNECTION FEE UPDATE

6.1 BACKGROUND

In addition to the cost of service and rate design for retail customers, the Study included the update of PCRWRD's connection fees based on current data. Connection fees are a capacity use charge designed to reflect PCRWRD's cost of providing wastewater treatment and conveyance capacity, and are assessed upfront to customers when they connect to the system or increase water meter size. The fees are based on the user's potential, rather than actual, discharge rate to ensure sufficient capacity exists in the system to convey and treat the wastewater.

6.2 OVERVIEW OF METHODOLOGY

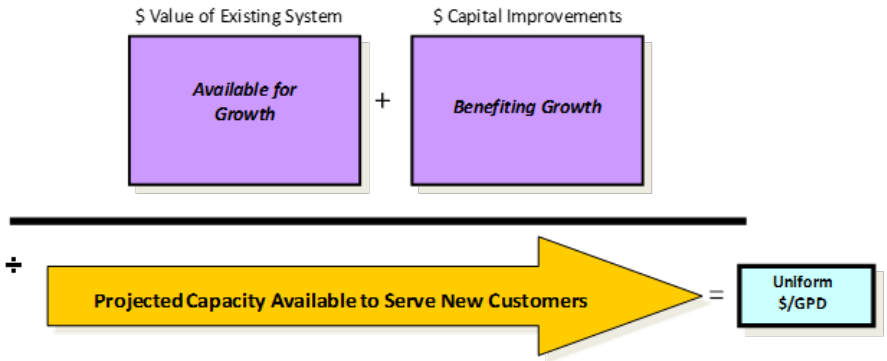
PCRWRD's connection fees are calculated using a hybrid approach based on a combination of the industry accepted methodologies including the system buy-in and the marginal incremental approaches.

- The ***buy-in approach*** incorporates existing assets and available capacity.
- The ***marginal incremental approach*** incorporates expansion of the system and is tied to the utility's Capital Improvement Plan (CIP).

The hybrid approach, which supports PCRWRD's connection fee, is called the System Average Cost Approach (see **Exhibit 6.1**).

Exhibit 6.1: System Average Cost Approach

Focuses on System Value (Existing and Future) and Capacity Available to Serve New Customers



PCRWRD's connection fees reflect only the cost of capacity associated with core, or "trunk", system capacity that is available to serve new customers.

6.3 ASSESSMENT METHODOLOGY

PCRWRD assesses connection fees based on the size of the connecting customer's water meter. Using the customer's water meter size as a basis of assessment is a straightforward approach for both the customer and for PCRWRD staff. Assessing connection fees based on the water meter size is a popular

method for several reasons, including the lack of complexity, which provides ease of implementation and administration, simplicity, minimum data requirements, and customer acceptance.

Meter size is also a readily identifiable detail, which creates consistency and limits upfront fee controversies or disputes. This structure encourages customers to use the proper meter size in development, thus providing a reasonable basis for a utility to determine the potential demand that new customer connections will place on the system. It is also prevalently used in the industry that indicates widespread understanding and acceptance.

6.4 DETERMINATION OF COSTS

To determine the costs associated with core, or "trunk", system capacity that is available to new customers, costs such as capital improvement projects, assets already in service and reserves need to be analyzed. To understand the appropriate level of these costs allocable to new customers, the set of allocation factors used for this determination must be considered

6.4.1 Cost Allocation Factors

Total costs associated with the core system capacity are readily available but determining the appropriate level to charge new customers requires an analysis of the wastewater system.

The first allocation factor is based on system capacity. PCRWRD's current treatment capacity of the two primary Water Reclamation Facilities (WRF) of Tres Rios and Agua Nueva is approximately 82 million gallons per day (MGD) combined. Another 9.55 MGD of capacity from outlying facilities results in a total system treatment capacity of 91.55 (MGD). Of this amount, PCRWRD experienced annual wastewater plant flows of 59.48 MGD in 2016, resulting in available treatment capacity for new connections of 32.07 MGD, or 35.0% of the system.

The second allocation factor is based on the collection and conveyance infrastructure. PCRWRD has approximately 18.4 million feet of pipe of various sizes within its system. An updated review of PCRWRD's piping infrastructure determined that 62.4% is associated with the wastewater collection system and 37.6% is associated with the wastewater conveyance system. Therefore, since 37.6% of the infrastructure is conveyance, or core system capacity, 37.6% of related infrastructure costs would be eligible for incorporation into the Connection Fee analysis.

6.4.2 Costs for Connection Fee Calculation

Once the cost allocation factors have been established, the cost pools can be identified and the appropriate level available for new capacity can be determined. There are three primary costs included in the Connection Fee calculation:

- **Capital Improvement Plan (CIP)** – PCRWRD has approximately $300 million in their 5-year CIP. After an evaluation of the purpose for the projects in the CIP and incorporation of the above allocation factors, $120.5 million of the $300 million in CIP projects is allocated for expansion or available capacity.

- **Fixed Assets in Service** – PCRWRD's updated fixed assets were functionalized to identify the purpose and related cost. Based on core system assets, such as wastewater conveyance and wastewater treatment, $356.4 million (replacement cost new less depreciation values) of assets are associated with capacity available to serve new customers.
- **Reserves** – PCRWRD's unrestricted cash and cash equivalents for FY 2016 was $143.3 million. Of this amount, $50.1 million, or 35.0% (related to available treatment capacity), is identified as a core asset and included in the connection fee calculation.

6.4.3 Cost per Gallon per Day Calculation

The CIP and fixed asset costs above were considered based on their function, such as land, wastewater conveyance and wastewater treatment. Reserves were included for a total cost pool of $527.1 million, as shown in **Exhibit 6.2**.

Exhibit 6.2: Cost of Capacity

	Capital Costs (1)
Cost of Capacity Per Gallon Per Day (gpd)	
Land	$ 5,294,381
Conveyance and Pumping	219,720,487
Wastewater Treatment	251,910,106
Reserves (3)	50,143,104
Cost of Capacity (per gpd) (4)	**$ 527,068,078**

Notes:
(1) Represents the portion of system capital costs available to serve new customers.

The cost of capacity is then converted to a cost per gallon per day (gpd) by applying the available capacity in the system for new customers. The results of the updated calculation of PCRWRD's cost of capacity is $16.44 per gallon per day (gpd), shown in **Exhibit 6.3**.

Exhibit 6.3: Cost of Capacity per GPD

	Capital Costs (1)	Capacity (MGD) (2)	Cost per GPD
Cost of Capacity Per Gallon Per Day (gpd)			
Land	$ 5,294,381	32.07	$ 0.17
Conveyance and Pumping	219,720,487	32.07	$ 6.85
Wastewater Treatment	251,910,106	32.07	$ 7.86
Reserves (3)	50,143,104	32.07	$ 1.56
Cost of Capacity (per gpd) (4)	**$ 527,068,078**		**$ 16.44**

Notes:
(1) Represents the portion of system capital costs available to serve new customers.
(2) Represents the portion of total projected system capacity available to serve new customers.
(3) Includes only the related portion of unrestricted cash and cash equivalents (current assets), emergency reserve, and 60 days of the 90 day O&M reserve identified in the County's FY 2015/16 financial statements for the wastewater enterprise system.
(4) Rounded up.

6.5 CALCULATION METHODOLOGY

The typical procedure for a utility developing a connection fee by meter size begins with the calculation of a charge for the smallest connection, usually a residential or commercial connection of 5/8-inch or 3/4-inch meter. The charge will be the product of a derived cost of capacity, expressed in gallons per day (gpd), multiplied by a specific level of anticipated flow from a residential customer and peak day, or weather-related, flow. For wastewater customers, this anticipated flow should, at a minimum, include a component based on daily indoor water usage, but can also include an adjustment for peak flows and/or to reflect system inflow and infiltration. The anticipated flow will represent a projected capacity need for customers connecting to the system with the smallest meter size. Using the residential charge as the basis for calculation, the upfront fees for larger meter sizes will be computed from a scale of factors related to either the capacity capability or the average customer demand of the respective meter relative to the average demand of 5/8-inch customers.

6.5.1 Fee for 5/8-inch Meters

The connection fee for 5/8-inch meters is calculated by multiplying the cost per gallon per day by the gallons per day demand for customers within the meter class including peak day demand. The residential customer demand component for a 5/8-inch meter is calculated using the anticipated demand per capita of 80 gpd multiplied by the estimated 2.7 people per household, which equals 216.0 gpd, shown. The 80 gpd per capita is a standard planning number for sewer systems identified by the Arizona Department of Environmental Quality. Additional peak day flow, which recognizes that the utility must also size its system to accommodate demand from system inflow and infiltration (I&I), is incorporated using a 17.5% factor above that of the residential demand. This results in a total demand component of 253.8 gpd.

Using $16.44 per gpd and an estimated design flow per customer per day of 253.8 gpd, which is consistent with PCRWRD's most recent connection fee calculation, the revised connection fee is $4,172 for a residential customer; this is a 2.6% increase above the existing connection fee, shown in **Exhibit 6.4**.

Exhibit 6.4: Connection Fee Calculation

	Current	Calculated	*% Change*
Total Household Demand	253.8 gpd	253.8 gpd	
Cost per gpd	$16.02	$16.44	
Connection Fee (5/8" or 3/4")	$4,066	$4,172	*2.6%*

6.5.2 Fees for Commercial, Industrial, and Multi-Family (1-inch to 4-inch Meters)

Connection fees for larger meters scale up based on what the meter is capable of flowing on a daily basis. As a result, the fees for meter sizes from 1-inch up to 4-inch are based on a set of escalation factors, or meter ratios. The meter ratios used in this update are the same as PCRWRD's most recent connection fee calculation, which was based on an analysis of average water consumption by meter size. For this update, the current fees for the larger meters were increased by 2.6%, consistent with the change in fee of the residential customer. The revised fees for meters up to 4" are presented in **Exhibit 6.5**.

Exhibit 6.5: Calculated Connections Fees by Meter Size

Meter Size	Current	Calculated	*% Change*
Residential			
5/8", 3/4", or 1"	$4,066	$4,172	*2.6%*
Commercial/Industrial/Multi-Family			
1"	$8,480	$8,700	*2.6%*
1 1/2"	$27,030	$27,733	*2.6%*
2"	$69,790	$71,605	*2.6%*
3"	$162,510	$166,735	*2.6%*
4"	$363,690	$373,146	*2.6%*

6.5.3 Fees for Meters above 4-inch

Customers requiring a meter size larger than four inches are assessed a connection fee based on estimated usage. The usage will be estimated by the customer and will include detailed supporting data. The estimate will be approved by PCRWRD and multiplied by the cost of capacity ($16.44) to derive the fee.

6.6 UTILITY CONNECTION FEE REIMBURSEMETS OR CREDITS

Connection fees are most often assessed to the developer who is constructing the home, community of homes, or business. These costs are later passed on to the home buyer or business owner through the sale of property. In some situations, developers may construct and contribute infrastructure above the standard infrastructure required to serve the connecting customers. In these situations, utilities may provide reimbursements or credits in the upfront fee process to reflect the enhanced infrastructure. For example, in the case of oversizing conveyance infrastructure, the utility determines that the upgraded infrastructure is part of the overall strategic master plan for the utility service area. Rather than the utility making the investment, the developer has already done so and thus the utility provides a reimbursement, credit, or discount on the upfront fees for this contribution.

Not all utilities do this, such as the city of Tempe, but several of PCRWRD's peers have put this into practice either formally or with policy driven reimbursements or credits. For example, the city of Peoria has a repayment, or reimbursement, process which is paid for by others connecting to the infrastructure in the future. El Paso Water has a standing refund in place for the developer oversizing mains larger than 8". Other peers have implemented a more informal process. For example, the cities of Phoenix and San Diego have no formal policy and assesses each application on a case by case basis.

7. APPENDICES

Exhibit 7.1: Plant O&M to Treatment Process Allocations (%)

Budget Category	2017	Prelim. Treatment	Primary Treatment	Aeration	Nutrient Removal	Secondary Treatment	Disinfection	Sludge Thickening	Sludge Digestion	Sludge Dewatering	Disposal	Lab	General Plant	Admin Overhead
Personnel Services	100%	10%	5%	8%	3%	4%	7%	7%	6%	6%	7%	2%	29%	6%
Chemicals	100%	0%	0%	0%	0%	0%	39%	2%	23%	6%	0%	0%	30%	0%
Energy	100%	12%	3%	39%	13%	4%	1%	3%	1%	7%	2%	1%	16%	1%
Waste Recycling	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
Repair and Maintenance	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	99%	1%
Motor Pool Charges	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	98%	2%
Overhead	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	64%	36%
Other Professional Services	100%	5%	5%	19%	5%	5%	19%	10%	0%	0%	14%	6%	9%	4%
Capital Equipment	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	96%	4%

Exhibit 7.2: Plant O&M to Treatment Process Allocations ($)

Budget Category	2017	Prelim. Treatment	Primary Treatment	Aeration	Nutrient Removal	Secondary Treatment	Disinfection	Sludge Thickening	Sludge Digestion	Sludge Dewatering	Disposal	Lab	General Plant	Admin Overhead
Personnel Services	$ 12,319,083	$ 1,227,966	$ 566,289	$ 968,744	$ 338,445	$ 501,941	$ 875,120	$ 855,128	$ 755,917	$ 755,917	$ 918,381	$ 246,058	$ 3,623,383	$ 685,795
Chemicals	2,537,328	0	0	0	0	0	988,405	47,300	584,637	146,159	0	908	769,918	0
Energy	5,279,908	624,500	136,500	2,047,500	682,500	198,500	78,500	140,500	29,000	348,000	111,500	29,000	819,408	34,500
Waste Recycling	1,630,800	0	0	0	0	0	0	0	0	0	1,626,800	0	4,000	0
Repair and Maintenance	4,260,106	0	0	0	0	0	0	0	0	0	0	0	4,222,856	37,250
Motor Pool Charges	936,692	0	0	0	0	0	0	0	0	0	0	0	919,477	17,215
Overhead	2,470,188	0	0	0	0	0	0	0	0	0	5,000	0	1,569,621	895,567
Other Professional Services	4,660,808	223,140	223,140	892,562	223,140	223,140	892,562	446,281	0	0	669,421	267,768	401,653	198,000
Capital Equipment	1,084,400	0	0	0	0	0	0	0	0	0	0	0	1,036,400	48,000
Total (less Contra & Deprec	**$ 35,179,313**	**$ 2,075,607**	**$ 925,929**	**$ 3,908,805**	**$ 1,244,085**	**$ 923,582**	**$ 2,834,586**	**$ 1,489,209**	**$ 1,369,554**	**$ 1,250,077**	**$ 3,331,102**	**$ 543,734**	**$ 13,366,716**	**$ 1,916,327**

Exhibit 7.3: Treatment Process to Volume and Strength Components (%)

Process	Total	Volume	TSS	COD	TN
Prelim. Treatment	100%	50%	50%	0%	0%
Primary Treatment	100%	50%	50%	0%	0%
Aeration	100%	0%	0%	100%	0%
Nutrient Removal	100%	0%	0%	0%	100%
Secondary Treatment	100%	0%	0%	100%	0%
Disinfection	100%	100%	0%	0%	0%
Sludge Thickening	100%	0%	45%	45%	10%
Sludge Digestion	100%	0%	45%	45%	10%
Sludge Dewatering	100%	0%	45%	45%	10%
Disposal	100%	0%	45%	45%	10%
Lab	100%	0%	34%	33%	33%
General Plant	100%	22%	25%	42%	11%
Admin Overhead	100%	22%	25%	42%	11%

Exhibit 7.4: Treatment Process to Volume and Strength Components ($)

Process	2017	Volume	TSS	COD	TN
Prelim. Treatment	$ 2,075,607	$ 1,037,803	$ 1,037,803	$ -	$ -
Primary Treatment	925,929	462,965	462,965	-	-
Aeration	3,908,805	-	-	3,908,805	-
Nutrient Removal	1,244,085	-	-	-	1,244,085
Secondary Treatment	923,582	-	-	923,582	-
Disinfection	2,834,586	2,834,586	-	-	-
Sludge Thickening	1,489,209	-	670,144	670,144	148,921
Sludge Digestion	1,369,554	-	616,299	616,299	136,955
Sludge Dewatering	1,250,077	-	562,534	562,534	125,008
Disposal	3,331,102	-	1,498,996	1,498,996	333,110
Lab	543,734	-	184,870	179,432	179,432
General Plant	13,366,716	2,912,579	3,381,682	5,616,278	1,456,178
Admin Overhead	1,916,327	417,564	484,817	805,181	208,766
Total	**$ 35,179,313**	**$ 7,665,497**	**$ 8,900,110**	**$14,781,252**	**$ 3,832,455**
	100%	*22%*	*25%*	*42%*	*11%*

Exhibit 7.5: Allocation of Functional O&M Costs to Drivers

		Flow Drivers				Fixed Drivers
Function	**FY 2017**	**Volume**	**TSS**	**COD**	**TN**	**Account**
Collection	$ 9,997,502	**100%**	0%	0%	0%	0%
Subtotal: Collection	$ 9,997,502	$ 9,997,502	$ -	$ -	$ -	$ -
Conveyance	$ 6,024,744	**100%**	0%	0%	0%	0%
Subtotal: Conveyance	$ 6,024,744	$ 6,024,744	$ -	$ -	$ -	$ -
Treatment						
Prelim. Treatment	$ 2,075,607	**50%**	**50%**	0%	0%	0%
Primary Treatment	$ 925,929	**50%**	**50%**	0%	0%	0%
Aeration	$ 3,908,805	0%	0%	**100%**	0%	0%
Nutrient Removal	$ 1,244,085	0%	0%	0%	**100%**	0%
Secondary Treatment	$ 923,582	0%	0%	**100%**	0%	0%
Disinfection	$ 2,834,586	**100%**	0%	0%	0%	0%
Sludge Thickening	$ 1,489,209	0%	**45%**	**45%**	**10%**	0%
Sludge Digestion	$ 1,369,554	0%	**45%**	**45%**	**10%**	0%
Sludge Dewatering	$ 1,250,077	0%	**45%**	**45%**	**10%**	0%
Disposal	$ 3,331,102	0%	**45%**	**45%**	**10%**	0%
Lab	$ 543,734	0%	**34%**	**33%**	**33%**	0%
General Plant	$ 13,366,716	**22%**	**25%**	**42%**	**11%**	0%
Admin Overhead	$ 1,916,327	**22%**	**25%**	**42%**	**11%**	0%
Subtotal: Treatment	$ 35,179,313	$ 7,665,497	$ 8,900,110	$ 14,781,252	$ 3,832,455	$ -
Laboratory	$ 7,436,922	0%	**34%**	**33%**	**33%**	0%
Subtotal: Laboratory	$ 7,436,922	$ -	$ 2,528,553	$ 2,454,184	$ 2,454,184	$ -
Meter	$ -	0%	0%	0%	0%	0%
Subtotal: Meter	$ -	$ -	$ -	$ -	$ -	$ -
Customer	$ 6,860,557	0%	0%	0%	0%	**100%**
Subtotal: Customer	$ 6,860,557	$ -	$ -	$ -	$ -	$ 6,860,557
General & Admin	$ 19,064,769	**36%**	**17%**	**26%**	**10%**	**10%**
Subtotal: General & Admin	$ 19,064,769	$ 6,894,778	$ 3,326,535	$ 5,016,709	$ 1,829,849	$ 1,996,899
Total: Functional Charges	**$ 84,563,807**	**$ 30,582,521**	**$ 14,755,198**	**$ 22,252,145**	**$ 8,116,488**	**$ 8,857,456**
		36%	*17%*	*26%*	*10%*	*10%*

Exhibit 7.6: Allocation of O&M Costs to Functions

		Flow Functions				Fixed Functions	Proportional
Operating Expenses	**FY 2017**	**Collection**	**Conveyance**	**Treatment**	**Lab**	**Customer**	**General & Admin**
Planning							
Personnel Expenses	$ 5,085,574	0%	0%	0%	0%	0%	**100%**
Supplies and Services	$ 603,364	0%	0%	0%	0%	0%	**100%**
Capital Equipment Purhases > $5000	$ -	0%	0%	0%	0%	0%	**100%**
Subtotal: Planning	$ 5,688,938	$ -	$ -	$ -	$ -	$ -	$ 5,688,938
Conveyance	$ 16,022,246	$ 9,997,502	$ 6,024,744	$ -	$ -	$ -	$ -
Treatment							
Personnel Services	$ 12,319,083	0%	0%	**100%**	0%	0%	0%
Chemicals	2,537,328	0%	0%	**100%**	0%	0%	0%
Energy	5,279,908	0%	0%	**100%**	0%	0%	0%
Waste Recycling	1,630,800	0%	0%	**100%**	0%	0%	0%
Repair and Maintenance	4,260,106	0%	0%	**100%**	0%	0%	0%
Motor Pool Charges	936,692	0%	0%	**100%**	0%	0%	0%
Overhead	2,470,188	0%	0%	**100%**	0%	0%	0%
Other Professional Services	4,660,808	0%	0%	**100%**	0%	0%	0%
Capital Equipment	1,084,400	0%	0%	**100%**	0%	0%	0%
Subtotal: Treatment	$ 35,179,313	$ -	$ -	$ 35,179,313	$ -	$ -	$ -
Admin							
Personnel Expenses	$ 3,064,995	0%	0%	0%	0%	0%	**100%**
Supplies and Services	$ 17,151,393	0%	0%	0%	0%	**40%**	**60%**
Capital Equipment Purhases > $5000	$ 20,000	0%	0%	0%	0%	0%	**100%**
Subtotal: Admin *(Less Laboratory)	$ 20,236,388	$ -	$ -	$ -	$ -	$ 6,860,557	$ 13,375,831
Laboratory							
Personnel Expenses	$ 5,231,705	0%	0%	0%	**100%**	0%	0%
Supplies and Services	$ 1,982,969	0%	0%	0%	**100%**	0%	0%
Capital Equipment Purhases > $5000	$ 222,248	0%	0%	0%	**100%**	0%	0%
Subtotal: Laboratory	$ 7,436,922	$ -	$ -	$ -	$ 7,436,922	$ -	$ -
Total: Operating Expenses	**$ 84,563,807**	**$ 9,997,502**	**$ 6,024,744**	**$ 35,179,313**	**$ 7,436,922**	**$ 6,860,557**	**$ 19,064,769**
		12%	*7%*	*42%*	*9%*	*8%*	*23%*

Exhibit 7.7: Allocation of Fixed Asset Costs to Functions (%)

Sewer System Assets	Net Book Value	Collection	Conveyance	Treatment	Lab	Customer	General & Admin
Building	$ 542,760,174	0%	0%	**90%**	0%	0%	**10%**
Equipment and Machinery	$ 76,049,758	**25%**	**25%**	**25%**	0%	0%	**25%**
Intangible Equipment and Software	$ 12,178,335	0%	0%	0%	0%	0%	**100%**
Land	$ 9,864,406	0%	0%	**100%**	0%	0%	0%
Other Improvements	$ 37,894,585	0%	0%	0%	0%	0%	**100%**
Rights of Way and Easements	$ 2,366,925	**62%**	**38%**	0%	0%	0%	0%
Sewage Conveyance Systems	$ 470,570,997	**62%**	**38%**	0%	0%	0%	0%
Vehicles	$ 1,522,984	0%	0%	0%	0%	0%	**100%**
Total: Sewer System Assets	$ 1,153,208,165	$ 314,114,503	$ 196,848,298	$ 517,361,003	$ -	$ -	$ 124,884,361
		27%	*17%*	*45%*	*0%*	*0%*	*11%*

Exhibit 7.8: Allocation of Fixed Asset Costs to Functions ($)

Sewer System Assets	Net Book Value	Collection	Conveyance	Treatment	Lab	Customer	General & Admin
Building	$ 542,760,174	$ -	$ -	$ 488,484,157	$-	$ -	$ 54,276,017
Equipment and Machinery	76,049,758	19,012,440	19,012,440	19,012,440	-	-	19,012,440
Intangible Equipment and Sof	12,178,335	-	-	-	-	-	12,178,335
Land	9,864,406	-	-	9,864,406	-	-	-
Other Improvements	37,894,585	-	-	-	-	-	37,894,585
Rights of Way and Easements	2,366,925	1,476,905	890,020	-	-	-	-
Sewage Conveyance Systems	470,570,997	293,625,158	176,945,839	-	-	-	-
Vehicles	1,522,984	-	-	-	-	-	1,522,984
Total: Sewer System Assets	$ 1,153,208,165	$ 314,114,503	$ 196,848,298	$ 517,361,003	$-	$ -	$ 124,884,361
		27%	*17%*	*45%*	*0%*	*0%*	*11%*

Exhibit 7.9: Allocation of Fixed Assets to Cost Drivers (%)

Sewer Asset Net Book Value	Net Book Value	Volume	TSS	COD	TN	Account
Collection	$ 314,114,503	**100%**	0%	0%	0%	0%
Conveyance	$ 196,848,298	**100%**	0%	0%	0%	0%
Treatment	$ 517,361,003	**18%**	**27%**	**40%**	**15%**	0%
Lab	$ -	0%	**34%**	**33%**	**33%**	0%
Meter	$ -	0%	0%	0%	0%	**100%**
Customer	$ -	0%	0%	0%	0%	**100%**
General & Admin	$ 124,884,361	**59%**	**13%**	**20%**	**7%**	0%
Total: Sewer Functional Categories	$ 1,153,208,165	$ 677,377,106	$ 155,593,648	$ 234,648,997	$ 85,588,413	$ -
		59%	*13%*	*20%*	*7%*	*0%*

Exhibit 7.10: Allocation of Fixed Assets to Cost Drivers ($)

		Flow Drivers				Fixed Drivers
Sewer Asset Net Book Value	**Net Book Value**	**Volume**	**TSS**	**COD**	**TN**	**Account**
Collection	$ 314,114,503	$ 314,114,503	$ -	$ -	$ -	$ -
Conveyance	196,848,298	196,848,298	-	-	-	-
Treatment	517,361,003	93,059,113	138,743,946	209,238,156	76,319,788	-
Lab	-	-	-	-	-	-
Meter	-	-	-	-	-	-
Customer	-	-	-	-	-	-
General & Admin	124,884,361	73,355,193	16,849,701	25,410,842	9,268,625	-
Total	$ 1,153,208,165	$ 677,377,106	$ 155,593,648	$ 234,648,997	$ 85,588,413	$ -
		59%	*13%*	*20%*	*7%*	*0%*

Exhibit 7.11: Cost of Service Unit Cost Breakdown

Unit Costs	**FY 2017**	**Volume**	**TSS**	**COD**	**TN**	**Account**
Operating Expenses	$ 82,752,953	$ 29,927,625	$ 14,439,229	$ 21,775,636	$ 7,942,681	$ 8,667,782
% Allocation		36%	17%	26%	10%	10%
Cost per unit		$ 0.93	$ 0.34	$ 0.18	$ 0.73	$ 2.69
Capital Costs	$ 75,731,646	$ 22,750,385	$ 5,225,768	$ 7,880,921	$ 2,874,572	$ 37,000,000
% Allocation		30%	7%	10%	4%	49%
Cost per unit		$ 0.70	$ 0.12	$ 0.07	$ 0.27	$ 11.47
		$ 1.63	$ 0.46	$ 0.25	$ 1.00	$ 14.16
Total	$ 158,484,599	$ 52,678,010	$ 19,664,997	$ 29,656,557	$ 10,817,253	$ 45,667,782

Exhibit 7.12: Cost of Service Summary

Class	Volume	TSS	COD	TN	Account	Total
Residential						
R - Residential	$ 30,197,011	$ 9,397,299	$ 16,180,691	$ 5,741,171	$ 41,930,671	$ 103,446,841
MF - Multi-family	10,271,012	3,196,335	5,503,593	1,952,764	728,565	$ 21,652,269
RA - SOS 75%	353,400	109,978	189,365	67,190	12,444	$ 732,377
RB - SOS 50%	95,567	29,740	51,208	18,170	5,097	$ 199,782
RC - SOS 25%	54,953	17,101	29,446	10,448	3,058	$ 115,006
SV - Duplex/Triplex	0	0	0	0	0	$ -
R2 - Vacant Home	62,894	19,573	33,701	11,958	45,699	$ 173,825
Commercial						
Commercial - regular	10,106,325	5,579,416	5,510,521	2,783,594	2,644,257	$ 26,624,113
Commercial - large meter	2,821	1,557	1,538	777	2,039	$ 8,731
Industrial						
SA - Auto Body and Fender Repair	25,746	6,699	18,305	6,333	19,296	$ 76,380
SB - Mortuary	4,897	999	3,985	1,040	3,143	$ 14,063
SC - Laundromat	120,044	27,016	92,586	10,838	8,537	$ 259,021
SD - Pet Clinic	20,945	8,654	13,314	5,432	12,571	$ 60,917
SE - Restaurant, with seating	608,426	984,151	1,210,677	83,557	93,946	$ 2,980,758
SF - Restaurant, fast food	258,016	102,977	381,962	48,265	77,340	$ 868,561
SG - Car wash, self-service	108,393	15,856	56,040	1,824	9,598	$ 191,712
SH - Car wash, full-service	120,691	51,776	56,942	3,232	6,654	$ 239,294
SI - Bottling company	46,134	3,755	159,573	2,294	2,223	$ 213,979
SJ - Printing, copying	13,846	4,504	15,751	1,298	7,376	$ 42,775
SK - Electric component manufacturer	72,496	56,593	32,497	18,470	7,602	$ 187,658
SL - Industrial laundry	59,794	25,441	45,835	25,253	1,302	$ 157,625
SM - Bakery	2,954	1,293	16,375	250	2,761	$ 23,632
SN - Miscellaneous food processor	7,056	1,973	9,648	1,371	2,633	$ 22,681
SO - Chemical, pharmaceutical	53,466	18,424	22,708	19,880	1,798	$ 116,276
SP - Meat packing	5,189	3,887	20,295	1,846	609	$ 31,826
Builder/Contractor	5,934	0	0	0	38,564	$ 44,498
Total: Cost of Service	**$ 52,678,010**	**$ 19,664,997**	**$ 29,656,557**	**$ 10,817,253**	**$ 45,667,782**	**$ 158,484,599**

Exhibit 7.13: Billable Units By Customer Class

	Volume Units				Chemical Oxygen Demand					Total Suspended Solids					Total Nitrogen					Customer Units	
	Annual Billed Volume	*I/I %*	*I/I Volume*	*Capacity Requirement*	Class *Strength*	I/I *Strength*	*Class COD*	*I/I COD*	*Total COD*	Class *Strength*	I/I *Strength*	*Class TSS*	*I/I TSS*	*Total TSS*	Class *Strength*	I/I *Strength*	*Class TN*	*I/I TN*	*Total TN*	*Bills*	Equivalent Bills
Units	(CCF)		(CCF)	(CCF)	(mg/L)	(mg/L)	(Lbs.)	(Lbs.)	(Lbs.)	(mg/L)	(mg/L)	(Lbs.)	(Lbs.)	(Lbs.)	(mg/L)	(mg/L)	(Lbs.)	(Lbs.)	(Lbs.)		(SOS Bills)
Residential																					
R - Residential	18,504,916	0.0%	-	18,504,916	569	-	65,727,691	-	65,727,691	177	-	20,446,048	-	20,446,048	49.7	-	5,741,065	-	5,741,065	2,961,819	2,961,819
MF - Multi-family	6,294,140	0.0%	-	6,294,140	569	-	22,356,183	-	22,356,183	177	-	6,954,384	-	6,954,384	49.7	-	1,952,728	-	1,952,728	51,463	51,463
RA - SOS 75%	216,566	0.0%	-	216,566	569	-	769,221	-	769,221	177	-	239,283	-	239,283	49.7	-	67,189	-	67,189	3,516	879
RB - SOS 50%	58,564	0.0%	-	58,564	569	-	208,014	-	208,014	177	-	64,707	-	64,707	49.7	-	18,169	-	18,169	720	360
RC - SOS 25%	33,676	0.0%	-	33,676	569	-	119,613	-	119,613	177	-	37,208	-	37,208	49.7	-	10,448	-	10,448	288	216
SV - Duplex/Triplex	-	0.0%	-	-	569	-	-	-	-	177	-	-	-	-	49.7	-	-	-	-	-	-
R2 - Vacant Home	38,542	0.0%	-	38,542	569	-	136,897	-	136,897	177	-	42,585	-	42,585	49.7	-	11,957	-	11,957	3,228	3,228
Commercial																					
Commercial - regular	6,193,219	0.0%	-	6,193,219	579	-	22,384,324	-	22,384,324	314	-	12,139,340	-	12,139,340	72.0	-	2,783,543	-	2,783,543	186,780	186,780
Commercial - large meter	1,728	0.0%	-	1,728	579	-	6,247	-	6,247	314	-	3,388	-	3,388	72.0	-	777	-	777	144	144
Industrial																					-
SA - Auto Body and Fender Repair	15,777	0.0%	-	15,777	755	-	74,359	-	74,359	148	-	14,576	-	14,576	64.3	-	6,333	-	6,333	1,363	1,363
SB - Mortuary	3,001	0.0%	-	3,001	864	-	16,186	-	16,186	116	-	2,173	-	2,173	55.5	-	1,040	-	1,040	222	222
SC - Laundromat	73,564	0.0%	-	73,564	819	-	376,096	-	376,096	128	-	58,779	-	58,779	23.6	-	10,837	-	10,837	603	603
SD - Pet Clinic	12,835	0.0%	-	12,835	675	-	54,082	-	54,082	235	-	18,829	-	18,829	67.8	-	5,432	-	5,432	888	888
SE - Restaurant, with seating	372,847	0.0%	-	372,847	2,113	-	4,917,900	-	4,917,900	920	-	2,141,253	-	2,141,253	35.9	-	83,555	-	83,555	6,636	6,636
SF - Restaurant, fast food	158,114	0.0%	-	158,114	1,572	-	1,551,572	-	1,551,572	227	-	224,050	-	224,050	48.9	-	48,265	-	48,265	5,463	5,463
SG - Car wash, self-service	66,424	0.0%	-	66,424	549	-	227,639	-	227,639	83	-	34,498	-	34,498	4.4	-	1,824	-	1,824	678	678
SH - Car wash, full-service	73,960	0.0%	-	73,960	501	-	231,304	-	231,304	244	-	112,651	-	112,651	7.0	-	3,232	-	3,232	470	470
SI - Bottling company	28,271	0.0%	-	28,271	3,673	-	648,203	-	648,203	46	-	8,171	-	8,171	13.0	-	2,294	-	2,294	157	157
SJ - Printing, copying	8,485	0.0%	-	8,485	1,208	-	63,984	-	63,984	185	-	9,799	-	9,799	24.5	-	1,298	-	1,298	521	521
SK - Electric component manufacturer	44,426	0.0%	-	44,426	476	-	132,006	-	132,006	444	-	123,131	-	123,131	66.6	-	18,470	-	18,470	537	537
SL - Industrial laundry	36,642	0.0%	-	36,642	814	-	186,188	-	186,188	242	-	55,353	-	55,353	110.4	-	25,252	-	25,252	92	92
SM - Bakery	1,810	0.0%	-	1,810	5,887	-	66,515	-	66,515	249	-	2,813	-	2,813	22.1	-	250	-	250	195	195
SN - Miscellaneous food processor	4,324	0.0%	-	4,324	1,452	-	39,192	-	39,192	159	-	4,292	-	4,292	50.8	-	1,371	-	1,371	186	186
SO - Chemical, pharmaceutical	32,764	0.0%	-	32,764	451	-	92,241	-	92,241	196	-	40,087	-	40,087	97.2	-	19,880	-	19,880	127	127
SP - Meat packing	3,180	0.0%	-	3,180	4,153	-	82,440	-	82,440	426	-	8,456	-	8,456	93.0	-	1,846	-	1,846	43	43
Builder/Contractor	3,637	0.0%	-	3,637		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,724	2,724
Total Retail	**32,281,413**		**-**	**32,281,413**			**120,468,097**	**-**	**120,468,097**			**42,785,856**	**-**	**42,785,856**			**10,817,055**	**-**	**10,817,055**	**3,228,863**	**3,225,794**

Exhibit 7.14: Public Force Mains

Pipe Diameter	Total Footage	Total Miles	Inch - Miles
4.00	11,417.05	2.16	8.64
6.00	13,310.84	2.52	15.12
8.00	8,529.57	1.62	12.96
10.00	11,361.23	2.15	21.50
12.00	35,083.07	6.64	79.68
14.00	5,162.14	0.98	13.72
16.00	20.00	-	-
18.00	34,601.99	6.55	117.90
24.00	24.20	-	-
30.00	880.00	0.17	5.10
Total	**120,390.09**	**22.79**	**274.62**

Exhibit 7.15: Public Sewer Mains

Pipe Diameter	Total Footage	Total Miles	Inch - Miles
4.00	5,639.83	1.07	4.28
6.00	1,628,150.92	308.36	1,850.16
8.00	13,330,439.34	2,524.70	20,197.60
10.00	693,628.33	131.37	1,313.70
12.00	838,530.98	158.81	1,905.72
14.00	11,584.52	2.19	30.66
15.00	462,650.80	87.62	1,314.30
16.00	7,525.76	1.43	22.88
18.00	384,039.20	72.73	1,309.14
20.00	9,785.24	1.85	37.00
21.00	175,197.51	33.18	696.78
22.00	20.28	-	-
24.00	151,420.67	28.68	688.32
27.00	42,814.69	8.11	218.97
30.00	188,917.84	35.78	1,073.40
33.00	57,998.21	10.98	362.34
34.00	665.08	0.13	4.42
36.00	65,972.46	12.49	449.64
39.00	24,920.47	4.72	184.08
42.00	39,922.07	7.56	317.52
48.00	38,939.22	7.37	353.76
54.00	16,218.08	3.07	165.78
60.00	10,923.55	2.07	124.20
66.00	37,391.03	7.08	467.28
72.00	25,304.75	4.79	344.88
78.00	4,206.39	0.80	62.40
79.00	37.49	0.01	0.79
84.00	385.69	0.07	5.88
Total	**18,253,230.40**	**3,457.02**	**33,505.88**