



## **Town of Castle Rock**

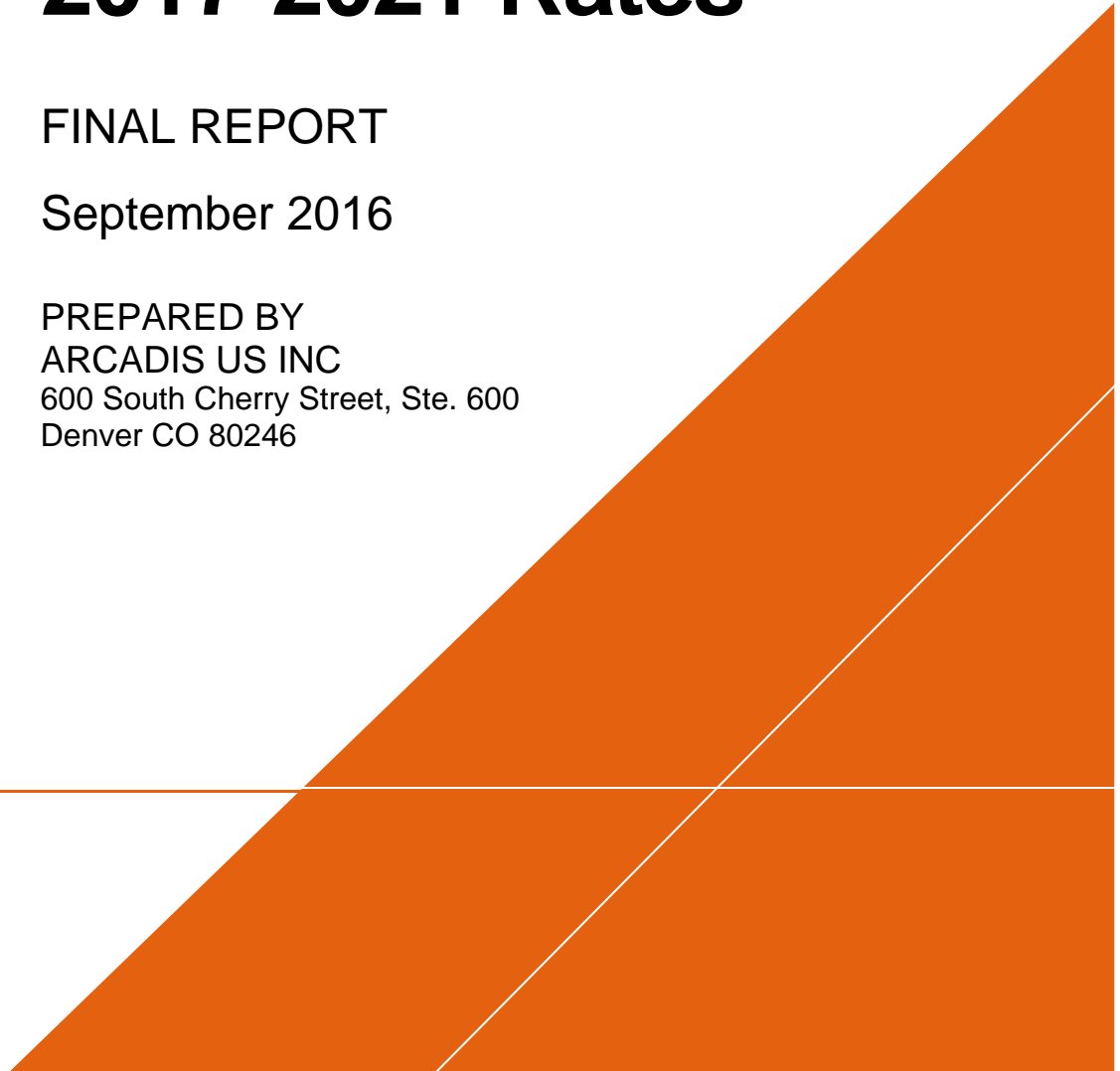
Utilities Department • 175 Kellogg Court • Castle Rock, CO 80109

# **2016 Utilities Rates and Fees Study Update – Vol. 1 of 2 2017-2021 Rates**

FINAL REPORT

September 2016

PREPARED BY  
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- B. Water Fund Long-Term Financial Plan – With Capital Improvement Program
- C. Water Resources Fund Long-Term Financial Plan – With Capital Improvement Program
- D. Wastewater Fund Long-Term Financial Plan – With Capital Improvement Program
- E. Stormwater Fund Long-Term Financial Plan – With Capital Improvement Program
- F. Water Fund Cost-of-Service Study
- G. Wastewater Fund Cost-of-Service Study
- H. Customer Characteristics Analysis Technical Memorandum

# 1 Executive Summary

## 1.1 PURPOSE

The Town of Castle Rock, Colorado (the Town) engaged Arcadis to conduct comprehensive rates and fees studies for water, water resources, wastewater, and stormwater utilities funds. The purpose of the rates and fees study is to provide the Town with a thorough review of annual revenue requirements and determine cost-of-service (COS) based rates for each utility enterprise fund. The Town's financial objectives must be met while at the same time being defensible and promoting water conservation.

This report presents the results of the financial plans and COS rates and fees study for the water, water resources, wastewater, and stormwater utilities funds for the 2016 Study Update. Occasionally, totals presented in the tables of this report will calculate to slightly different numbers due to rounding.

Financial plans, COS analyses, and rate designs for the water and water resources funds take into account the Town's Hybrid 3,500 acre feet (AF) renewable water project costs. The impact of the Hybrid 3,500 AF plan on user charge revenue requirements began in 2013. The 2016 Annual Rates and Fees Study Update (the Study) is informed by the financial terms of negotiated agreements and revised capital and operating expenditure projections. This update also aims to be in line with Castle Rock Water's Financial Management Plan goals, one of which is to minimize future rates at or below the 2013 Hybrid Model levels.

## 1.2 FINANCIAL MANAGEMENT PLAN

Castle Rock Water prepared its Financial Management Plan (FMP) in 2015 and will update this plan on an annual basis. The FMP was completed to help the utility achieve the following goals:

1. To minimize future rates at or below the 2013 Hybrid Model levels
2. To minimize debt carrying costs at or below industry standards
3. To minimize risk by balancing fixed versus variable revenues and expenses equal or matching as appropriate
4. To keep costs at or under budget for capital and operational budgets each year by fund and to continuously strive towards more efficient operations
5. To keep our rates and fees competitive with surrounding communities
6. To keep adequate reserves and maintain fund balances between minimums and maximums
7. To keep rates and fees affordable within various national affordability indices
8. To develop regional partnerships to provide economies of scale to reduce total costs of infrastructure to our customers
9. To be an industry leader in the application of financial management benchmarking ourselves against others locally and nationally



## **1.3 COST-OF-SERVICE ANALYSIS RESULTS**

### **1.3.1 Revenue Requirements**

Arcadis prepared a long-term financial plan to project the revenues required for each of Town's utilities funds. The financial plans allow the integration of debt, accumulation/use of reserves, and other assumptions to finance the Town's utility system operations and maintenance (O&M) expenses and capital improvements for each respective utility. For each utility fund, the financial plan calculates the annual user charge revenue requirements. The projection period developed for each utility financial plan was driven by the length of the capital improvement program (CIP) and ends in 2055.

While the projection period extends many years, in this report revenue requirements and capital improvement programs are presented only for the 2017 through 2021 study period for all the Town's utility funds.

#### **1.3.1.1 Utility Revenue Requirements**

Utility rates and charges are based on the Town's projected revenue requirements to operate and maintain the respective utility system along with the utility's CIP.

- The Town's 2017 total water revenue requirement from rates is estimated to be \$13.7 million.
- The Town's 2017 total water resources revenue required from charges is estimated to be \$8.6 million.
- The Town's 2017 total wastewater revenue required from rates is estimated to be \$10.7 million.
- The Town's 2017 total stormwater revenue required from fees is estimated to be \$3.0 million.

#### **1.3.1.2 Utility Fund Summaries**

A summary of fund revenue requirements for the rates and fees study period of 2017 through 2021 is presented in Appendix A.

### **1.3.2 Current Rates**

The Town's current utility rates are listed in Tables 1-1 through 1-5. Volumetric rates are presented per 1,000 gallons (kgal).

Table 1-1:  
Water  
Existing 2016 Monthly Service Charges

Meter Size	Monthly Charge
5/8" x 3/4"	\$9.54
3/4"	\$9.54
1"	\$13.72
1.5"	\$18.78
2"	\$26.00
3"	\$41.78
4"	\$94.12
6"	\$147.26
Bulk Customers*	\$9.54

\*Bulk monthly service charge is equivalent to a ¾" meter monthly service charge per bill.

Table 1-2:  
Water  
Existing 2016 Volumetric Rates by Tier

Irrigation Season (April through October 31 Consumption)				
Class	Tier 1 AWMC	Tier 2 Irrigation	Tier 3 Excess	Tier 4 Surcharge over 40 Kgals
Residential	\$2.75	\$5.39	\$8.08	\$8.08
Multi-family Indoor Use Only	\$2.75	N/A	\$3.48	N/A
Multi-family w/Irrigation	\$2.75	\$4.58	\$6.87	N/A
Commercial Indoor Use Only	\$2.75	N/A	\$3.71	N/A
Commercial w/Irrigation	\$2.75	\$4.63	\$6.95	N/A
Irrigation	N/A	\$7.39	\$11.08	N/A
Bulk	\$5.07	N/A	N/A	N/A
Winter Season – (November 1 through March 31 Consumption)				
Class	Tier 1 AWMC	Tier 2 Irrigation	Tier 3 Excess	Tier 4 Surcharge over 40 Kgals
Residential	\$2.75	N/A	\$5.39	\$8.08
Multi-family Indoor Use Only	\$2.75	N/A	\$3.48	N/A
Multi-family w/Irrigation	\$2.75	N/A	\$4.58	N/A
Commercial Indoor Use Only	\$2.75	N/A	\$3.71	N/A
Commercial w/Irrigation	\$2.75	N/A	\$4.63	N/A
Irrigation	N/A	N/A	\$11.08	N/A
Bulk	\$5.07	N/A	N/A	N/A

Table 1-3:  
Water Resources  
Existing 2016 Monthly and Volumetric Rates

Meter Size	Monthly Charge
5/8" x 3/4"	\$17.52
3/4"	\$26.15
1"	\$99.11
1.5"	\$187.50
2"	\$313.54
3"	\$588.90
4"	\$1,502.32
6"	\$2,429.34
<b>Volumetric Rate Bulk</b>	
Customer, Per Kgal	\$0.23

Table 1-4:  
Wastewater  
Existing 2016 Monthly and Volumetric Rates

Meter Size	Monthly Charge
5/8" x 3/4"	\$9.30
3/4"	\$9.30
1"	\$14.80
1.5"	\$21.46
2"	\$30.96
3"	\$51.72
4"	\$120.58
6"	\$190.48
<b>Volumetric Rate</b>	
All Customers, Per Kgal	\$6.59

Table 1-5:  
Stormwater  
Existing 2016 Monthly Service Charges

Monthly Stormwater Fee		
All Customers, per Single Family Equivalent (SFE)		\$6.85
SFE Assignment		
Customer Class	Impervious Sq. Ft.	SFE
Single Family Attached & Detached	3,255	1
Non-Single Family (Multi Family & Commercial)	Parcel size times 80% imperviousness divided by 3,255 impervious sq. ft. per SFE = # of SFEs	

## 1.4 RATES AND FEES ANALYSIS

Arcadis updated COS based rates for the water and wastewater utilities and user charges for the water resources and stormwater utilities that meet the annual user charge revenue requirements. The rates and fees meet the Town's financial objectives while being defensible. The Town's rates and fees goals as described in the FMP include:

- Keep rates and fees competitive with surrounding communities
- Keep rates and fees affordable within various national affordability indices

These are based on the cost of providing utility service and the Town's comprehensive review of current customer service characteristics. A summary of the customer service characteristics analysis is presented in Section 4 of the full report.

## 1.5 RECOMMENDED RATE SCHEDULES

### 1.5.1 Water

The water rate structure includes a monthly service charge by meter size. This monthly charge comprises a customer charge per account and a charge for meters and services that varies by meter size. Water volumetric rates are presented for the Town's water budget rate structure where AWMC means Average Winter Monthly Consumption.

Based on the cost of service analysis, no changes were recommended to the 2016 water rates. Table 1-6 and Table 1-7 present the recommended water rates for 2017.

Recommended rate schedules for the full study period (2017 through 2021) are presented in Section 1.5 and attached as Appendix B.

Table 1-6:  
Water  
Proposed 2017 Monthly Service Charges

Meter Size	Monthly Charge
5/8" x 3/4"	\$9.54
3/4"	\$9.54
1"	\$13.72
1.5"	\$18.78
2"	\$26.00
3"	\$41.78
4"	\$94.12
6"	\$147.26
Bulk Customers*	\$9.54

\*Bulk monthly service charge is equivalent to a ¾" meter monthly service charge per bill.

Table 1-7:  
Water  
Proposed 2017 Volumetric Rates by Tier

Irrigation Season (April through October 31 Consumption)				
Class	Tier 1 AWMC	Tier 2 Irrigation	Tier 3 Excess	Tier 4 Surcharge over 40 Kgals
Residential	\$2.82	\$5.53	\$8.29	\$8.29
Multi-family Indoor Use Only	\$2.82	N/A	\$3.57	N/A
Multi-family w/Irrigation	\$2.82	\$4.70	\$7.04	N/A
Commercial Indoor Use Only	\$2.82	N/A	\$3.80	N/A
Commercial w/Irrigation	\$2.82	\$4.75	\$7.13	N/A
Irrigation	N/A	\$7.58	\$11.36	N/A
Bulk	\$5.07	N/A	N/A	N/A
Winter Season – (November 1 through March 31 Consumption)				
Class	Tier 1 AWMC	Tier 2 Irrigation	Tier 3 Excess	Tier 4 Surcharge over 40 Kgals
Residential	\$2.82	N/A	\$5.53	\$8.29
Multi-family Indoor Use Only	\$2.82	N/A	\$3.57	N/A
Multi-family w/Irrigation	\$2.82	N/A	\$4.70	N/A
Commercial Indoor Use Only	\$2.82	N/A	\$3.80	N/A
Commercial w/Irrigation	\$2.82	N/A	\$4.75	N/A
Irrigation	N/A	N/A	\$11.36	N/A
Bulk	\$5.07	N/A	N/A	N/A

### 1.5.2 Water Resources

The Town currently assesses all water resources customers a monthly service charge per SFE. A small increase of 3 percent is needed in Water Resources in 2017. This 3 percent will be collected thru an increase in the proposed 2017 volumetric rates by tier, with the revenue going to the Water Resources Fund. This is in lieu of increasing the Water Resources fixed monthly charge, thus giving customers more control over the variable rate and conservation efforts. The proposed 2017 water resources charge calculated per SFE by meter size is presented in Table 1-8.

Table 1-8:  
Water Resources  
Proposed 2017 Monthly and Volumetric Rates

Meter Size	Monthly Charge
5/8" x 3/4"	\$17.52
3/4"	\$26.15
1"	\$99.11
1.5"	\$187.50
2"	\$313.54
3"	\$588.90
4"	\$1,502.32
6"	\$2,429.34
<b>Volumetric Rate</b>	
Bulk Customer, Per Kgal	\$0.24

### 1.5.3 Wastewater

The Town currently charges wastewater customers a monthly service charge that consists of a fixed monthly charge, plus a volumetric rate for wastewater flow that has been estimated using the account's AWMC. Based on the cost of service analysis, no changes are proposed to the 2016 wastewater rates. The proposed 2017 wastewater rates consist of a monthly charge that includes the demand charge by meter size, plus a uniform volume rate for all customers.

Table 1-9:  
Wastewater  
Proposed 2017 Monthly and Volumetric Rates

Meter Size	Monthly Charge
5/8" x 3/4"	\$9.30
3/4"	\$9.30
1"	\$14.80
1.5"	\$21.46
2"	\$30.96
3"	\$51.72
4"	\$120.58
6"	\$190.48
<b>Volumetric Rate</b>	
All Customers, Per Kgal	\$6.59

### 1.5.4 Stormwater

Arcadis reviewed the existing assumptions used for determining the stormwater monthly utility fee. Arcadis was asked to verify the assumptions used in determining the fee and update as necessary. The primary assumption in determining stormwater utility fees is the definition of an SFE. The Town's existing 2016 and proposed 2017 fees are based on one SFE being equal to 3,255 square feet (sq. ft.) of impervious area. For non-residential accounts, all properties were assumed to be 80 percent impervious unless otherwise indicated in the billing system.

Given updates to the revenue requirements and the number of SFEs billed for stormwater, Arcadis calculated the fees shown in Table 1-10. An increase of 4 percent is proposed for the 2017 stormwater fee.

Table 1-10:  
Stormwater  
Proposed 2017 Monthly service Charges

Monthly Stormwater Fee		
All Customers, per Single Family Equivalent (SFE)		\$7.12
SFE Assignment		
Customer Class	Impervious Sq. Ft.	SFE
Single Family Attached & Detached	3,255	1
Non-Single Family (Multi Family & Commercial)	Parcel size times 80% imperviousness divided by 3,255 impervious sq. ft. per SFE = # of SFEs	

## 1.6 PROPOSED RATES FOR 2017 THROUGH 2021

Rates for the five-year study period (2017 through 2021) were projected using the water, water resources, wastewater, and stormwater COS model results and the percentage rate revenue increases projected by the financial plans. Table 1-11 presents proposed rate revenue changes for 2017 through 2021. Tables 1-12 through 1-16 and Appendix B contain the rate schedules for the years 2017 through 2021.

Table 1-11:  
Proposed Rate Revenue Changes  
2017 - 2021

Year	Water	Water Resources	Wastewater	Stormwater
2017	0.0%	3.0%	0.0%	4.0%
2018	0.0%	3.0%	0.0%	4.0%
2019	0.0%	3.0%	0.0%	4.0%
2020	0.0%	3.0%	0.0%	4.0%
2021	0.0%	3.5%	0.0%	4.0%

Table 1-12:  
Water  
Proposed Monthly Service Charges 2017 - 2021

Meter Size	FY2017	FY2018	FY2019	FY2020	FY2021
5/8" x 3/4"	\$9.54	\$9.54	\$9.54	\$9.54	\$9.54
3/4"	\$9.54	\$9.54	\$9.54	\$9.54	\$9.54
1"	\$13.72	\$13.72	\$13.72	\$13.72	\$13.72
1.5"	\$18.78	\$18.78	\$18.78	\$18.78	\$18.78
2"	\$26.00	\$26.00	\$26.00	\$26.00	\$26.00
3"	\$41.78	\$41.78	\$41.78	\$41.78	\$41.78
4"	\$94.12	\$94.12	\$94.12	\$94.12	\$94.12
6"	\$147.26	\$147.26	\$147.26	\$147.26	\$147.26
Bulk Customers	\$9.54	\$9.54	\$9.54	\$9.54	\$9.54



Table 1-13:  
Water  
Proposed Volume Rates 2017 - 2021

Irrigation Season – April through October 31 Consumption															
Class	Tier 1 AWMC					Tier 2 Irrigation					Tier 3 Excess				
	FY2017	FY2018	FY2019	FY2020	FY2021	FY2017	FY2018	FY2019	FY2020	FY2021	FY2017	FY2018	FY2019	FY2020	FY2021
Residential	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	\$5.53	\$5.53	\$5.53	\$5.53	\$5.53	\$8.29	\$8.29	\$8.29	\$8.29	\$8.29
Multi-family Indoor Use Only	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	N/A	N/A	N/A	N/A	N/A	\$3.57	\$3.57	\$3.57	\$3.57	\$3.57
Multi-family with Irrigation	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	\$4.70	\$4.70	\$4.70	\$4.70	\$4.70	\$7.04	\$7.04	\$7.04	\$7.04	\$7.04
Commercial – Indoor Use Only	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	N/A	N/A	N/A	N/A	N/A	\$3.80	\$3.80	\$3.80	\$3.80	\$3.80
Commercial with Irrigation	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	\$4.75	\$4.75	\$4.75	\$4.75	\$4.75	\$7.13	\$7.13	\$7.13	\$7.13	\$7.13
Irrigation	N/A	N/A	N/A	N/A	N/A	\$7.58	\$7.58	\$7.58	\$7.58	\$7.58	\$11.36	\$11.36	\$11.36	\$11.36	\$11.36
Winter Season – November 1 through March 31 Consumption															
Residential	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	N/A	N/A	N/A	N/A	N/A	\$5.53	\$5.53	\$5.53	\$5.53	\$5.53
Multi-family Indoor Use Only	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	N/A	N/A	N/A	N/A	N/A	\$3.57	\$3.57	\$3.57	\$3.57	\$3.57
Multi-family with Irrigation	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	N/A	N/A	N/A	N/A	N/A	\$4.70	\$4.70	\$4.70	\$4.70	\$4.70
Commercial - Indoor Use Only	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	N/A	N/A	N/A	N/A	N/A	\$3.80	\$3.80	\$3.80	\$3.80	\$3.80
Commercial with Irrigation	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	N/A	N/A	N/A	N/A	N/A	\$4.75	\$4.75	\$4.75	\$4.75	\$4.75
Irrigation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$11.36	\$11.36	\$11.36	\$11.36	\$11.36
Bulk	\$5.07	\$5.07	\$5.07	\$5.07	\$5.07	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 1-14:  
Water Resources  
Proposed Monthly and Volumetric Rates 2017 - 2021

Meter Size	FY2017	FY2018	FY2019	FY2020	FY2021
5/8" x 3/4"	\$17.52	\$18.05	\$18.59	\$19.15	\$19.82
3/4"	\$26.15	\$26.93	\$27.74	\$28.57	\$29.57
1"	\$99.11	\$102.08	\$105.14	\$108.30	\$112.09
1.5"	\$187.50	\$193.12	\$198.91	\$204.88	\$212.05
2"	\$313.54	\$322.94	\$332.63	\$342.61	\$354.60
3"	\$588.90	\$606.56	\$624.76	\$643.50	\$666.03
4"	\$1,502.32	\$1,547.39	\$1,593.81	\$1,641.62	\$1,699.08
6"	\$2,429.34	\$2,502.22	\$2,577.28	\$2,654.60	\$2,747.51
<b>Bulk Customers Volumetric Rate</b>					
Per Kgal	\$0.24	\$0.24	\$0.25	\$0.26	\$0.27

Table 1-15:  
Wastewater  
Proposed Monthly and Volumetric Rates 2017 - 2021

Meter Size	FY2017	FY2018	FY2019	FY2020	FY2021
5/8" x 3/4"	\$9.30	\$9.30	\$9.30	\$9.30	\$9.30
3/4"	\$9.30	\$9.30	\$9.30	\$9.30	\$9.30
1"	\$14.80	\$14.80	\$14.80	\$14.80	\$14.80
1.5"	\$21.46	\$21.46	\$21.46	\$21.46	\$21.46
2"	\$30.96	\$30.96	\$30.96	\$30.96	\$30.96
3"	\$51.72	\$51.72	\$51.72	\$51.72	\$51.72
4"	\$120.58	\$120.58	\$120.58	\$120.58	\$120.58
6"	\$190.48	\$190.48	\$190.48	\$190.48	\$190.48
<b>Volumetric Rate</b>					
All Customers, Per Kgal	\$6.59	\$6.59	\$6.59	\$6.59	\$6.59

Table 1-16:  
Stormwater  
Proposed Monthly Service Charges 2017 - 2021

Description	FY2017	FY2018	FY2019	FY2020	FY2021
All Customers, per Single Family Equivalent (SFE)	\$7.12	\$7.41	\$7.71	\$8.01	\$8.33

## 2 Introduction

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### 2.1 PROJECT PURPOSE

The purpose of the rates and fees study update is to provide the Town with cost-of-service (COS) based rates for each utility fund that meet the Town's financial goals while being defensible and promoting water conservation. The study update informs the Town of changes in assumptions on customer service characteristics and annual revenue requirements.

### 2.2 ORGANIZATION OF REPORT

This report consists of an Executive Summary, a main body comprising five sections, and appendices.

- *Section 1, Executive Summary* contains a summary of the report and may be read or distributed separately. The main body contains more details of the study than the Executive Summary.
- *Section 2, Introduction*, provides details about the report organization.
- *Section 3, Long-Term Financial Planning*, describes steps taken by the project team to update critical assumptions in each utility fund, update growth assumptions, and complete a projection of the sources and uses of funds required in this study period.
- *Section 4, Customer Service Characteristics*, provides information regarding the review of customer characteristics such as current number of accounts and projected growth for each of the four funds. It also discusses maintenance of the equivalency schedules that are used to determine single-family residential equivalents for use in calculating the rates and fees.
- *Section 5, Water and Wastewater Cost-of-Service Analysis*, provides the information regarding the results of the COS water and wastewater rate study.
- *Section 6, Rate Design*, provides results of the rate design process for all four utilities funds.
- *Section 7, Findings and Recommendations*, provides an overall review of the findings and recommendations from the study.

The appendices attached to this report provide detailed analysis and paper copies of the completed COS rate models.

## 2.3 LIST OF ACRONYMS

The following provides a list of acronyms used throughout the report and its meaning:

- AF: Acre Feet
- AWMC: Average Winter Monthly Consumption
- BOD: Biochemical Oxygen Demand
- CIM: Conservation Impact Model
- CIP: Capital Improvement Program
- COP: Certificates of Participation
- COS: Cost of Service
- ET: Evapotranspiration Rates
- FMP: Financial Management Plan
- FY: Fiscal Year
- GPM: Gallons per minute
- GIS: Geographical Information System
- Kgal : Thousand (1,000) gallons
- O&M: Operations and Maintenance
- PCWRA: Plum Creek Water Reclamation Authority
- SDF: System Development Fee
- SFE: Single Family Equivalent
- Sq. Ft.: Square Feet
- TSS: Total Suspended Solids

## 3 Long-Term Financial Planning

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### 3.1 BACKGROUND

The Town engaged Arcadis to assist in updating the comprehensive utility-specific financial plans that examine revenues, expenditures, debt service requirements, cash flows, reserve requirements, fund balances, and capital project costs for the study period. The financial plans can be found in Appendix C through F. The financial plan is used as the basis for projecting utility-specific revenue requirements for the water, water resources, wastewater, and stormwater utilities. Assumptions used in the development of the long-term financial plans play a critical role in the results of this study. A full understanding of the assumptions used is therefore vitally important in qualifying study results. The following sections provide both the planning assumptions and calculation of revenue requirements used for the purposes of the study.

### 3.2 FINANCIAL PLANNING OVERVIEW

The main function of the financial plan is to balance the sources of funds with the uses of funds. Sources of funds include revenues from water sales (or water resources charges, wastewater charges, stormwater fees), miscellaneous fee revenue, interest/investment earnings, use of cash reserves, debt proceeds, and contributions (including grants, developer contributions, etc.). Uses of funds include expenditures for operating expenses, repairs and replacements, debt service, increases in reserves, and cash-financed capital expenditures. The Town has an explicit financial goal to minimize risk by balancing fixed versus variable revenues and expenses as appropriate. By identifying all of the planned uses of funds, the Town developed financial plans to balance the sources of funds while minimizing the impact on rates to the greatest extent possible.

The financial plan is a forward-looking model, meaning that all values reported are for future periods. For the purposes of this study, the first year in the model is fiscal year 2017. The model includes projections of sources and uses of funds throughout the study period. Figure 3-1 provides a visual overview of the financial planning process followed by the Town and reviewed by Arcadis. Each step of the financial planning process is described individually in greater detail in the following sections.

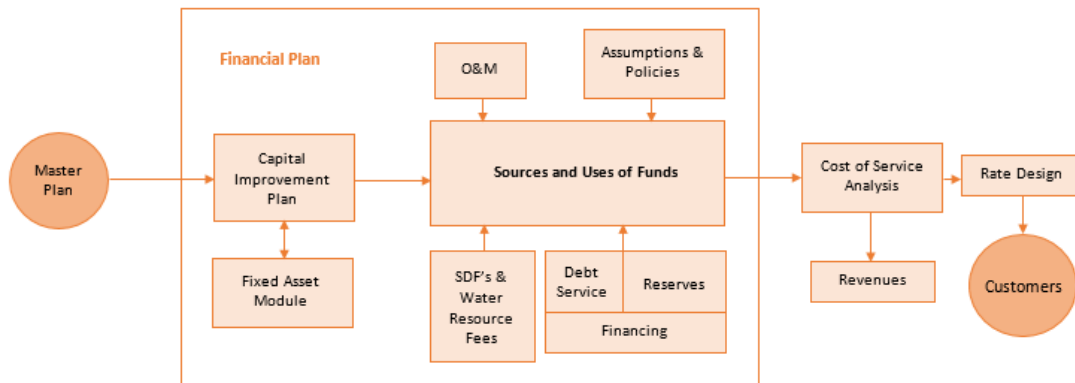


Figure 3-1: Financial Planning Flowchart

### 3.2.1 Capital Improvements

Capital improvements are the planned capital expenditures specific to each fund that are projected for the term of the corresponding utility's financial plan. Capital items are physical assets and infrastructure with a useful life greater than one year that meet all of the Town's established capitalization policy criteria. The Town also established a measurable goal to keep costs at or under budget for capital budgets each year by fund. Detailed CIPs were developed by Utilities Department engineers and can be found in Appendix C through F.

### 3.2.2 Operating Expenditures

Operating expenditures are planned annually as part of the operating budget. The majority of operating costs are fixed as opposed to variable, meaning that increases or decreases in usage will have little effect on the total costs of operations. Similar to capital expenses, the Town also aims to keep costs at or under budget for operational budgets each year by fund and continuously strives towards more efficient operations.

### 3.2.3 Other Capital Funding Costs

Planned capital expenditures project monies that will be needed to fund the major infrastructure projects for each fund through the term of the study period. Capital funding costs are expenditures that the respective utility fund will need to make in order to fund capital projects. These expenditures include the annual costs of debt service (principal and interest payments), the cost of cash financing a given portion of the project's costs, and the cost of funding repair and replacement reserves. A critical assumption for the water, water resources, wastewater, and stormwater funds during the study period is that no new debt will be issued to fund capital improvements. The capital funding costs presented in this report include the impacts of the 3,500 AF Hybrid renewable water supply option which Town Council approved in October 2012.

### 3.2.4 Revenue Requirements

Revenue requirements define the total amount of income the utility must earn in order to operate on a day-to-day basis, conduct any necessary repairs, and respond to the needs of growth in the system. Two major requirements are measured as revenue requirements: 1) the total revenue requirements needed, and 2) the revenues required from rates (also called user charge revenue requirements).

The revenue requirements of each utility fund include O&M costs, cash-financed capital improvements, debt service payments, and funding of operations and capital reserves. The water fund requires additional funding of rate revenue stabilization reserves.

### 3.2.5 Calibration of Financial Plan

In general, there are five major tools one can utilize in optimizing the financial plan to meet revenue requirements while remaining aligned with Town policies and objectives. These include:

1. Additional income from rate revenue increases,
2. Proceeds from new debt issuance,
3. Contributions from system development fees,
4. The use of reserve funds, and
5. Interfund loans.

As the Town has determined no new debt will be issued for the water, water resources, wastewater, and stormwater utilities in the near term, only four main sources of revenues exist for these utility funds.

## 3.3 ASSUMPTIONS SHARED ACROSS FUNDS

Some of the assumptions and inputs used in the development of the long-term financial plans are shared across all four funds.

*System growth* – customer growth in the system increases total system revenues due to the nature of its relationship to water consumption, wastewater usage, and increases in the number of SFEs.

Table 3-1 presents projected system growth for each of the Town's four utility funds. These assumptions were developed by Town staff and take into account the type of customers, meter size, lot size, and irrigation characteristics.

Table 3-1:  
Projected SFEs and Percentage Growth by Fund

Year	Water Fund		Water Resources Fund		Wastewater Fund		Stormwater Fund	
	SFEs	Percentage Growth	SFEs	Percentage Growth	SFEs	Percentage Growth	SFEs	Percentage Growth
FY2017	800	2.94%	800	2.96%	800	3.49%	1,186	3.59%
FY2018	800	2.85%	800	2.88%	800	3.37%	970	2.83%
FY2019	800	2.77%	800	2.80%	800	3.26%	1,058	3.01%
FY2020	800	2.70%	800	2.72%	800	3.16%	837	2.31%
FY2021	800	2.63%	800	2.65%	800	3.06%	1,062	2.86%

*Escalation Factors* – As part of the projections of O&M costs for the study period, the Town has provided a 5-year O&M budget. Arcadis relied on the Town budget documents for O&M projections within the 5-year budget period. After the five years O&M costs were escalated at 2.80 percent. This escalation represents Arcadis’ expectation of future cost escalations based on the average Engineering News Record (ENR) index increase from 2007 through July of 2016.

### 3.4 WATER FUND

The water fund financial plan projects the water utility’s sources and uses of funds from 2017 through 2055. The water utility financial model developed for this study contains four sub-funds:

- Operating
- Capital Reserve
- Catastrophic Failure Reserve
- Rate Revenue Stabilization Reserve

#### 3.4.1 Sources of Funds

Sources of funds include all cash inflows to the water fund. These range from user charge revenues to miscellaneous income to contributed capital and interest earnings. The major assumptions for specific sources of funding are provided below:

*System growth* – customer growth in the system increases total system revenues because of its relationship to water consumption and increases in the number of SFEs. Table 3-1 presents the projected system growth for each of Utilities’ four funds.

*Rate revenue increases* – system revenues are derived primarily from user charges, or rates. Revenue is a function of price and the current water fund financial plan assumes no rate revenue increases from 2017 through 2021.

*System Development Fee (SDF) Revenues* – SDFs are one-time charges to new connections to the system that are intended to recover the Town’s investments in capacity to serve new customers. SDF revenue is directly related to the SFE and growth assumptions. SDF



revenues are used to fund the growth related CIP. Arcadis updated the Town's SDFs and results are presented in a separate report.

*Revenue bonds* – Within the study period 2017 through 2021, no new debt is planned.

*Interfund loans* – The interfund loan from water to transportation will be paid back by the end of 2017 and the 2014 interfund loan from water to stormwater will be paid back in 2019.

*Other revenues* – This source of funds includes non-rate related revenues, miscellaneous revenues, fines, leases, intergovernmental agreements, and interest earnings. Arcadis applied the miscellaneous revenues projected in the Town's 5-year budget. Interest earnings are calculated based on the average operating fund balance with an assumed interest rate of approximately 0.40 percent. For the period 2017 through 2021, the water fund other revenues are presented in Table 3-2.

Table 3-2:  
Water Fund Other Revenues

Other Revenues	FY2017	FY2018	FY2019	FY2020	FY2021
Meter Services	\$ 640,026	\$ 665,026	\$ 690,026	\$ 690,026	\$ 690,026
Customer Billing	\$ 329,500	\$ 329,500	\$ 329,500	\$ 329,500	\$ 329,500
Tower Lease	\$ 70,310	\$ 70,310	\$ 70,310	\$ 70,310	\$ 70,310
Bulk Water	\$ 277,441	\$ 291,313	\$ 305,879	\$ 321,172	\$ 337,231
Interest Earnings	\$ 10,100	\$ 24,008	\$ 33,819	\$ 41,169	\$ 45,828
Miscellaneous Revenues	\$ 6,795	\$ 6,926	\$ 7,059	\$ 7,195	\$ 7,404
<b>Total</b>	<b>\$ 1,334,172</b>	<b>\$ 1,387,083</b>	<b>\$ 1,436,592</b>	<b>\$ 1,459,372</b>	<b>\$ 1,480,298</b>

*Fund balances* – The water fund is projected to have a reserve fund balance of approximately \$5.7 million at the beginning of 2017, not including capital reserve funds. Each of the sub-funds in the water utility financial plan has a minimum fund balance requirement to help mitigate financial risk, which is in line with the FMP goal to keep adequate reserves and maintain fund balances between minimums and maximums. The requirements by sub funds are:

- Operating – 60-days of O&M; increasing from approximately \$1.5 million to \$1.8 million throughout the study period.
- Capital Reserve – obligated reserves vary from year to year, depending on the CIP. The fund maintains an unobligated reserve of \$1.0 million throughout the study period.
- Catastrophic Failure Reserve – approximately 2 percent of fixed asset value, averaging \$4.1 million throughout the study period
- Rate Revenue Stabilization Reserve – based upon the percent increase in revenues; increasing from \$1.7 million to \$2.1 million throughout the study period.

The financial plan calls for maintaining the fund balance requirements presented above while subsequently using the net available reserve fund balance in capital reserves over time to offset short-term capital needs. The goal is to balance the need for rate increases and, if necessary, additional debt.

### 3.4.2 Uses of Funds

Uses of funds include all expenditures, either operating or capital, and any reserve requirement or increase in fund balance the Town plans to achieve. The major assumptions for uses of funds are as follows.

*Operating expenses* – Represents the basic costs of operating the system. Projection of O&M expenses varies depending on the degree of fixed versus variable costs for each budgeted line item. Most of the costs of the water system are fixed and therefore do not escalate with increased system use. Meanwhile, variable costs escalate both with increased system use and the expected inflation rate. Town staff have made a reasonable effort to separate the two for projection purposes. O&M expenses during the rate period were provided by the Town. The Utility's goal is to keep costs at or under budget for capital and operational budgets each year by fund and to continuously strive towards more efficient operations.

Personnel services are one of the most important cost drivers in operating expenses. Staff additions over the next five years are included in the Town's 5-year financial planning document.

Energy costs are a major component in plant operations and an important cost driver in variable operating expenses. Over the next five years energy costs are expected to increase at a rate higher than inflation.

*Capital improvements* – Capital improvement projections are provided in Appendix C by year, as indicated. Total water system capital improvement costs from 2017 through 2021 are expected to be \$22.1 million in today's dollars. Capital improvement costs were provided by the Town for years 2017 through 2055. Arcadis recommends capital improvements assumptions, including annual escalation, are reviewed annually.

*Interfund loans* – The water fund does not have an interfund loan balance at this time.

*Fund balances* – When funds are drawn down from initial balances, the use of those funds is a *source* of funding for the water operating fund. Alternatively, when fund balances are building, it is a *use* of funds from the water operating fund. For planning purposes, it is generally a poor idea to allow a fund balance to decline below an acceptable level of working capital.

For the purposes of this study, it is assumed the Town will not allow its water fund balances to dip below the requirements presented in the above section. This conforms to the FMP goal to keep adequate reserves and maintain fund balances between minimums and maximums.

*Debt service* – The debt service sub-fund currently carries debt service obligations of the water fund. As stated in the FMP, the Town aims to minimize debt carrying costs at or below industry standards. The water fund currently has two outstanding revenue bond issues (2012 and 2015). The 2012 bond issue was a refinancing of 2003 and 2004 bonds, and the 2015 bond issue was a refinancing of 2006 bonds. The water fund debt service amounts to

approximately \$1.7 million annually for 2017 through 2023 and then declines to approximately \$700,000 annually for 2024 through 2026.

*Debt Service Coverage* – The water fund outstanding revenue bonds require operating revenues to be 1.2 times the total annual debt service amount. As a more conservative target, the water fund financial plan was developed to meet debt service coverage of 1.25 times annual debt service.

### 3.4.3 User Charge Revenue Requirements

The portion of annual system revenue requirements to be recovered through rates depends on a utility's financing policy and its other sources of income. To determine the amount of revenue rates the water enterprise must generate annually, the total revenue requirements must be reduced by non-rate or other system revenues. Other system revenues are defined as all revenues except those derived from water rates. Table 3-3 presents the water fund user charge revenue requirements for the period 2017 through 2021. The Plum Creek Water Purification Facility (PCWPF) opened in 2013. Operating costs (PCWPF Water Treatment Charges) for the facility and functions supporting PCWPF operation are recovered via the water system volumetric rates, and revenues generated from these operating costs are transferred to the Water Resources fund where the assets reside.

Table 3-3:  
Water Fund User Charge Revenue Requirements

Item	FY2017	FY2018	FY2019	FY2020	FY2021
Operating and Maintenance	\$ 8,705,180	\$ 9,057,141	\$ 9,520,448	\$ 10,221,945	\$ 10,679,897
PCWPF Water Treatment Charges	\$ 1,528,166	\$ 1,607,369	\$ 1,704,115	\$ 1,811,221	\$ 1,994,905
Debt Service	\$ 1,740,767	\$ 1,746,879	\$ 1,752,251	\$ 1,733,994	\$ 1,740,790
Transfers Out	\$ 200,643	\$ 225,861	\$ 272,052	\$ 339,856	\$ 238,710
Minor Capital Outlay	\$ 984,182	\$ 1,017,882	\$ 1,040,682	\$ 1,048,282	\$ 1,082,482
Cash Funded Capital	\$ 5,378,920	\$ 2,764,951	\$ 4,475,356	\$ 8,290,897	\$ 2,683,562
<b>Total Expenditures</b>	<b>\$ 18,537,857</b>	<b>\$ 16,420,084</b>	<b>\$ 18,764,905</b>	<b>\$ 23,446,195</b>	<b>\$ 18,420,346</b>
Non-Rate Revenues	\$ (1,384,581)	\$ (1,431,391)	\$ (1,476,728)	\$ (1,484,296)	\$ (1,493,899)
Capital Adjustments	\$ (3,463,962)	\$ (908,837)	\$ (2,817,779)	\$ (7,100,959)	\$ (1,674,965)
<b>Revenues</b>					
<b>Required from Rates</b>	<b>\$ 13,689,314</b>	<b>\$ 14,079,856</b>	<b>\$ 14,470,398</b>	<b>\$ 14,860,940</b>	<b>\$ 15,251,482</b>

## 3.5 WATER RESOURCES

The water resources fund financial plan projects the fund's sources and uses of funds from fiscal year 2017 through fiscal year 2055. As noted previously, the results presented for the

water resources fund include the impacts of the renewable water supply review for the 3,500 AF Hybrid proposal authorized by Town Council in October 2012. The water resources utility financial model developed in this study contains three sub-funds:

- Operating
- Capital Reserve
- Catastrophic Failure Reserve

The major assumptions for specific sources of funding are provided below:

### 3.5.1 Sources of Funds

The sources of funds include all cash inflows to the operating fund. These range from user charge revenues to miscellaneous income to contributed capital and interest earnings. The major assumptions for specific sources of funding are provided below:

*System growth* – Table 3-1 presents the projected system growth by fund.

*Rate revenue increases* – System revenues are derived from system development fees and user charges. Revenue is a function of price and number of SFEs; growth is expected to remain strong during the five-year period, and price becomes the other major variable in total revenues. The current financial plan assumes 3.0 percent increases annually in 2017 through 2020 and an increase of 3.5 percent in 2021. Higher projected increases further in the planning horizon are driven by timing and magnitude of capital improvements; specifically, subscription fees, water delivery charges, and corresponding treatment, transmission, and storage infrastructure investment.

*System Development Fee (SDF) Revenues* –SDF revenue is directly related to the SFE and growth assumptions. Arcadis updated the Town’s water resources SDF and results are presented in a separate report.

*Revenue bonds* – Within the study period 2017 through 2021, no new debt is planned.

*Interfund loans* – There were no loans payable to the water resources fund.

*Other revenues* – This source of funds includes non-rate related revenues, miscellaneous revenues, leases, fines, water conservation surcharges, intergovernmental agreements, and interest earnings. Arcadis applied the miscellaneous revenues projected in the Town’s five-year budget. Interest earnings are calculated based on the average operating fund balance with an assumed interest rate of approximately 0.4 percent. PCWPF reimbursement revenue represents the PCWPF operating costs recovered through water fund rate revenues, subsequently transferred to the water resources fund. For the period 2017 through 2021, the water resources fund other revenues are presented in Table 3-4.

Table 3-4:  
Water Resources Fund Other Revenues

Other Revenues	FY2017	FY2018	FY2019	FY2020	FY2021
Water Surcharges	\$ 45,000	\$ 45,000	\$ 45,000	\$ 45,000	\$ 45,000
Misc Revenues	\$ 135,740	\$ 135,740	\$ 4,403,490	\$ 6,740	\$ 6,740
Interest Earnings	\$ 137,411	\$ 94,596	\$ 106,035	\$ 116,972	\$ 118,873
PCWPF Reimbursement Revenue	\$ 1,528,166	\$ 1,607,369	\$ 1,704,115	\$ 1,811,221	\$ 1,994,905
<b>Total</b>	<b>\$ 1,846,317</b>	<b>\$ 1,882,706</b>	<b>\$ 6,258,640</b>	<b>\$ 1,979,933</b>	<b>\$ 2,165,518</b>

*Fund balances* – The water resources fund was projected to have a reserve of approximately \$47.9 million at the beginning of 2017, not including capital reserve funds. Each of the sub-funds in the water resources financial plan has a minimum balance requirement to help mitigate financial risk, which is in line with the FMP goal to keep adequate reserves and maintain fund balances between minimums and maximums. The requirements by sub fund are:

- Operating – 60-days of O&M; increasing from approximately \$866,000 to \$1.5 million throughout the study period
- Capital Reserve – obligated reserves vary from year to year, depending on the CIP. The fund maintains an unobligated reserve of \$500,000 throughout study period.
- Catastrophic Failure Reserve – approximately 2 percent of original fixed asset value; increasing from \$2.5 million to \$3.0 million throughout the study period

The financial plan calls for maintaining the fund balance requirements presented above and subsequently using net available reserve fund balance in capital reserves over time to offset short-term capital needs. As stated for the water utility, the goal is to balance the need for rate increases and additional debt.

### 3.5.2 Uses of Funds

Uses of funds include all expenditures, either operating or capital, and any reserve requirement or increase in fund balance the Town plans to achieve. The major assumptions for uses of funds are as follows.

*Operating costs* – Represents the basic costs of operating the system. Projection of O&M expenses varies depending on the degree of fixed versus variable costs for each budgeted line item. Most of the costs of the water resources system are fixed and therefore do not escalate based on system use. Meanwhile, variable costs escalate both with increased system use and the expected inflation rate. Town staff have made a reasonable effort to separate the two for projection purposes. O&M expenses during the rate period were provided by the Town. The Utility's goal is to keep costs at or under budget for capital and operational budgets each year by fund and to continuously strive towards more efficient operations.

Personnel services are one of the most important cost drivers in operating expenses. Staff additions over the next five years are included in the Town provided five-year financial planning document.

Energy costs are a major component in plant operations and an important cost driver in operating expenses. Over the next five years energy costs are expected to increase at a rate higher than inflation.

*Capital improvements* – Capital improvements are assumed at the levels provided in Appendix D in the years indicated. Total capital improvement costs are expected to exceed \$84.9 million from 2017 through 2021. Capital improvement costs were provided by the Town for years 2017 through 2055. Arcadis recommends capital improvements assumptions, including annual escalation, are reviewed annually.

*Interfund loans* – There are currently no interfund loans.

*Fund balances* –For the purposes of this study, it is assumed the Town will not allow its water resources fund balances to drop below the requirements presented in the above section. This conforms to the FMP goal to keep adequate reserves and maintain fund balances between minimums and maximums.

*Debt service* –The water resources fund had one outstanding debt issue- the 2008 Certificates of Participation (COP). The Town recently secured revenue bonds at a lower fixed interest rate of 2.505 percent, replacing the COP, with the objective of minimizing debt carrying costs at or below industry standard. The water resources fund existing debt service amounts to an average of \$3.7 million annually for 2017 through 2034. This includes principal, interest, remarketing, and other associated fees.

*Debt Service Coverage* – The water resources fund outstanding COP debt did not require a specific coverage ratio. The revenue bonds require a 1.25 debt coverage ratio.

### **3.5.3 User Charge Revenue Requirements**

Table 3-5 presents the water resources fund user charge revenue requirements for the study period, 2017 through 2021.

Table 3-5:  
Water Resources Fund User Charge Revenue Requirements

Item	FY2017	FY2018	FY2019	FY2020	FY2021
Operating and Maintenance	\$ 5,193,463	\$ 6,506,812	\$ 7,287,181	\$ 7,905,423	\$ 8,873,006
Debt Service	\$ 3,665,025	\$ 3,679,475	\$ 3,701,975	\$ 3,728,975	\$ 3,741,975
Transfers Out	\$ 4,707	\$ 248,974	\$ 189,976	\$ 66,311	\$ 28,764
Minor Capital Outlay	\$ 36,405	\$ 36,521	\$ 36,639	\$ 36,749	\$ 37,201
Cash Funded Capital	\$ 56,664,897	\$ 13,618,625	\$ 10,457,166	\$ 4,016,706	\$ 2,021,888
<b>Total Expenditures</b>	<b>\$ 65,564,497</b>	<b>\$ 24,090,407</b>	<b>\$ 21,672,937</b>	<b>\$15,754,165</b>	<b>\$ 14,702,835</b>
Non-Rate Revenues	\$ (355,019)	\$ (281,288)	\$ (4,575,739)	\$ (226,549)	\$ (284,185)
PCWPF Reimbursement	\$ (1,528,166)	\$ (1,607,369)	\$ (1,704,115)	\$ (1,811,221)	\$ (1,994,905)
Capital Adjustments	\$(55,047,172)	\$(13,052,715)	\$ (5,706,030)	\$ (3,467,279)	\$ (1,534,956)
<b>Revenues Required from Rates</b>	<b>\$ 8,634,140</b>	<b>\$ 9,149,035</b>	<b>\$ 9,687,052</b>	<b>\$10,249,116</b>	<b>\$10,888,789</b>

### 3.6 WASTEWATER

The wastewater fund financial plan projects the fund's sources and uses of funds from fiscal year 2017 through fiscal year 2055. The wastewater utility financial model includes three sub-funds:

- Operating
- Capital Reserve
- Catastrophic Failure Reserve

#### 3.6.1 Sources of Funds

The sources of funds include all cash inflows to the wastewater operating fund. These range from user charge revenues to miscellaneous income to contributed capital and interest earnings. The major assumptions for specific sources of funding are provided below:

*System growth* – Customer growth in the system increases total system revenues because of its relationship to wastewater usage and increase in the number of SFEs.

Table 3-1 presents the projected system growth by fund.

*Rate revenue increases* – Due to adjustment in flow estimates and growth in the system and customer base, the current financial plan assumes no rate revenue increases from 2017 through 2021.

*SDF Revenues* –Arcadis updated the Town's wastewater SDF and results are presented in a separate report.



*Revenue bonds* – No debt issues were assumed in the calibration of the wastewater fund financial plan.

*Interfund loans* – There were no loans payable to the wastewater fund.

*Other revenues* –For the study period 2017 through 2021, the wastewater fund other revenues are presented in Table 3-6.

Table 3-6:  
Wastewater Fund Other Revenues

Other Revenues	FY2017	FY2018	FY2019	FY2020	FY2021
Developer Contributions	\$ 21,469	\$ 21,469	\$ 21,469	\$ 21,469	\$ 21,469
Other Revenues	\$138,435	\$138,435	\$138,435	\$138,435	\$138,435
Interest Earnings	\$ 11,314	\$ 32,501	\$ 54,334	\$ 57,328	\$ 56,788
<b>Total</b>	<b>\$171,218</b>	<b>\$192,405</b>	<b>\$214,238</b>	<b>\$217,232</b>	<b>\$216,692</b>

*Fund balances* – The wastewater fund is projected to have total reserve fund balances of approximately \$2.0 million at the beginning of 2017, not including capital reserve funds. Each of the sub-funds in the wastewater utility financial plan has a minimum balance requirement. The requirements by sub fund are:

- Operating – 60-days of O&M; increasing from approximately \$861,000 to \$1.0 million throughout the study period
- Capital Reserve Fund – obligated reserves vary from year to year, depending on the CIP. The fund maintains an unobligated reserve of \$1.0 million throughout study period.
- Catastrophic Failure Reserve – between \$1.8 million and \$2.7 million throughout the study period

The financial plan calls for maintaining the fund balance requirements presented above and subsequently using the net available reserve fund balance in capital reserves over time to offset short-term capital needs and balance the need for rate increases and additional debt.

### 3.6.2 Uses of Funds

Uses of funds include all expenditures, either operating or capital, and any reserve requirement or increase in fund balance the Town plans to achieve. The major assumptions for the wastewater utility are as follows:

*Operating costs* – Represents the basic costs of operating the system. Projection of O&M expenses varies depending on the degree of fixed versus variable costs for each budgeted line item. Most of the costs of the wastewater system are fixed and therefore do not escalate with increased system use. Meanwhile, variable costs escalate both with increased system use and the expected inflation rate. Town staff have made a reasonable effort to separate



the two for projection purposes. O&M expenses during the rate period were provided by the Town. The Utility's goal is to keep costs at or under budget for capital and operational budgets each year by fund and to continuously strive towards more efficient operations.

Personnel services are one of the most important cost drivers in operating expenses. Staff additions over the next 5 years are included in the Town provided 5-year financial planning document.

Energy costs are a major component in plant operations and an important cost driver in operating expenses. Over the next 5 years energy costs are expected to increase at a rate higher than inflation.

*Capital improvements* – Capital improvements are assumed at the levels provided in Appendix E in the years indicated. Total capital improvement costs are expected to exceed \$42.8 million from 2017 through 2021. Capital improvement costs were provided by the Town for years 2017 through 2055. Arcadis recommends capital improvements assumptions, including annual escalation, are reviewed annually.

*Interfund loans* – There are currently no interfund loans payable to other funds.

*Fund balances* –For the purposes of this study, it is assumed the Town will not allow its wastewater fund balances to dip below the requirements presented in the above section. This conforms to the FMP goal to keep adequate reserves and maintain fund balances between minimums and maximums.

*Debt service* – The debt service sub-fund currently carries the debt service obligations of the wastewater fund. As stated in the FMP, the Town aims to minimize debt carrying costs at or below industry standards. The wastewater fund currently has one outstanding revenue bond issue, the 2012 revenue bond, which is a refinancing of a 2004 revenue bond series. The 2012 series principal and interest equals approximately \$333,000 annually from 2017 through 2024. No future revenue bond debt is anticipated in the financial plan.

*Debt Service Coverage* – The wastewater fund outstanding revenue bonds require operating revenues to be 1.2 times the total debt service amount. The wastewater fund financial plan was developed to meet debt service coverage of 1.25 times.

### **3.6.3 User Charge Revenue Requirements**

Table 3-7 presents the wastewater fund user charge revenue requirements for the period 2017 through 2021.

Table 3-7:  
Wastewater Fund User Charge Revenue Requirements

Item	FY2017	FY2018	FY2019	FY2020	FY2021
Operating and Maintenance	\$ 5,167,766	\$ 5,392,772	\$ 5,604,147	\$ 5,888,586	\$ 6,114,891
Debt Service	\$ 333,258	\$ 333,546	\$ 335,274	\$ 331,356	\$ 333,660
Transfers Out	\$ 67,001	\$ 138,404	\$ 156,470	\$ 10,302,620	\$ 2,139,363
Minor Capital Outlay	\$ 76,750	\$ 84,750	\$ 79,750	\$ 79,750	\$ 79,750
Cash Funded Capital	<u>\$ 5,636,243</u>	<u>\$ 4,339,389</u>	<u>\$ 5,059,692</u>	<u>\$ 25,406,647</u>	<u>\$ 5,603,132</u>
<b>Total Expenditures</b>	<b>\$11,281,018</b>	<b>\$10,288,861</b>	<b>\$ 11,235,333</b>	<b>\$ 42,008,959</b>	<b>\$14,270,796</b>
Non-Rate Revenues	\$ (244,251)	\$ (257,088)	\$ (272,304)	\$ (227,217)	\$ (216,731)
Capital Adjustment	\$ (340,506)	\$ 1,024,999	\$ 454,253	\$20,327,970)	\$ 65,068
<b>Revenues Required from Rates</b>	<b>\$10,696,262</b>	<b>\$11,056,772</b>	<b>\$11,417,282</b>	<b>\$21,453,773</b>	<b>\$14,119,134</b>

### 3.7 STORMWATER

The stormwater fund financial plan projects the fund's sources and uses of funds from fiscal year 2017 through fiscal year 2055. Arcadis recommends that to ensure the long-term sustainability of the stormwater enterprise, a review of the timing of CIP expenditures, O&M expenses, and sources and uses of funds among sub-funds be thoroughly performed. The stormwater utility financial model contains three sub-funds:

- Operating
- Capital Reserve
- Catastrophic Failure Reserve

#### 3.7.1 Sources of Funds

The sources of funds include all cash inflows to the stormwater operating fund. These range from user charge revenues to miscellaneous income to contributed capital and interest earnings. The major assumptions for specific sources of funding are provided below:

*System growth* – Table 3-1 presents the projected system growth by fund.

*Rate revenue increases* – The current financial plan assumes an annual increase of 5 percent from 2017 through 2021.

*Stormwater Development Impact Fee Revenues* – Arcadis updated the Town's stormwater development impact fee and results are presented in a separate report.

*Revenue bonds* – The stormwater fund is permitted to issue debt. However, no bond issues were assumed in the calibration of the stormwater financial plan.

*Interfund loans* – There are currently no loans payable to the stormwater fund.

*Other revenues* – For the period 2017 through 2021, the stormwater fund other revenues are presented in Table 3-8.

Table 3-8:  
Stormwater Other Revenues

Other Revenues	FY2017	FY2018	FY2019	FY2020	FY2021
Miscellaneous Revenues	\$ 7,384	\$ 7,451	\$ 7,588	\$ 7,729	\$ 7,867
DESC/GESC Fees	\$303,645	\$ 303,645	\$ 303,645	\$ 303,645	\$ 303,645
Stormwater Cap Charge	\$670,174	\$ 693,730	\$ 717,621	\$ 724,736	\$ 750,102
Interest Earnings	\$ 12,292	\$ 15,003	\$ 14,441	\$ 14,231	\$ 16,694
<b>Total</b>	<b>\$993,495</b>	<b>\$1,019,829</b>	<b>\$1,043,295</b>	<b>\$1,050,341</b>	<b>\$1,078,308</b>

*Fund balances* – The stormwater fund is projected to have a fund balance reserve of approximately \$3.7 million at the beginning of 2017. Each of the sub-funds in the stormwater utility financial plan has a minimum balance requirement. The requirements by sub fund are:

- Operating – 60-days of O&M; increasing from approximately \$361,000 to \$462,000 throughout the study period
- Capital Reserve – obligated reserves vary from year to year, depending on the CIP. The fund maintains an unobligated reserve of \$500,000 throughout the study period.
- Catastrophic Failure Reserve – There are minimal reserves during the study period, increasing from \$10,000 in 2017 to \$61,000 in 2021.

The financial plan calls for maintaining fund balance requirements presented above and subsequently using the net reserve available capital reserves over time to offset short-term capital needs and reduce the need for rate increases. The financial plan was developed in accordance to the FMP goals, including to keep adequate reserves and maintain fund balances between minimums and maximums.

### 3.7.2 Uses of Funds

The major assumptions for uses of funds are as follows.

*Operating costs* – – Represents the basic costs of operating the system. Projection of O&M expenses varies depending on the degree of fixed versus variable costs for each budgeted line item. Most of the costs of the stormwater system are fixed. Variable costs escalate both with increased system use and the expected inflation rate. Town staff have made a reasonable effort to separate the two for projection purposes. O&M expenses during the rate period were provided by the Town. The Utility's goal is to keep costs at or under budget for capital and operational budgets each year by fund and to continuously strive towards more efficient operations.

Personnel services are one of the most important cost drivers in operating expenses. Staff additions over the next five years are included in the Town's five-year financial planning document.

*Capital improvements* – Capital improvements are assumed at the levels provided in Appendix F in the years indicated. Total capital improvement costs are expected to exceed \$15.0 million from 2017 through 2021. Capital improvement costs were provided by the

Town for years 2017 through 2055. Arcadis recommends capital improvements assumptions, including annual escalation, are reviewed annually.

*Fund balances* – For the purposes of this study, it is assumed that the Town will not allow its fund balances to dip below the requirements presented in the above section.

*Debt service* – The stormwater fund does not have existing debt service and the financial plan does not assume new debt issues.

*Interfund loans* – The 2014 interfund loan to stormwater from water is scheduled to be repaid in 2019.

### 3.7.3 User Charge Revenue Requirements

To determine the amount of revenue the utility fees must generate annually, the total revenue requirements must be reduced by non-rate or other system revenues. Other system revenues are defined as all revenues except revenues derived from stormwater utility fees. Table 3-9 presents the stormwater fund user charge revenue requirements for the period 2017 through 2021.

Table 3-9:  
Stormwater Fund User Charge Revenue Requirements

Item	FY2017	FY2018	FY2019	FY2020	FY2021
Operating and Maintenance	\$ 2,164,123	\$ 2,311,947	\$ 2,407,899	\$ 2,675,132	\$ 2,773,663
Transfers Out	\$ 202,283	\$ 2,032,557	\$ 2,133,591	\$ 2,033,724	\$ 1,012,145
Minor Capital Outlay	\$ 5,500	\$ 5,500	\$ 5,500	\$ 5,500	\$ 5,500
Cash Funded Capital	\$ 2,180,161	\$ 2,480,611	\$ 2,593,161	\$ 3,366,845	\$ 2,385,567
<b>Total Expenditures</b>	<b>\$ 4,552,067</b>	<b>\$ 6,830,615</b>	<b>\$ 7,140,151</b>	<b>\$ 8,081,201</b>	<b>\$ 6,176,875</b>
Non-Rate Revenues	\$ (997,102)	\$(1,019,828)	\$(1,043,295)	\$(1,050,341)	\$(1,078,484)
Capital Adjustment	\$ (555,723)	\$(1,424,103)	\$(1,342,960)	\$(1,439,313)	\$ (235,532)
<b>Revenues Required from Rates</b>	<b>\$ 2,999,242</b>	<b>\$ 4,386,684</b>	<b>\$ 4,753,895</b>	<b>\$ 5,591,546</b>	<b>\$ 4,862,859</b>

## 4 Customer Service Characteristics

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In preparation for this cost-of-service 2016 Study Update, Town staff completed the analysis of usage data for all customers and customer classes. The approach used for this analysis is consistent with the analysis that Arcadis performed in previous years. It is best practice to have the Utilities Department prepare this analysis on an annual basis as they maintain the data and can monitor the accounts and usage throughout the year.

Data was analyzed to determine assumptions such as number of accounts by meter size and customer class.<sup>1</sup> The Town has updated its calculations on meter equivalency ratios for 2016, calculated the representative customer by class to be used in presenting the comparison of adopted and proposed rates on a representative customer's total utility bill, and prepared a table to review over time the water consumption by rate tier. Appendix I contains the full analysis prepared by the Town, including the calculation of the average representative customer by class used in presenting the proposed effect of 2017 rates on a representative customer's bill. A portion of the analysis and tables prepared by Town Staff are reproduced in this section.

### 4.1 WATER UTILITY CUSTOMERS BY METER SIZE

Table 4-1 shows meters by meter size using 12 months of data (Jan15-Dec15). This shows that 18,737 customers were receiving Town water services during this capture period. The FY2014 accounts based on 12 months of data (Jan14-Dec14) showed 17,961 customers were receiving Town water services. There are 776 more accounts in the 2016 study versus the 2015 study.

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<sup>1</sup> Latigo Multifamily Indoor Only 1.5-inch meter customers have been moved to 1-inch meter size for the customer characteristics analysis.

Table 4-1:  
Water Utility Meters by Meter Size  
FY2015 Accounts Based on 12 Months of Data (Jan 15 – Dec 15)

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	502	-	4	-	19	-	-	525
3/4"	16,794	14	127	27	118	100	108	17,288
1"	12	25	71	-	85	64	71	328
1.5"	-	55	48	-	115	86	54	358
2"	-	15	24	-	82	40	40	201
3"	-	2	5	2	8	-	13	30
4"	-	1	-	-	2	-	2	5
6"	-	-	1	-	-	-	1	2
<b>Total</b>	<b>17,308</b>	<b>112</b>	<b>280</b>	<b>29</b>	<b>429</b>	<b>290</b>	<b>289</b>	<b>18,737</b>

Table 4-2:  
Water Utility Meters by Meter Size  
FY2014 Accounts based on 12 months of data (Jan14-Dec14)

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	331	-	3	-	16	-	-	350
3/4"	16,224	14	127	28	116	100	105	16,714
1"	9	25	72	-	84	64	69	323
1.5"	-	54	48	-	109	79	48	338
2"	-	15	24	-	81	39	39	198
3"	-	2	5	3	8	-	13	31
4"	-	1	-	-	2	-	2	5
6"	-	-	1	-	-	-	1	2
<b>Total</b>	<b>16,564</b>	<b>111</b>	<b>280</b>	<b>31</b>	<b>416</b>	<b>282</b>	<b>277</b>	<b>17,961</b>

The difference in accounts is primarily due to an additional 744 residential accounts reported in the FY2015 billing data.

Table 4-3:  
Water Utility Meters by Meter Size  
FY2017 Projected Accounts Based on 12 Months of Data (Jan 15 – Dec15) Plus Projected  
Growth for 2016 & 2017

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	694	-	4	-	21	416	-	1,135
3/4"	18,202	14	127	55	122	100	108	18,728
1"	12	25	79	-	85	64	71	336
1.5"	-	55	48	-	115	86	54	358
2"	-	15	30	-	82	40	40	207
3"	-	2	5	2	8	-	13	30
4"	-	1	-	-	2	-	2	5
6"	-	-	1	-	-	-	1	2
<b>Total</b>	<b>18,908</b>	<b>112</b>	<b>294</b>	<b>57</b>	<b>435</b>	<b>706</b>	<b>289</b>	<b>20,801</b>

Table 4-3 shows FY2017 projected water utility accounts using 2015 billing data plus projected growth for 2016 and 2017. The FY2017 water accounts are projected to equal 20,801. Growth is projected for the following classes:

2016:

- 96 Residential 5/8"x 3/4" meter accounts
- 704 Residential 3/4" meter accounts (all single family detached units)
- 316 Multi-Family 5/8"x 3/4" meter accounts
- 4 Commercial 1" accounts
- 3 Commercial 2" accounts
- 1 Irrigation 5/8" x 3/4" accounts
- 2 Irrigation 3/4" x 3/4" accounts
- 28 Bulk 3/4" x 3/4" accounts
- 1,154 Total

2017:

- 96 Residential 5/8"x 3/4" meter accounts
- 704 Residential 3/4" meter accounts (all single family detached units)
- 100 Multi-Family 5/8"x 3/4" meter accounts
- 4 Commercial 1" accounts
- 3 Commercial 2" accounts
- 1 Irrigation 5/8" x 3/4" accounts
- 2 Irrigation 3/4" x 3/4" accounts
- 910 Total

Total growth of 1,154 accounts is projected for 2016 and 910 accounts for 2017 for a total of 2,064 projected for the water fund thru FY2017.

## 4.2 WASTEWATER UTILITY CUSTOMERS BY METER SIZE

Table 4-4 shows customer meters by meter size using 12 months of data (Jan15-Dec15). This shows that 18,099 customers are receiving Town wastewater services. The FY2014 accounts based on 12 months of data (Jan14-Dec14) shows that 17,335 customers received Town wastewater services. There are 764 more accounts in the 2016 study versus the 2015 study.

Table 4-4:  
Wastewater Utility Meters by Meter Size  
FY2015 Accounts Based on 12 Months of Data (Jan15-Dec15)

Meter Size	Residential	Multifamily	Commercial	Multifamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	502	-	4	-	-	506
3/4"	16,639	14	124	100	101	16,978
1"	11	25	68	64	66	234
1.5"	-	55	47	86	53	241
2"	-	15	24	40	38	117
3"	-	2	5	-	12	19
4"	-	1	-	-	1	2
6"	-	-	1	-	1	2
<b>Total</b>	<b>17,152</b>	<b>112</b>	<b>273</b>	<b>290</b>	<b>272</b>	<b>18,099</b>

Table 4-5:  
Wastewater Utility Meters by Meter Size  
FY2014 Accounts Based on 12 Months of Data (Jan14-Dec14)

Meter Size	Residential	Multifamily	Commercial	Multifamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	331	-	3	-	-	334
3/4"	16,070	14	124	100	99	16,407
1"	8	25	69	64	64	230
1.5"	-	54	47	79	46	226
2"	-	15	24	39	37	115
3"	-	2	5	-	12	19
4"	-	1	-	-	1	2
6"	-	-	1	-	1	2
<b>Total</b>	<b>16,409</b>	<b>111</b>	<b>273</b>	<b>282</b>	<b>260</b>	<b>17,335</b>

Similar to the Water Fund, an additional 743 residential accounts were reported in the most recent billing data.



Table 4-6:  
Wastewater Utility Meters by Meter Size  
FY2017 Projected Accounts Based on 12 Months of Data (Jan15-Dec15) Plus Projected  
Growth for 2016 & 2017

Meter Size	Residential	Multifamily	Commercial	Multifamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	694	-	4	416	-	1,114
3/4"	18,047	14	124	100	101	18,386
1"	11	25	76	64	66	242
1.5"	-	55	47	86	53	241
2"	-	15	30	40	38	123
3"	-	2	5	-	12	19
4"	-	1	-	-	1	2
6"	-	-	1	-	1	2
<b>Total</b>	<b>18,752</b>	<b>112</b>	<b>287</b>	<b>706</b>	<b>272</b>	<b>20,129</b>

Table 4-6 shows projected wastewater utility accounts using billing data (Jan15-Dec15) plus projected growth for 2016 and 2017. The FY2017 wastewater accounts are projected to equal 20,129. Growth is projected for the following classes:

2016:

- 96 Residential 5/8"x 3/4" meter accounts
- 704 Residential 3/4" meter accounts (all single family detached units)
- 316 Multi-Family 5/8"x 3/4" meter accounts
- 4 Commercial 1" accounts
- 3 Commercial 2" accounts
- 1,123 Total

2017:

- 96 Residential 5/8"x 3/4" meter accounts
- 704 Residential 3/4" meter accounts (all single family detached units)
- 100 Multi-Family 5/8"x 3/4" meter accounts
- 4 Commercial 1" accounts
- 3 Commercial 2" accounts
- 907 Total

Total growth of 1,123 accounts is projected for 2016 and 907 for 2017 for a total of 2,030 projected for the wastewater fund thru FY2017.

### 4.3 WATER RESOURCES UTILITY CUSTOMERS BY METER SIZE

Table 4-7 shows Water Resources customer meters by meter size based on 12 months of billing data (Jan15-Dec15). Table 8 shows Water Resources customer meters by meter size

based on 12 months of billing data (Jan14-Dec14). There are 773 more accounts in the 2016 study versus the 2015 study.

Table 4-7:  
Water Resources Utility Meters by Meter Size  
FY2015 Accounts Based on 12 Months of Data (Jan15-Dec15)

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	502	-	4	-	19	-	-	525
3/4"	16,793	14	127	27	118	100	108	17,287
1"	12	25	71	-	85	64	70	327
1.5"	-	55	48	-	110	86	54	353
2"	-	15	24	-	77	40	40	196
3"	-	2	5	2	7	-	13	29
4"	-	1	-	-	3	-	1	4
6"	-	-	1	-	-	-	1	2
<b>Total</b>	<b>17,307</b>	<b>112</b>	<b>280</b>	<b>29</b>	<b>418</b>	<b>290</b>	<b>287</b>	<b>18,723</b>

Table 4-8:  
Water Resources Utility Meters by Meter Size  
FY2014 Accounts Based on 12 Months of Data (Jan14-Dec14)

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	331	-	3	-	16	-	-	350
3/4"	16,223	14	127	28	116	100	105	16,713
1"	9	25	72	-	84	64	68	322
1.5"	-	54	48	-	106	79	48	335
2"	-	15	24	-	77	39	39	194
3"	-	2	5	3	7	-	13	30
4"	-	1	-	-	2	-	1	4
6"	-	-	1	-	-	-	1	2
<b>Total</b>	<b>16,563</b>	<b>111</b>	<b>280</b>	<b>31</b>	<b>408</b>	<b>282</b>	<b>275</b>	<b>17,950</b>

Table 4-9:  
Water Resources Utility Meters by Meter Size  
FY2017 Projected Accounts Based on 12 Months of Data (Jan15-Dec15) Plus Projected  
Growth for 2016 & 2017

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	694	-	4	-	21	416	-	1,135
3/4"	18,201	14	127	27	122	100	108	18,699
1"	12	25	79	-	85	64	70	335
1.5"	-	55	48	-	110	86	54	353
2"	-	15	30	-	77	40	40	202
3"	-	2	5	2	7	-	13	29
4"	-	1	-	-	2	-	1	4
6"	-	-	1	-	-	-	1	2
<b>Total</b>	<b>18,907</b>	<b>112</b>	<b>294</b>	<b>29</b>	<b>424</b>	<b>706</b>	<b>287</b>	<b>20,759</b>

Table 4-9 shows FY2017 projected water resources fund accounts based on billing data (Jan15-Dec15) plus projected growth for 2016 and 2017. The FY2017 water resources accounts are projected to equal 20,787. Growth is projected for the following classes:

2016:

- 96 Residential 5/8"x 3/4" meter accounts
- 704 Residential 3/4" meter accounts (all single family detached units)
- 316 Multi-Family 5/8"x 3/4" meter accounts
- 4 Commercial 1" accounts
- 3 Commercial 2" accounts
- 1 Irrigation 5/8" x 3/4" accounts
- 2 Irrigation 3/4" x 3/4" accounts
- 1,126 Total

2017:

- 96 Residential 5/8"x 3/4" meter accounts
- 704 Residential 3/4" meter accounts (all single family detached units)
- 100 Multi-Family 5/8"x 3/4" meter accounts
- 4 Commercial 1" accounts
- 3 Commercial 2" accounts
- 1 Irrigation 5/8" x 3/4" accounts
- 2 Irrigation 3/4" x 3/4" accounts
- 910 Total

Total growth of 1,126 accounts is projected for 2016 and 910 for 2017 for a total of 2,036 projected for the water resources fund thru FY2017.

#### 4.4 STORMWATER UTILITY SFES

Table 4-10 shows stormwater average monthly SFES accounts based on 12 months of billing data (Jan15-Dec15). Table 4-11 shows stormwater average monthly SFES accounts based on 12 months of billing data (Jan14-Dec14).

Table 4-10:  
Stormwater Utility Average Monthly SFES for Billing Purposes  
FY2015 Accounts Based on 12 Months of Billing Data (Jan15-Dec15)

Average Monthly SFE	
Residential	17,142
Non-Residential	13,747
<b>Total Stormwater Customers</b>	<b>30,889</b>

Table 4-11:  
Stormwater Utility Average Monthly SFES for Billing Purposes  
FY2014 Accounts Based on 12 Months of Billing Data (Jan14-Dec14)

Average Monthly SFE	
Residential	16,388
Non-Residential	13,441
<b>Total Stormwater Customers</b>	<b>29,828</b>

Table 4-12:  
Stormwater Utility Average Monthly SFES for Billing Purposes  
FY2017 Projected Accounts Based on 12 Months of Billing Data  
(Jan15-Dec15) Plus Growth Projections for 2016 & 2017

Average Monthly SFE	
Residential	19,158
Non-Residential	14,087
<b>Total Stormwater Customers</b>	<b>33,245</b>

Table 4-12 shows 2017 projected stormwater accounts based on 12 months of billing data (Jan15-Dec15) plus projected growth for 2016 and 2017. The FY2017 stormwater SFE's are projected to equal 33,245. Growth is projected for the following classes:

2016:

- 1,116 Residential SFES accounts
  - 80 Detached SFES in Cherry Creek Basin
  - 1,036 Detached SFES in Plum Creek Basin
- 170 Commercial SFES in the Plum Creek Basin

2017:

- 900 Residential SFEs accounts
  - 112 Detached SFEs in Cherry Creek Basin
  - 788 Detached SFEs in Plum Creek Basin
- 170 Commercial SFEs in the Plum Creek Basin

Total growth of 1,286 SFEs is projected for the stormwater fund in 2016 and 1,070 is projected for 2017; SFE counts in Tables 4-10 through 4-12 have been rounded.

## 4.5 METER EQUIVALENCY SCHEDULE FOR MONTHLY SERVICE CHARGES

The Town implemented an actual use meter equivalency schedule for assessing monthly service charges for water, wastewater, and water resources in 2010. Analysis of three years of water consumption by meter size serves as the basis for the actual use equivalencies. Equivalency factors were calculated by establishing the average use for all ¾-inch meters as the base unit and dividing the average use for larger meter sizes by the average use for ¾-inch meters.

Table 4-13 shows average water consumption by class and meter size for the updated 2016 analysis. Our analysis includes a three-year rolling average of water utility billing data. The latest data includes years 2013, 2014 and 2015. Table 4-14 shows the same data for years 2012, 2013, and 2014.

Table 4-13:  
Actual Use Equivalency Factors (2016 Rate Study Update)  
(2013, 2014, and 2015 Calendar Year Billing Data)

Meter Size	Residential	Multifamily	Commercial	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only	Equivalency Factor
5/8"	1.00	3.14	1.16	2.35	0.58	1.04	1.00
1"	1.90	5.31	4.75	4.41	2.15	4.66	4.06
1.5"	-	11.36	8.40	11.82	6.41	5.73	9.18
2"	-	13.13	13.39	14.31	12.34	11.85	13.19
3"	-	52.93	22.58	29.05	-	12.29	19.92
4"	-	76.40	-	76.77	-	83.58	81.19
6"	-	-	189.06	-	-	16.28	102.67

Table 4-14:  
Actual Use Equivalency Factors (2015 Rate Study)  
(2012, 2013, 2014 Calendar Year Billing Data)

Meter Size	Residential	Multifamily	Commercial	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only	Equivalency Factor
3/4"	1.00	2.98	1.04	2.15	0.55	1.03	1.00
1"	1.57	5.04	4.33	4.77	2.06	3.48	3.82
1.5"	-	10.22	8.17	11.07	6.07	5.40	8.55
2"	-	12.51	14.35	15.31	10.89	11.57	13.22
3"	-	49.70	23.26	29.37	-	12.19	20.43
4"	-	71.67	-	104.12	-	66.53	68.25
6"	-	-	179.20	-	-	16.74	97.97

While the actual meter equivalencies are slightly higher for most meter sizes, Arcadis does not see a significant difference in meter equivalencies that substantiates changing meter equivalency ratios used in the Town's rates and fees update. Arcadis acknowledges a significant difference in meter equivalency factors in the 4-inch meter size. These differences are due to small sample sizes within the meter size. Arcadis recommends the Town continue to monitor meter equivalencies in the future for any changes that may materialize as a result of increased conservation efforts or water budget rate structure outcomes.

Table 4-15 shows the existing equivalency schedule recommended for the Town.

Table 4-15:  
Existing 2015 Equivalency Schedules for Monthly Service Charges

Meter Size	Actual Use Equivalency Schedule
5/8" x 3/4"	1.00
3/4"	1.00
1"	4.06
1.5"	9.18
2"	13.19
3"	19.92
4"	81.19
6"	102.67

The full discussion of SDFs and associated equivalency schedules is further documented in Arcadis' report on the system development fee analysis, conducted as part of the 2016 Utilities Rates and Fees Study Update.

## 5 Water and Wastewater Cost-of-Service Analysis

### 5.1 INTRODUCTION

Arcadis' scope of services includes updating the water and wastewater cost-of-service (COS) analysis to implement the rate revenue requirements determined in the financial plans. The results of the COS analysis are monthly service charges and volume rates by customer class that equitably distribute the Town's ongoing water and wastewater costs across customer classes.

### 5.2 COST-OF-SERVICE METHODOLOGY

The basic philosophy behind a COS methodology is that utilities should be self-sustaining enterprises that are adequately financed with rates that are based on sound engineering and economic principles. In addition, rates should be equitable and proportionate to the costs of providing service to a given type of customer. The guidelines of water ratemaking are established by the American Water Works Association (AWWA) in the Manual M1. The guidelines for wastewater ratemaking are established by the Water Environment Federation (WEF) in the Manual of Practice No. 27.

Figure 5-1 illustrates the flow of information involved in developing COS rates. More specifically, the steps required to develop COS rates include:

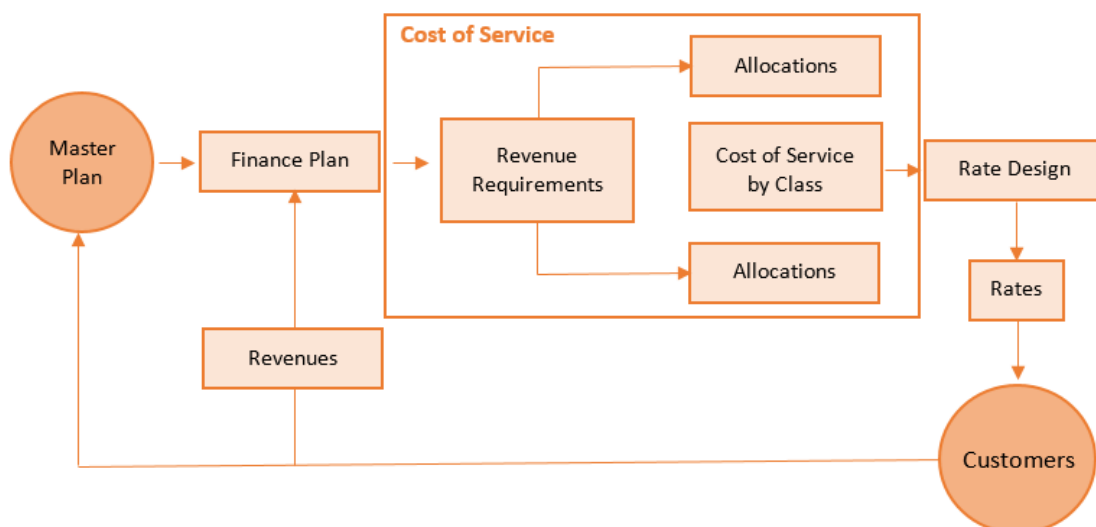


Figure 5-1: Cost-of-Service Process

- Determination of the system's annual revenue requirements (i.e., costs)
- Determination of user charge revenue requirements
- Analysis of customer demands and usage characteristics
- Allocation of user charge revenue requirements by type to customer classes
- Design of rates

The COS process utilizes information generated in the financial plan, as discussed in Section 3. The CIP is a particularly critical component of the financial plan because the way in which the utility plans to meet its capital costs has major implications on the level of rates that customers pay. Indeed, a major function of the finance plan is to give management a tool to evaluate the impact of the costs of capital projects on user charges, debt, fund balances, etc. A major result of the financial plan is the annual user charge revenue requirements: the amount of revenue the utility must earn from the assessment of water and wastewater rates in order to meet all of its financial needs and obligations. The COS analysis allocates user charge revenue requirements among the Town's customer classes to determine the cost of service by class.

The financial plan attempts to balance cash sources and uses through 2055; however, Arcadis' COS analysis focuses on the water and wastewater system revenue requirements for a single test year with two projected years. Arcadis' goal was to determine rates for recommendation in 2017. Revenue requirements for 2017 through 2021, therefore, were obtained from the financial plans developed for the Town. The actual rate design step in the study is described in Section 6 of this report.

The steps of the COS process follow below.

### **5.2.1 Determination of Annual System Revenue Requirements**

Revenue requirements are total operating and capital costs of the system for a single year to be recovered from all available revenue sources. Under a cash-needs approach followed by most governmental-type entities, total revenue requirements typically equal:

- O&M expenses
- Debt service
- Cash-financed capital expenditures
- Transfers to reserves

### **5.2.2 Determination of User Charge Revenue Requirements**

The portion of annual system revenue requirements to be recovered through rates depends on a utility's financing policy and its other sources of income. To determine the amount of revenue that rates must generate annually, the total revenue requirements must be reduced by non-rate or other system revenues. Other system revenues are defined as all revenues except those derived from water and wastewater rates.



### 5.2.3 Analysis of Flows and Usage Characteristics

Analyzing annual consumption and flows in the Town's system and other usage characteristics begins with a review of the Town's customer classes. The Town currently serves seven retail customer classes for water:

- Residential
- Multi-family (with indoor and outdoor consumption)
- Multi-family Indoor Use Only
- Commercial (with indoor and outdoor consumption)
- Commercial Indoor Use Only
- Irrigation Only
- Bulk

The Town serves five classes for wastewater:

- Residential
- Multi-family (with indoor and outdoor consumption)
- Multi-family Indoor Use Only
- Commercial (with indoor and outdoor consumption)
- Commercial Indoor Use Only

The Commercial class includes such customers as schools, churches, and the Town's non-irrigation accounts. The Irrigation Only class includes all irrigation-only accounts.

To equitably allocate the user charge revenue requirements of the system, an analysis of each customer class' consumption and flow characteristics is necessary. Characteristics such as annual and monthly consumption in millions of gallons, average winter monthly consumption, summer monthly consumption, and the number of customers are determined for each class.

### 5.2.4 Customer Service Characteristics

The Town's customer service characteristics analyzed in this study include the following for the water system:

- Base Water Demand
- Maximum-Day Extra Capacity
- Maximum-Hour Extra Capacity
- Meters & Services
- Number of Customers

*Base Water Demand* represents the average annual water consumption in thousand gallons for each customer class. This information was obtained from the Town's Customer Characteristics

Analysis – 2016 memo. The analysis summarized billing records for the most recent twelve months ending December 2015.

*Maximum-day and maximum-hour extra capacity* demands represent water demands that exceed average levels of water usage by system customers. Maximum-day and maximum-hour extra capacity demands are calculated by applying the class peaking factors to the base demand.

*Meters & Services* represent the total number of equivalent meters. Equivalent meters are derived by applying the average actual usage meter equivalency schedule to the number of meters of each size by class.

*Number of Customers* equals the projected total number of customers by class for the test year.

For wastewater the analyzed customer service characteristics are:

- Flow Demand
- Biochemical Oxygen Demand (BOD)
- Total Suspended Solids (TSS)
- Meters & Services
- Number of Customers

*Flow Demand* represents the quantity discharged from customers directly to the wastewater system. Because wastewater discharge is not metered, wastewater flows are measured by the average winter monthly consumption (AWMC) of each customer. AWMC was provided by the Town's Customer Characteristics Analysis – 2016 memo which summarized billing data for the most recent twelve months ending December 2015.

*Pollutant strength* including BOD and TSS represents total pounds of loadings expected from each customer class. Pounds of loadings by customer class are calculated assuming domestic strength concentrations and volume of flow for each customer class.

*Meter & Services* represents the total number of equivalent meters for each class. Equivalent meters are derived by applying the average actual use meter equivalency schedule to the number of meters of each size by class.

*Number of Customers* is simply the projected total number of customers by class for the test year.

The percentage of each customer class' share of each characteristic above forms the basis for allocating costs of service to each customer class.

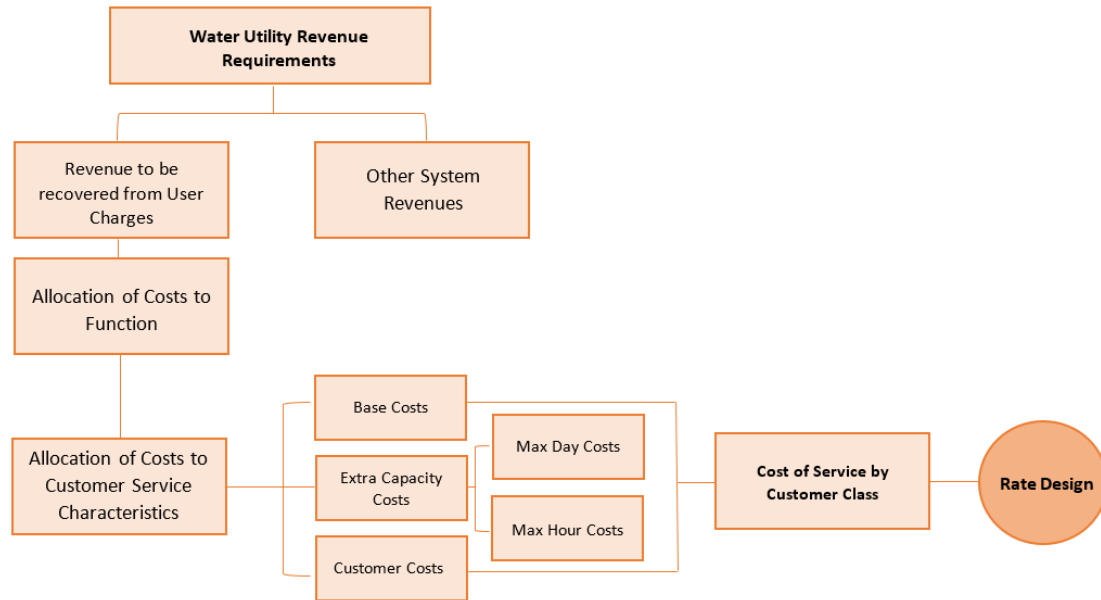
### 5.2.5 Allocation of Costs to Customer Classes

Equitably allocating the water and wastewater systems' user charge revenue requirements to the customer classes involves a multi-step process. Beginning with O&M costs, the following steps were completed:

- Allocate costs to functions (called unit processes in the wastewater system)
- Allocate costs by functions to customer service characteristic
- Allocate costs to customer classes based on each class' proportion of the customer service characteristics

Figure 5-2 illustrates how the separate cost allocation steps fit into the overall process of setting rates for the water system.

Figure 5-2: Rate Setting Process



### 5.2.6 Allocation of Costs to Functions

A water or wastewater utility's O&M expenditures may be reported according to a chart of accounts that identifies the system functions. Alternatively, the expenses may follow the divisions of the utility such as management, distribution, storage, treatment, billing, etc. The functions need to be identified and costs separated accordingly. The first cost allocation step determines the percentage of each O&M line item to be allocated to one or more of the system's functions. Functionalizing costs in this manner enhances the accuracy and equity of the system cost allocation to the customer classes. For purposes of the study, the O&M expenditures for the water system were allocated to the following system functions based on fixed asset allocations and direction from Utility Staff:

- Source of Supply
- Treatment
- Pumping
- Transmission
- Distribution
- Storage
- Buildings/ Improvements

- Administration
- Tools/Equip
- Power & Chemicals
- Meters & Services
- Customer & Accounts

The O&M expenditures for the wastewater system were allocated to the following unit processes based on fixed asset allocations and direction from Utility Staff:

- Treatment by Others
- Collection
- Interceptor
- Lift Station
- Administration
- Customer & Accounts
- Meters & Services

#### **5.2.7 Allocation of Costs to Customer Service Characteristics**

The assignment of costs to customer service characteristics varies with the allocation methodology used. In the method of cost allocation used by Arcadis, costs are typically assigned to the following customer service characteristics for water:

- Base
- Maximum-Day Extra Capacity
- Maximum-Hour Extra Capacity
- Customer
- Meter & Services

*Base costs* vary with water consumption under average demand conditions. They are the costs that would be incurred if water consumption occurred evenly from day to day and hour to hour, and the system did not require investment in additional capacity to meet peak requirements.

*Maximum-day and maximum-hour extra capacity costs* (otherwise known as extra-capacity demands) represent costs incurred to meet water demands that exceed average levels of water usage by system customers. Extra-capacity costs are incurred because of water usage variations and peak demands imposed on a water system. Such demands are directly related to customer water consumption characteristics and fire-flow demands. Extra-capacity costs are typically divided into costs incurred to meet maximum-day and maximum-hour water demands of system customers.

*Customer-related* costs are those costs incurred to serve customers, regardless of water demands. Customer costs vary with the number of customers. Examples of these costs include administration and billing costs.

*Meter & Services* costs vary with the size of the meter and/or service used to serve the customer. Examples of meter & services costs include meter replacement and maintenance costs.

In the method of cost allocation followed by Arcadis, costs are typically assigned to the following customer service characteristics for wastewater:

- Flow
- BOD
- TSS
- Number of Customers
- Demand

*Flow costs* vary with the hydraulic flow of sanitary sewage. The relative strength of sewage does not affect flow costs. Typically, flow costs include the cost of operating lift stations and the capital costs for assets that are designed based on hydraulic flow requirements.

*Pollutant strength* costs, including BOD and TSS, represent costs incurred to treat wastewater of various qualities. As the Town's wastewater treatment processes are the responsibility of PCWRA and the wastewater fund does not charge for strength characteristics, the single unit process allocated to the strength characteristics is Treatment by Others.

*Customer-related* costs are incurred to serve customers, regardless of wastewater flows or strengths. Customer costs are those costs that vary with the number of customers. Examples of these costs include water meter reading (to bill wastewater flow) and billing costs.

*Demand-related* costs are those capital-related costs that are to be recovered on an equivalent water meter basis. In this COS analysis, 20 percent of the wastewater system's capital costs are recovered in this manner. The demand-related cost represents a portion of the cost of capacity in PCWRA's system.

#### **5.2.8 Distribution of Costs to Customer Classes**

The projections of customer class consumption and their respective usage characteristics are calculated in this step. As mentioned previously, the water system customer classes included in this study are residential, multi-family, multi-family indoor use only, commercial, commercial indoor use only, irrigation, and bulk; wastewater system classes are residential, multi-family, multi-family indoor use only, commercial, and commercial indoor use only. Each class contributes a different proportion of total annual usage.

For the water utility, base costs are allocated to each class in proportion to its total annual consumption. Costs related to max-day and max-hour extra capacity are allocated to each class in proportion to the class' estimated peaking factors of each class' extra-capacity demands relative to the total extra-capacity demands. Peaking factors by class were determined by analyzing monthly consumption data and system peaking factors.

Customer costs typically are allocated based on the proportion of the number of customers of each class. Meters and service costs are allocated according to the proportion of equivalent meters.

For the wastewater utility, flow costs are allocated to each class in proportion to total annual usage (calculated using the AWMC). Costs related to BOD and TSS are allocated to each class in proportion to the class' estimated strengths based on typical domestic strength factors.

Customer costs are allocated based on the proportion of customers; meters and services costs are allocated according to the proportion of equivalent meters. The proportion of equivalent meters by customer class is also used to allocate demand costs.

### 5.2.9 Capital Costs

Under the cash-basis approach to calculating revenue requirements, capital costs consist of non-debt funded capital expenditures (e.g., capital outlays), debt service, and transfers to reserve funds. Unlike O&M costs where each line item is allocated to the water system functions, capital costs under this approach are allocated to customer classes based on the allocation of fixed assets net of accumulated depreciation and contributions. To generate capital cost allocation percentages used under the cash basis approach, each fixed asset line item is allocated according to the following four steps:

1. Allocate net fixed assets used to serve the Town's customers to functions (called unit processes in the wastewater system)
2. Allocate assets by functions to customer service characteristics
3. Allocate assets to customer classes based on each class' proportion of the customer service characteristics
4. Distribute the capital costs to each class of customers based on each class' proportionate use of the allocated assets

### 5.2.10 Rate Design Development and Rate Calculation

The last step in the COS analysis is the actual design of the water and wastewater rate structures and calculation of the rates by customer class. Several types of rate structures have been used historically and are currently in use throughout the industry. The most important concern is to ensure the rate structure recovers the costs of service and meets the Town's objectives identified by the community. The rate design process is described in Section 6 of this report.

## 5.3 WATER COST-OF-SERVICE ANALYSIS RESULTS

Arcadis followed the steps described above to conduct the water COS analysis. The results presented in this section summarize the costs of service for each of the water system's customer classes for 2017.

### 5.3.1 Estimated Water System Revenue Requirements

The first two steps of the analysis determine the test year revenue requirements and user charge revenue requirements, or revenues to be recovered from the calculated water rates. Based on the Town's O&M and capital budget and Arcadis' financial planning assumptions, Table 5-1 presents the water fund revenue requirements for 2017. Appendix G presents the entire water fund COS analysis.

Table 5-1:  
Summary of 2017 Water Fund Revenue Requirements

Description	FY2017
<b>O&amp;M Expenses</b>	
Admin <sup>1</sup>	\$1,309,782
Customer Billing	222,813
Meter Services	1,083,890
Meters Retrofit / AMI	
Engineering	360,092
Mapping	77,641
Field Services	729,517
Facility Maintenance	899,429
Water Plant Operations	3,517,224
SCADA	347,567
Reg & Water Quality Compliance	157,225
CIP Related O&M	-
PCWPF Water Treatment Charges	1,528,166
<b>Subtotal O&amp;M</b>	<b>\$10,233,345</b>
Less: Transfers	-
Less: Minor Capital	-
<b>Total O&amp;M</b>	<b>\$10,233,345</b>
<b>Capital Expenses</b>	
Transfer to Capital Fund	\$200,643
Debt Service	1,740,767
Cash Funded Capital	5,378,920
Minor Capital Outlay	984,182
<b>Subtotal Capital</b>	<b>\$8,304,512</b>
<b>Total Revenue Requirements</b>	<b>\$18,537,857</b>
Less: O&M Related Non-Rate Revenue	(1,384,581)
Less: Capital Related Non-Rate Revenue	(3,463,962)
<b>User Charge Revenue Requirement</b>	<b>\$13,689,314</b>

<sup>1</sup>Includes cost of services provided by the Town like HR, IT, Finance, TM, etc.

After subtracting non-rate revenues and calculating the user charge revenue requirements for 2017, Arcadis determined the water rates for 2017 need to recover approximately \$13.7 million.

Customer service characteristics are estimated for 2017 based on consumption for the most recent twelve months ending December 2015 from the Town's billing records, peaking factors calculated by the Town, plus the projected minimum additional flow by customer class. Minimum additional flow per class is calculated based on a representative customer's annualized average winter monthly consumption multiplied by projected growth. Based on expected water sales in 2016, projections were limited to a total of 2.3 billion gallons in 2016 for all customers except Bulk users. Bulk user volume is based on actual usage data given the variability of this customer class' consumption. Table 5-2 summarizes the projected 2017 customer service characteristics. Table 5-3 shows the proportions of each characteristic projected for 2017 for each customer class.



Table 5-2:  
Water Customer Service Characteristics by Customer Class  
Projected for 2017

Customer Class	Base Consumption (kgal)	Max-Day Extra Capacity (MGD)	Max-Hour Extra Capacity (MGD)	Customers	Equivalent Meter
Residential	1,598,618	6.35	8.58	18,908	18,937
Multi-family	95,577	0.25	0.41	112	790
Commercial	134,909	0.37	0.59	294	1,288
Bulk	52,002	0.19	0.31	29	65
Irrigation	314,657	2.28	2.51	435	2,506
Multi-family Indoor Use Only	118,314	0.10	0.34	706	1,843
Commercial Indoor Use Only	129,331	0.16	0.41	289	1,669
<b>Total</b>	<b>2,443,408</b>	<b>9.70</b>	<b>13.16</b>	<b>20,773</b>	<b>27,098</b>

Table 5-3:  
Summary of Water Customer Service Characteristics  
Projected for 2017

Customer Class	Base	Max-Day	Max-Hour	Customer	Meter
Residential	65.43%	65.44%	65.25%	91.02%	69.88%
Multi-family	3.91%	2.62%	3.12%	0.54%	2.92%
Commercial	5.52%	3.81%	4.49%	1.42%	4.75%
Bulk	2.13%	1.91%	2.38%	0.14%	0.24%
Irrigation	12.88%	23.54%	19.07%	2.09%	9.25%
Multi-family Indoor Use Only	4.84%	1.04%	2.59%	3.40%	6.80%
Commercial Indoor Use Only	5.29%	1.64%	3.10%	1.39%	6.16%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

The user charge revenue requirements reported in Table 5-1 are allocated first among functions, then to customer service characteristic, and finally to each customer class based on the percentages presented in Table 5-3. The result is the cost of service by customer service characteristic and class, shown in Table 5-4.

Table 5-4:  
Summary of Water Cost of Service by Customer Class  
Projected for 2017

Customer Class	Base	Max-Day	Max-Hour	Customer	Meter	Total
Residential	\$4,070,500	\$2,241,822	\$709,648	\$1,704,454	\$756,145	\$9,482,570
Multi-family	243,365	89,664	33,986	10,096	31,544	408,655
Commercial	343,515	130,476	48,888	26,503	51,415	600,796
Bulk	132,411	65,381	25,911	2,614	2,588	228,905
Irrigation	801,198	806,438	207,382	39,213	100,084	1,954,316
Multi-family						
Indoor Use Only	301,259	35,472	28,136	63,642	73,598	502,107
Commercial						
Indoor Use Only	329,310	56,286	33,685	26,052	66,631	511,965
<b>Total</b>	<b>\$6,221,558</b>	<b>\$3,425,540</b>	<b>\$1,087,638</b>	<b>\$1,872,573</b>	<b>\$1,082,005</b>	<b>\$13,689,314</b>

## 5.4 WASTEWATER COST-OF-SERVICE ANALYSIS RESULTS

Arcadis' approach to the wastewater COS analysis follows guidelines discussed in this section. This section presents the costs of service by customer class for the wastewater system.

### 5.4.1 Estimated Wastewater System Revenue Requirements

Test year revenue requirements and user charge revenue requirements, or revenues to be recovered from the calculated wastewater rates, are presented in Table 5-5. Arcadis projects that the wastewater system needs to recover approximately \$10.7 million from its wastewater customers in 2017. Appendix H presents the entire wastewater fund COS analysis.

Table 5-5:  
Summary of 2017 Wastewater Fund Revenue Requirements

Description	FY2017
<b>O&amp;M Expenses</b>	
Administration <sup>1</sup>	\$741,042
Customer Billing	215,802
Engineering	247,973
Mapping	77,552
Field Services	655,145
Facility Maintenance	377,749
Plant Operations <sup>2</sup>	2,665,184
SCADA	178,713
CIP Related O&M	8,606
Subtotal O&M	\$5,167,766
Less: Transfers	-
Less: Minor Capital Outlay	-
<b>Total O&amp;M</b>	<b>\$5,167,766</b>
<b>Capital Expenses</b>	
Capital Fund Transfer	\$67,001
Minor Capital Outlay	76,750
Debt Service	333,258
Cash Funded Capital	\$5,636,243
<b>Subtotal Capital</b>	<b>6,113,252</b>
<b>Total Revenue Requirements</b>	<b>\$11,281,018</b>
Less: O&M Related Non-Rate Revenue	(\$244,251)
Less: Capital Related Non-Rate Revenue	(\$340,506)
<b>User Charge Revenue Requirement</b>	<b>\$10,696,262</b>

<sup>1</sup>Includes cost of services provided by the town like HR, IT, Finance, and TM.

<sup>2</sup>Provided by PCWRA

Customer service characteristics are estimated for 2017 based on the latest 12 months ending December 2015 flow from the Town's billing records and assumed residential strength factors plus the projected minimum additional flow by customer class. The 2016 cost-of-service model does not currently base wastewater charges on BOD and TSS; therefore, no differences in concentrations are used. However, the model has the capability to adjust for future customers with difference strength characteristics. Minimum additional flow per class is calculated based on a representative customer's annualized average winter monthly consumption multiplied by projected growth. Table 5-6 summarizes the projected 2017 customer service characteristics. Table 5-7 shows the proportions of each characteristic, as projected for 2017 for each customer class.

Table 5-6:  
Wastewater Customer Service Characteristics by Customer Class  
Projected for 2017

Customer Class	Flow (kgal)	BOD (Pounds)	TSS (Pounds)	Customers	Equivalent Meter
Residential	729,886	2,095,270	2,631,270	18,552	18,586
Commercial	74,674	214,366	269,204	287	1,466
Commercial Indoor Use Only	108,583	311,707	391,446	272	1,780
Multi-family	63,082	181,088	227,413	112	939
Multi-family Indoor Use Only	107,231	307,826	386,572	706	2,093
<b>Total</b>	<b>1,083,457</b>	<b>3,110,258</b>	<b>3,905,905</b>	<b>19,929</b>	<b>24,863</b>

Table 5-7:  
Summary of Wastewater Customer Service Characteristics  
Projected for 2017

Customer Class	Flow (kgal)	BOD (Pounds)	TSS (Pounds)	Customers	Equivalent Meter
Residential	67.37%	67.37%	67.37%	93.09%	74.75%
Commercial	6.89%	6.89%	6.89%	1.44%	5.90%
Commercial Indoor Use Only	10.02%	10.02%	10.02%	1.36%	7.16%
Multi-family	5.82%	5.82%	5.82%	0.56%	3.78%
Multi-family Indoor Use Only	9.90%	9.90%	9.90%	3.54%	8.42%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

The user charge revenue requirements reported in Table 5-5 are allocated first among unit processes, then to customer service characteristic, and finally to each customer class based on the percentages presented in Table 5-7. The result is the cost of service by customer service characteristic and class. Table 5-8 shows the result.

Table 5-8:  
Summary of Wastewater Cost of Service by Customer Class  
Projected for 2017

Customer Class	Flow (kgal)	BOD (Pounds)	TSS (Pounds)	Customers	Total
Residential	\$5,285,367	\$687,491	\$382,229	\$1,175,411	\$7,530,498
Commercial	540,744	70,337	39,106	18,184	668,370
Indoor Use Only	786,287	102,276	56,863	17,233	962,659
Multi-family	456,799	59,418	33,035	7,096	556,348
Multi-family					
Indoor Use Only	776,498	101,003	56,155	44,731	978,386
<b>Total</b>	<b>\$7,845,695</b>	<b>\$1,020,525</b>	<b>\$567,387</b>	<b>\$1,262,655</b>	<b>\$10,696,262</b>

#### 5.4.2 Wastewater Monthly Service Charge

An important rate design feature that directly affects the rate results is the policy decision to include 20 percent of annual capital costs in the monthly service charge. Including a portion of capital costs in the monthly service charge increases revenue stability and requires all customers to pay a portion of debt service and other capital expenses strictly on an equivalent water meter basis rather than on a wastewater volume basis. Including 20 percent of capital costs in the base rate reduces the volume rate and recovers a portion of the PCWRA debt service costs from users who require more capacity in the wastewater system. In Arcadis' analysis, the demand charge component of the monthly service charges recovers the 20 percent of annual wastewater system capital costs.

Water meter size is closely related to the amount of water a customer can potentially use and therefore discharge into the Town's wastewater system. Accounts with larger meter sizes potentially use more capacity in the Town's system. With this rate design feature, these accounts pay a proportionate share of the capital costs as part of the monthly service charge.

## 6 Rate Design

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### 6.1 INTRODUCTION

Once the costs of service by class were determined, Arcadis developed water and wastewater COS based rates based on the Town's existing rate structures. The wastewater fund follows a uniform rate structure, with a monthly service charge that varies by meter size. This section presents the results of the rate development for water, water resources, wastewater, and stormwater utilities.

### 6.2 WATER SYSTEM RATES

#### 6.2.1 Water Budget-Based Rate Structure

A water budget-based rate structure identifies a monthly budgeted amount of water by individual account that varies by landscaped area and historical evapotranspiration rates (ET). Irrigation requirements per square foot of landscaped area depend on ET for the area of Castle Rock and historical precipitation.

The irrigation season in the Town is defined as the months of April through October. Total inches of water allowed per square foot of landscaped area for the Town averages approximately 30 inches. The total water allowance is based on 80 percent of the 7 year average of historical ET for the year. The Town believes this value is adequate because ET demands are based on the maximum requirements for bluegrass. The 80 percent factor adjusts the annual monthly allowance for a more appropriate irrigation allowance.

For non-irrigation or winter months, an irrigation allowance is not included in an account's water budget. Rather, an account's historical average winter monthly water consumption (AWMC) provides actual data on the account's winter water usage during November, December, January, and February. The water budget for an account during November through March will be equal to the account's AWMC for the previous year.

Data on AWMC by account are currently calculated for sewer billings. For accounts with two meters (i.e., one indoor meter and one irrigation meter), the water budget-based rate structure will be applied to the irrigation meter only. The indoor meter will be billed as if each month were a winter or non-irrigation month (customer is billed based on the account's AWMC).

#### 6.2.2 Water Usage Thresholds

The water budget-based rate structure consists of three consumption tiers. Table 6-1 presents the tier threshold by class for the irrigation and winter seasons.

Table 6-1:  
Water Usage Thresholds

Irrigation Season (April through October 31 Consumption)				
Class	Tier 1	Tier 2	Tier 3	
Residential	AWMC	Budget	Excess	
Multi-family Indoor Use Only	AWMC	N/A	Excess	
Multi-family	AWMC	Budget	Excess	
Commercial Indoor Use Only	AWMC	N/A	Excess	
Commercial	AWMC	Budget	Excess	
Irrigation	N/A	Budget	Excess	
Winter Season – (November 1 through March 31 Consumption)				
Class	Tier 1	Tier 2	Tier 3	
Residential	AWMC	N/A	Excess	
Multi-family Indoor Use Only	AWMC	N/A	Excess	
Multi-family	AWMC	N/A	Excess	
Commercial Indoor Use Only	AWMC	N/A	Excess	
Commercial	AWMC	N/A	Excess	
Irrigation	N/A	N/A	Excess	

Explanations of the specific tier rates follow. Bulk water accounts are not subject to a water budget-based rate structure and are not discussed in this section.

#### 6.2.2.1 Description of Thresholds

For Residential, Multi-family and Commercial accounts with meters providing both indoor and irrigation water, the rate structure includes three usage tiers at increasing rates per thousand gallons (kgal).

Tier 1, or base tier, includes all usage up to an individual account's AWMC. This represents the base amount of consumption an individual account requires for basic indoor use. Average AWMC for the Town's representative residential customer is 5,000 gallons per month. AWMC for Multi-family and Commercial accounts varies according to meter size and type of commercial account.

Tier 2, or irrigation budget tier, includes usage above an account's AWMC and including its monthly irrigation allowance. The threshold will vary by month during the irrigation months. An account's landscaped area in square feet and the weekly irrigation requirements will determine the monthly irrigation allowance.

Tier 3, or excess tier, includes all usage greater than an account's AWMC plus irrigation allowance during a month. The goal of this tier is to target users who may be using water inefficiently.

#### 6.2.3 Tier Rates

The actual rates calculated for consumption tiers in the water budget rate structure recommended here are tied to the results of the COS analysis. Each account, excluding Bulk customers, pays a fixed monthly service charge consisting of a customer charge and a meter charge. A monthly water resource charge per single family equivalent (SFE, varying by

meter size) is added to an account's bill. The water resources charge is discussed in Section 6.4.

The water rate structure consists of three increasing tier rates:

- Tier 1 = Base COS rate
- Tier 2 = Base plus extra-capacity rates by customer class
- Tier 3 = Excess-use rate to recover the Town's remaining revenue requirements

The rate per 1,000 gallons for Tier 1 was initially tied to the Town's base unit cost per 1,000 gallons. This rate equals the cost to the Town of providing one unit of water to its customers on an average use basis. It differs from the average COS rates because it does not include any peaking-related costs. This rate is the same for all customer classes and provides an incentive for customers to maintain low water usage.

The rate for Tier 2 was intended to represent the cost of providing base and peaking-related water demands to the Town's customers. It includes the costs of maximum-day and maximum-hour costs of delivering water during the peak irrigation periods. This rate varies by customer class due to differences in peaking characteristics among the classes. Irrigation requirements cause peaking on the system; therefore the water used within a customer's irrigation budget is charged at the peaking rate.

Finally, the rate for Tier 3 recovers a portion of the Town's remaining revenue requirements. This rate is determined from the CIM analysis and is intended to recover a portion of the remaining revenue requirements not collected from the monthly service charges and volume revenues from Tiers 1 and 2. The analysis assumes 50 percent of revenues collected for consumption in Tier 3 will be counted toward rate revenues. The remaining amount will be for additional water conservation efforts. The Tier 3 rate is based on four factors:

1. The Tier 1 rate is set lower than the average cost of service, thereby under collecting for usage up to an account's AWMC;
2. The effect of price elasticity of demand on water usage – as the price for water changes, customers respond by conserving water; and
3. An expectation that some of the Town's accounts will use more than their water budget allowance.
4. Adjustments to Tier 1 and 2 rates to recover a portion of the remaining revenue requirements.

Residential accounts are subject to a water conservation surcharge for usage greater than 40,000 gallons per month. This surcharge intends to send a conservation price signal to customers with excessive usage.



### **6.3 WASTEWATER SYSTEM RATES**

The Town currently charges wastewater customers a fixed monthly service charge that consists of a customer charge and a demand charge, plus a uniform volume rate for wastewater flow. An account's flow is estimated using its AWMC. The proposed 2017 wastewater rates consist of a monthly charge that includes the demand charge by meter size, plus a uniform volume rate for all customers.

### **6.4 WATER RESOURCES USER CHARGES**

The Town currently assesses all water resources customers a fixed monthly service charge per SFE. Arcadis recommends no change in the equivalency schedule used to determine SFEs for assessing water resources charges. The water resource charge calculated per SFE for 2017 is presented in Section 7.

### **6.5 STORMWATER MONTHLY UTILITY FEE**

During the 2010 study, Arcadis reviewed the existing assumptions used for determining the stormwater monthly utility fee. This year's study update used assumptions revised during the 2010 review. For single-family residential units, the percent imperviousness was determined based on the following assumptions:

- Density of 3 units per acre from the water design criteria section of the Town of Castle Rock - Public Works Regulations – February 12, 1999
- Typical two-story homes
- Average home size of 2,100 sq. ft. from County Assessor data

Using these assumptions and Figure RO-5 from the Urban Drainage and Flood Control District (UDFCD) Criteria Manual, a single-family residential account's percent imperviousness was estimated to be 33 percent.

Town Geographical Information System (GIS) data indicate the average lot size of a single-family home in the Town is 9,864 sq. ft. Applying 33 percent imperviousness to this lot size results in an impervious area of 3,255 sq. ft. per SFE. The assumption of one SFE used in this study is 3,255 sq. ft.

Arcadis also re-calculated the stormwater SFEs based on percent imperviousness for non-residential accounts during this 2016 Update Study. The average percent imperviousness for multi-family and other non-residential properties was assumed to be 80 percent, unless otherwise indicated in the Town's billing system data. SFEs were calculated based on the percent imperviousness of each property multiplied by its parcel size.

## 7 Findings and Recommendations

### 7.1 FINDINGS

Arcadis has completed the 2016 Utilities Rates and Fees Study Update, including utility system financial planning, COS rate studies, and rate design. The purpose of this study is to provide the Town with an update for their water, water resources, wastewater, and stormwater fund rates and fees designed to meet Town policies and objectives during the years 2017 through 2021. Arcadis' findings are based on a thorough review of the information provided.

After the rate structure analysis and consideration of the Town's preferences, Arcadis has concluded the following rates and structures will adequately address the Town's needs for 2017.

Table 7-1:  
Water  
Proposed 2017 Monthly Service Charge

Meter Size	Monthly Charge
5/8" x 3/4"	\$9.54
3/4"	\$9.54
1"	\$13.72
1.5"	\$18.78
2"	\$26.00
3"	\$41.78
4"	\$94.12
6"	\$147.26
<b>Bulk Customers</b>	\$9.54

Table 7-2:  
Water  
Proposed 2017 Volumetric Rates by Tier

Irrigation Season (April through October 31 Consumption)				
Class	Tier 1 AWMC	Tier 2 Irrigation	Tier 3 Excess	Tier 4 Surcharge over 40 Kgals
Residential	\$2.82	\$5.53	\$8.29	\$8.29
Multi-family Indoor Use Only	\$2.82	N/A	\$3.57	N/A
Multi-family w/Irrigation	\$2.82	\$4.70	\$7.04	N/A
Commercial Indoor Use Only	\$2.82	N/A	\$3.80	N/A
Commercial w/Irrigation	\$2.82	\$4.75	\$7.13	N/A
Irrigation	N/A	\$7.58	\$11.36	N/A
Bulk	\$5.07	N/A	N/A	N/A
Winter Season – (November 1 through March 31 Consumption)				
Class	Tier 1 AWMC	Tier 2 Irrigation	Tier 3 Excess	Tier 4 Surcharge over 40 Kgals
Residential	\$2.82	N/A	\$5.53	\$8.29
Multi-family Indoor Use Only	\$2.82	N/A	\$3.57	N/A
Multi-family w/Irrigation	\$2.82	N/A	\$4.70	N/A
Commercial Indoor Use Only	\$2.82	N/A	\$3.80	N/A
Commercial w/Irrigation	\$2.82	N/A	\$4.75	N/A
Irrigation	N/A	N/A	\$11.36	N/A
Bulk	\$5.07	N/A	N/A	N/A

Table 7-3:  
Water Resources  
Proposed 2017 Monthly and Volumetric

Meter Size	Monthly Charge
5/8" x 3/4"	\$17.52
3/4"	\$26.15
1"	\$99.11
1.5"	\$187.50
2"	\$313.54
3"	\$588.90
4"	\$1,502.32
6"	\$2,429.34
Volumetric Rate	
Bulk Customer, Per Kgal	\$0.24

Table 7-4:  
Wastewater  
Proposed 2017 Monthly and Volumetric Rates

Meter Size	Monthly Charge
5/8" x 3/4"	\$9.30
3/4"	\$9.30
1"	\$14.80
1.5"	\$21.46
2"	\$30.96
3"	\$51.72
4"	\$120.58
6"	\$190.48
<b>Volumetric Rate</b>	
All Customers, Per Kgal	\$6.59

Table 7-5:  
Proposed 2017 Stormwater Monthly Service Charges

Monthly Stormwater Fee		
All Customers, per Single Family Equivalent (SFE)		\$7.12
SFE Assignment		
Customer Class	Impervious Sq. Ft.	SFE
Single Family Attached & Detached	3,255	1
Non-Single Family (Multi Family & Commercial)	Parcel size times 80% imperviousness divided by 3,255 impervious sq. ft. per SFE = # of SFEs	

## 7.2 PROPOSED RATES FOR 2017 THROUGH 2021

Rates for the five-year study period (2017 through 2021) were projected using the percentage rate revenue increases projected by the financial plans. Appendix B contains the rate schedules for the years 2017 through 2021.

### 7.3 RECOMMENDATIONS

As part of the 2016 Utilities Rates and Fees Study Update, Arcadis recommends the Town:

- Continue to monitor changes in the actual use equivalency schedule to be applied when assessing monthly service charges by meter size. Also monitor by meter type within each meter size.
- Adopt the presented rates and fees for the years 2017 through 2021.
- Closely monitor water sales and revenues to ensure revenues are adequate to cover costs.
- Arcadis recommends that to ensure the long-term sustainability of the stormwater enterprise, a review of the timing of CIP expenditures, O&M expenses, and sources and uses of funds among sub-funds be thoroughly performed.
- Annually review the operating results and update the financial plan to proactively manage changes in costs, revenues, and system growth.
- Maintain a minimum of 1,000 gallons AWMC for customers with zero AWMC. This will result in a more appropriate wastewater charge and will create a minimum Tier 1 usage allowance for the water bill calculation.

# APPENDIX A

Rate Schedules for FY2017 through FY2021



Water  
Proposed Monthly Service Charges 2017 - 2021

Meter Size	FY2017	FY2018	FY2019	FY2020	FY2021
5/8" x 3/4"	\$9.54	\$9.54	\$9.54	\$9.54	\$9.54
3/4"	\$9.54	\$9.54	\$9.54	\$9.54	\$9.54
1"	\$13.72	\$13.72	\$13.72	\$13.72	\$13.72
1.5"	\$18.78	\$18.78	\$18.78	\$18.78	\$18.78
2"	\$26.00	\$26.00	\$26.00	\$26.00	\$26.00
3"	\$41.78	\$41.78	\$41.78	\$41.78	\$41.78
4"	\$94.12	\$94.12	\$94.12	\$94.12	\$94.12
6"	\$147.26	\$147.26	\$147.26	\$147.26	\$147.26
Bulk Customers	\$9.54	\$9.54	\$9.54	\$9.54	\$9.54

Water  
Proposed Volume Rates 2017 - 2021

Irrigation Season – April through October 31 Consumption															
Class	Tier 1 AWMC					Tier 2 Irrigation					Tier 3 Excess				
	FY2017	FY2018	FY2019	FY2020	FY2021	FY2017	FY2018	FY2019	FY2020	FY2021	FY2017	FY2018	FY2019	FY2020	FY2021
Residential	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	\$5.53	\$5.53	\$5.53	\$5.53	\$5.53	\$8.29	\$8.29	\$8.29	\$8.29	\$8.29
Multi-family Indoor Use Only	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	N/A	N/A	N/A	N/A	N/A	\$3.57	\$3.57	\$3.57	\$3.57	\$3.57
Multi-family with Irrigation	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	\$4.70	\$4.70	\$4.70	\$4.70	\$4.70	\$7.04	\$7.04	\$7.04	\$7.04	\$7.04
Commercial – Indoor Use Only	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	N/A	N/A	N/A	N/A	N/A	\$3.80	\$3.80	\$3.80	\$3.80	\$3.80
Commercial with Irrigation	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	\$4.75	\$4.75	\$4.75	\$4.75	\$4.75	\$7.13	\$7.13	\$7.13	\$7.13	\$7.13
	N/A	N/A	N/A	N/A	N/A	\$7.58	\$7.58	\$7.58	\$7.58	\$7.58	\$11.36	\$11.36	\$11.36	\$11.36	\$11.36
Winter Season – November 1 through March 31 Consumption															
Residential	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	N/A	N/A	N/A	N/A	N/A	\$5.53	\$5.53	\$5.53	\$5.53	\$5.53
Multi-family Indoor Use Only	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	N/A	N/A	N/A	N/A	N/A	\$3.57	\$3.57	\$3.57	\$3.57	\$3.57
Multi-family with Irrigation	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	N/A	N/A	N/A	N/A	N/A	\$4.70	\$4.70	\$4.70	\$4.70	\$4.70
Commercial - Indoor Use Only	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	N/A	N/A	N/A	N/A	N/A	\$3.80	\$3.80	\$3.80	\$3.80	\$3.80
Commercial with Irrigation	\$2.82	\$2.82	\$2.82	\$2.82	\$2.82	N/A	N/A	N/A	N/A	N/A	\$4.75	\$4.75	\$4.75	\$4.75	\$4.75
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$11.36	\$11.36	\$11.36	\$11.36	\$11.36
Bulk	5.07	5.07	5.07	5.07	5.07	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A



Water Resources  
Proposed Monthly and Volumetric Rates 2017 - 2021

Meter Size	FY2017	FY2018	FY2019	FY2020	FY2021
5/8" x 3/4"	\$17.52	\$18.05	\$18.59	\$19.15	\$19.82
3/4"	\$26.15	\$26.93	\$27.74	\$28.57	\$29.57
1"	\$99.11	\$102.08	\$105.14	\$108.30	\$112.09
1.5"	\$187.50	\$193.12	\$198.91	\$204.88	\$212.05
2"	\$313.54	\$322.94	\$332.63	\$342.61	\$354.60
3"	\$588.90	\$606.56	\$624.76	\$643.50	\$666.03
4"	\$1,502.32	\$1,547.39	\$1,593.81	\$1,641.62	\$1,699.08
6"	\$2,429.34	\$2,502.22	\$2,577.28	\$2,654.60	\$2,747.51
<b>Bulk Customers Volumetric Rate</b>					
Per Kgal	\$0.24	\$0.24	\$0.25	\$0.26	\$0.27

Wastewater  
Proposed Monthly and Volumetric Rates 2017 - 2021

Meter Size	FY2017	FY2018	FY2019	FY2020	FY2021
5/8" x 3/4"	\$9.30	\$9.30	\$9.30	\$9.30	\$9.30
3/4"	\$9.30	\$9.30	\$9.30	\$9.30	\$9.30
1"	\$14.80	\$14.80	\$14.80	\$14.80	\$14.80
1.5"	\$21.46	\$21.46	\$21.46	\$21.46	\$21.46
2"	\$30.96	\$30.96	\$30.96	\$30.96	\$30.96
3"	\$51.72	\$51.72	\$51.72	\$51.72	\$51.72
4"	\$120.58	\$120.58	\$120.58	\$120.58	\$120.58
6"	\$190.48	\$190.48	\$190.48	\$190.48	\$190.48
<b>Volumetric Rate</b>					
All Customers, Per Kgal	\$6.59	\$6.59	\$6.59	\$6.59	\$6.59

Stormwater  
Proposed Monthly Service Charges 2017 - 2021

Description	FY2017	FY2018	FY2019	FY2020	FY2021
All Customers, per Single Family Equivalent (SFE)	\$7.12	\$7.41	\$7.71	\$8.01	\$8.33

# APPENDIX B

Water Fund Long-Term Financial Plan – With Capital  
Improvement Program



**Table 1**  
**Town of Castle Rock**  
**Water**  
**Proforma - Operating Fund**

Line No.	Description	FY2017	FY2018	FY2019	FY2020	FY2021
	Revenues					
1	Rate Revenues	\$ 13,689,314	\$ 14,079,856	\$ 14,470,398	\$ 14,860,940	\$ 15,251,482
2	Rate Revenues from Increase	-	-	-	-	-
3	Miscellaneous Revenue	1,324,072	1,363,075	1,402,774	1,418,203	1,434,471
4	Transfers In	2,557,750	695,250	685,125	-	-
5	Interest Income	10,100	24,008	33,819	41,169	45,828
6	Total Revenues	\$ 17,581,235	\$ 16,162,189	\$ 16,592,115	\$ 16,320,312	\$ 16,731,780
	Revenue Requirements					
7	Operating Expenses	\$ 8,705,180	\$ 9,057,141	\$ 9,520,448	\$ 10,221,945	\$ 10,679,897
8	Non-Operating Expenses	-	-	-	-	-
9	Transfers Out	1,728,809	1,808,271	1,905,445	2,014,536	2,200,625
10	Minor Capital Expense	984,182	1,017,882	1,040,682	1,048,282	1,082,482
	Debt Service					
11	Existing Debt Service	1,740,767	1,746,879	1,752,251	1,733,994	1,740,790
12	New-Revenue Bond	-	-	-	-	-
13	New-General Obligation Bond	-	-	-	-	-
14	New-State Revolving Loan Fund	-	-	-	-	-
15	Total Debt Service	\$ 1,740,767	\$ 1,746,879	\$ 1,752,251	\$ 1,733,994	\$ 1,740,790
16	Capital Projects Funded with Cash	-	-	-	-	-
17	Total Revenue Requirements	\$ 13,158,937	\$ 13,630,173	\$ 14,218,826	\$ 15,018,757	\$ 15,703,794
18	Revenues Over (Under) Expenses	\$ 4,422,298	\$ 2,532,016	\$ 2,373,289	\$ 1,301,555	\$ 1,027,986
19	Beginning Balance	\$ 313,776	\$ 4,736,074	\$ 7,268,089	\$ 9,641,378	\$ 10,942,933
20	Revenues Over (Under) Expenses	4,422,298	2,532,016	2,373,289	1,301,555	1,027,986
21	Ending Balance	\$ 4,736,074	\$ 7,268,089	\$ 9,641,378	\$ 10,942,933	\$ 11,970,919

**Table 2**  
**Town of Castle Rock**  
**Water**  
**Projected Rate Revenue Requirements**

Line No.	Description	Category	1	2	3	4	5
			FY2017	FY2018	FY2019	FY2020	FY2021
	Operation and Maintenance Expense						
1	Water Fund O&M		\$ 8,705,180	\$ 9,057,141	\$ 9,520,448	\$ 10,221,945	\$ 10,679,897
2	WR Fund - 4260 PCWPF Water Treatment Charges		<u>1,528,166</u>	<u>1,607,369</u>	<u>1,704,115</u>	<u>1,811,221</u>	<u>1,994,905</u>
3	Total O&M Expenses		\$ 10,233,345	\$ 10,664,510	\$ 11,224,563	\$ 12,033,166	\$ 12,674,802
	Capital Expenditures						
4	Debt Service		\$ 1,740,767	\$ 1,746,879	\$ 1,752,251	\$ 1,733,994	\$ 1,740,790
5	Transfers Out		200,643	225,861	272,052	339,856	238,710
6	Minor Capital Outlay		984,182	1,017,882	1,040,682	1,048,282	1,082,482
7	Pay-Go Cash Funded Capital		<u>5,378,920</u>	<u>2,764,951</u>	<u>4,475,356</u>	<u>8,290,897</u>	<u>2,683,562</u>
8	Total Capital Expenditures		\$ 8,304,512	\$ 5,755,573	\$ 7,540,341	\$ 11,413,029	\$ 5,745,544
9	Total O&M and Capital Expenses		\$ 18,537,857	\$ 16,420,084	\$ 18,764,905	\$ 23,446,195	\$ 18,420,346
	Less Revenue From Other Sources						
10	Miscellaneous Revenue	O&M	\$1,324,072	\$1,363,075	\$1,402,774	\$1,418,203	\$1,434,471
11	System Development Fee Revenue	Capital	2,476,181	2,546,943	2,618,496	2,684,064	2,760,058
12	Transfers From Restricted Fund	Capital	2,557,750	695,250	685,125	-	-
13	Interest Income	O&M	60,509	68,316	73,954	66,092	59,429
14	Sources & Uses of Funds	Capital	<u>(1,569,969)</u>	<u>(2,333,356)</u>	<u>(485,842)</u>	<u>4,416,895</u>	<u>(1,085,093)</u>
15	Rate Revenue Requirement		\$ 13,689,314	\$ 14,079,856	\$ 14,470,398	\$ 14,860,940	\$ 15,251,482
	Adjustment for Revenue From Other Sources						
16	Operation and Maintenance Expenses		\$ 8,848,764	\$ 9,233,120	\$ 9,747,836	\$ 10,548,870	\$ 11,180,903
17	Capital Expenses		<u>4,840,550</u>	<u>4,846,736</u>	<u>4,722,562</u>	<u>4,312,069</u>	<u>4,070,579</u>
18	Total Rate Revenue Requirement		\$ 13,689,314	\$ 14,079,856	\$ 14,470,398	\$ 14,860,940	\$ 15,251,482

Town of Castle Rock

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Water

Capital Improvement Program - Alternative 1 (Priority 1, 2 and 3)

	=Rank 1
	=Rank 2
	=Rank 3
	= Not Ranked

Line No	Description	1 2017	2 2018	3 2019	4 2020	5 2021
1	<b>Water Supply Wells</b>					
2	Well Rehab/Replacement	500,000	500,000	500,000	500,000	500,000
3	Well Equipment Replacement	100,000	100,000	100,000	100,000	100,000
4	Building 204 Improvements	0	0	0	0	0
5	NEW Deep Groundwater Well and raw waterline	2,750,000	0	0	0	0
6	Crystal Valley Ranch Wells - 1300 GPM ph1	0	0	0	0	0
7	Crystal Valley Ranch Wells - 1250 GPM ph1	0	0	0	0	0
8	Crystal Valley Ranch Wells - 1175 GPM ph3	0	0	0	0	0
9	Lanterns Wells 1500 gpm (raw line?; treat where?)	0	0	0	0	0
10	Raw Water Transmission Lines to where ?	0	0	0	0	0
11	VFD replacement (Well/ps/tmt plant)	125,000	125,000	125,000	125,000	125,000
12	<b>Treatment</b>					
13	RWTP Filter Media Underdrains Upgrades	0	0	0	0	0
14	Meadows WTP Filter Rehab	0	0	0	0	0
15	WTP Facility Upgrades	50,000	50,000	50,000	50,000	50,000
16	WTP Equipment replacement	100,000	100,000	100,000	100,000	100,000
17	Meadows WTP Skylight Removal Ph 2	0	0	0	0	0
18	Decommission Miller WTP (?)	0	0	0	0	0
19	Water WTP Access Drive Paving	0	0	0	0	0
20	Water Tmt Plant media replacement	0	0	0	105,000	0
21	<b>Water Storage</b>					
22	Tank Rehab	50,000	50,000	50,000	50,000	50,000
23	Liberty Village Yellow Zone Tank (Tank 18) Liberty Village	0	0	0	3,425,609	0
24	Tank 11B (was Tank 14B) 2.3 MG (Tower Rd)	0	0	0	0	0
25	Tank (2.0 MG) Red Zone	0	0	0	0	0
26	Tank 6B Demolition	0	0	0	0	0
27	Tank 3 demolition	0	0	0	0	0
28	Tank 3 Replacement (Reservoir Road)	0	0	0	0	0
29	Add stairs to Tank 3, Tank 4 and 16A (? Which tank)	60,000	60,000	0	0	0
30	Tank 5 Demolition	150,000	0	0	0	0
31	Tanks 17 Access Road Paving	0	0	0	0	0
32	Storage Tank Replacement	0	0	0	0	0
33	<b>Water Pumping</b>					
34	Green Zone Pumping Upgrades Ph1, Phase I (2100 gpm; +	0	0	0	0	0
35	PS Equipment Replacement	50,000	50,000	50,000	50,000	50,000
36	Blue Zone PS Upsize (replace mid-duty pump, inc 1000 g	0	0	0	0	0
37	Red Zone Pumping Upsize, Ph1 (2245 gpm) 75 HP	0	0	550,000	0	0
38	Red Zone Pumping Upsize, Ph2 (4170 gpm) 125 HP	0	0	0	0	0
39	Red Zone Pumping Upsize, Ph3 (14,000 gpm) 425 HP	0	0	0	0	0
40	Milestone Pump Station PRV Valve	0	0	0	75,000	0
41	Green Zone Pumping Upgrades Phase II (9205 gpm)	0	0	0	0	0
42	Well 9 demolition (Kinner St)	0	0	0	0	0
43	Blue Zone Pressure Control mode	0	0	0	0	0
44	<b>Transmission &amp; Distribution</b>					
45	Young American Valve Replacement Program	160,000	160,000	0	0	0
46	Waterline Rehab/Replacement	150,000	150,000	200,000	200,000	200,000
47	Distribution System Upgrades (PRVs, pipelines, etc)	250,000	250,000	250,000	250,000	250,000
48	Craig & Gould North Infrastructure Improvements (FF Issue	0	0	55,000	480,000	0
49	Tacker Court PRV (former Tank 2 site)	200,000	0	0	0	0
50	Electric Actuated Valves at Tanks	75,000	75,000	75,000	0	0
51	Tank Mixers	25,000	25,000	25,000	0	0
52	Meadows Skylight Removal	0	0	0	0	0
53	Facilities Paving Program	50,000	50,000	50,000	50,000	50,000
54	Diamond Ridge Pump Station Control Valve	0	0	0	0	75,000
55	Prairie Hawk Waterline Extension	0	0	0	0	0
56	Glovers Waterline Replacement phase 1	0	0	374,000	0	0
57	Glovers Waterline Replacement phase 2	0	0	0	363,000	0
58	Glovers Waterline Replacement phase 2	0	0	0	0	594,000
59	Crowfoot Purple Line Upsize	151,000	0	0	0	0
60	Crowfoot Red Zone Upsize	0	0	0	0	0
61	Crowfoot to Crimson Sky (developer 16" or town build 16")	0	0	0	0	0
62	Crimson Sky to Oaks Valve	0	0	0	0	0
63	RWRWTO Tank 16 Transmission Line	0	0	0	0	0
64	5th Street Red Zone Connection	0	0	0	0	0
65	Tank 18 Blue Zone Transmission	0	0	0	0	0
66	South Ridge Rd Transmission, 24"	0	0	0	0	0
67	Tank 6 to CVR Transmission, 24" (developer 16")	0	0	0	0	0
68	Crystal Valley Ranch Loop Rd Ph1, 24" (developer 16")	0	0	0	0	0
69	Crystal Valley Ranch Loop Rd Ph2, 20" (developer 16")	0	0	0	0	0
70	Blue Zone - Plum Creek to Frontage Road Transmission, 2	0	0	0	0	0
71	Pine Canyon Transmission (may need to have developer u	0	0	0	0	0
72	Tank 11 to Pine Canyon 16" Pipe (developer 12")	0	0	0	321,000	0
73	Pine Canyon Red Zone Transmission	0	0	0	0	0
74	RWTP Red Zone Transmission	0	0	0	0	0
75	RWTP Green Zone Transmission	0	0	0	0	0
76	Plum Creek WTP to Tank 12 Transmission	0	0	0	0	0
77	Highway 85 Transmission	0	703,000	0	0	0
78	Topeka Way/Plum Creek Parkway Waterline Looping, 12"	0	0	0	0	0
79	Woodlands Founders PRV	0	0	0	0	0
80	<b>Other Projects</b>					
81	Security Improvements	50,000	50,000	50,000	50,000	25,000
82	General Facility Upgrades	75,000	75,000	75,000	75,000	75,000
83	SCADA System Capital Improvements	25,000	25,000	25,000	25,000	25,000
84	Facilities Capital Replacements (bldg components)	75,000	75,000	75,000	75,000	75,000
85	Machinery and Equipment	0	0	0	0	0
86	Admin/Customr Service Building	0	0	1,403,641	0	0
87	Site Improvements at 175 Kellogg Court	157,920	0	0	1,021,325	0
88	<b>Total Capital Improvements</b>	<b>5,378,920</b>	<b>2,673,000</b>	<b>4,182,641</b>	<b>7,490,934</b>	<b>2,344,000</b>

# APPENDIX C

Water Resources Fund Long-Term Financial Plan – With Capital  
Improvement Program





**Table 1**  
**Town of Castle Rock**  
**Water Resources**  
**Proforma - Operating Fund**

Line No.	Description	FY2017	FY2018	FY2019	FY2020	FY2021
Revenues						
1	Rate Revenues	\$ 8,382,661	\$ 8,882,558	\$ 9,404,905	\$ 9,950,598	\$ 10,520,569
2	Rate Revenues from Increase	251,480	266,477	282,147	298,518	368,220
3	Miscellaneous Revenue	180,740	180,740	4,448,490	51,740	51,740
4	Transfers In	1,528,166	1,607,369	1,704,115	1,811,221	1,994,905
5	Interest Income	<u>137,411</u>	<u>94,596</u>	<u>106,035</u>	<u>116,972</u>	<u>118,873</u>
6	Total Revenues	\$ 10,480,457	\$ 11,031,740	\$ 15,945,692	\$ 12,229,049	\$ 13,054,307
Revenue Requirements						
7	Operating Expenses	\$ 5,193,463	\$ 6,506,812	\$ 7,287,181	\$ 7,905,423	\$ 8,873,006
8	Non-Operating Expenses	-	-	-	-	-
9	Transfers Out	4,707	4,707	4,707	4,707	4,707
10	Minor Capital Expense	36,405	36,521	36,639	36,749	37,201
Debt Service						
11	Existing Debt Service	3,665,025	3,679,475	3,701,975	3,728,975	3,741,975
12	New-Revenue Bond	-	-	-	-	-
13	New-General Obligation Bond	-	-	-	-	-
14	New-State Revolving Loan Fund	-	-	-	-	-
15	Total Debt Service	\$ 3,665,025	\$ 3,679,475	\$ 3,701,975	\$ 3,728,975	\$ 3,741,975
16	Capital Projects Funded with Cash	23,792,542	-	-	-	-
17	Total Revenue Requirements	\$ 32,692,142	\$ 10,227,515	\$ 11,030,502	\$ 11,675,854	\$ 12,656,890
18	Revenues Over (Under) Expenses	\$ (22,211,685)	\$ 804,225	\$ 4,915,191	\$ 553,195	\$ 397,417
19	Beginning Balance	\$ 45,458,641	\$ 23,246,956	\$ 24,051,181	\$ 28,966,372	\$ 29,519,567
20	Revenues Over (Under) Expenses	<u>(22,211,685)</u>	<u>804,225</u>	<u>4,915,191</u>	<u>553,195</u>	<u>397,417</u>
21	Ending Balance	\$ 23,246,956	\$ 24,051,181	\$ 28,966,372	\$ 29,519,567	\$ 29,916,984
Debt Service Coverage						
22	Debt Service Coverage Test 1	523%	510%	628%	515%	517%
23	Debt Service Coverage Test 2	523%	510%	628%	515%	517%

**Table 2**  
**Town of Castle Rock**  
**Water Resources**  
**Projected Rate Revenue Requirements**

Line No.	Description	Category	1	2	3	4	5
			FY2017	FY2018	FY2019	FY2020	FY2021
1	Operation and Maintenance Expense		\$ 5,193,463	\$ 6,506,812	\$ 7,287,181	\$ 7,905,423	\$ 8,873,006
	Capital Expenditures						
2	Debt Service		\$ 3,665,025	\$ 3,679,475	\$ 3,701,975	\$ 3,728,975	\$ 3,741,975
3	Transfers Out		4,707	248,974	189,976	66,311	28,764
4	Minor Capital Outlay		36,405	36,521	36,639	36,749	37,201
5	Pay-Go Cash Funded Capital		<u>56,664,897</u>	<u>13,618,625</u>	<u>10,457,166</u>	<u>4,016,706</u>	<u>2,021,888</u>
6	Total Capital Expenditures		\$ 60,371,034	\$ 17,583,595	\$ 14,385,756	\$ 7,848,741	\$ 5,829,828
7	Total O&M and Capital Expenses		\$ 65,564,497	\$ 24,090,407	\$ 21,672,937	\$ 15,754,165	\$ 14,702,835
	Less Revenue From Other Sources						
8	Miscellaneous Revenue	O&M	\$ 180,740	\$ 180,740	\$ 4,448,490	\$ 51,740	\$ 51,740
9	Water Resources Fee Revenue	Capital	15,401,681	15,832,928	16,276,250	16,676,767	17,143,716
10	Transfers From Restricted Fund	Capital	1,528,166	1,607,369	1,704,115	1,811,221	1,994,905
11	Interest Income	O&M	174,279	100,548	127,249	174,809	232,445
12	Sources & Uses of Funds	Capital	<u>39,645,491</u>	<u>(2,780,213)</u>	<u>(10,570,220)</u>	<u>(13,209,488)</u>	<u>(15,608,760)</u>
13	Rate Revenue Requirement		\$ 8,634,140	\$ 9,149,035	\$ 9,687,052	\$ 10,249,116	\$ 10,888,789
	Adjustment for Revenue From Other Sources						
14	Operation and Maintenance Expenses		\$ 4,838,444	\$ 6,225,524	\$ 2,711,442	\$ 7,678,875	\$ 8,588,821
15	Capital Expenses		<u>3,795,696</u>	<u>2,923,511</u>	<u>6,975,610</u>	<u>2,570,241</u>	<u>2,299,967</u>
16	Total Rate Revenue Requirement		\$ 8,634,140	\$ 9,149,035	\$ 9,687,052	\$ 10,249,116	\$ 10,888,789

Town of Castle Rock  
e-Forecast Version 3.0

Water Resources

Capital Improvement Program - Alternative 1



	=Rank 1
	=Rank 2
	=Rank 3
	= Not Ranked

Line No	Description	1 2017	2 2018	3 2019	4 2020	5 2021
1	Plum Creek Diversion Structure & Pump Station	3,065,007	-	-	-	-
2	Raw Water Pipeline from Diversion to PCWPF	4,890,384	-	-	-	-
3	Pre-Sedimentation Basin	1,261,997	-	-	-	-
4	Horizontal Directionally Drilled Infiltration Galleries	2,500,000	-	-	-	-
5	HDD Gallery property acquisition	250,000	-	-	-	-
6	West Plum Creek Alluvial Wells, Pump Station, and Pipeline	-	-	-	-	-
7	Purchase WISE Water Capacity from Dominion if Raw Water Pump Station is not complete	-	-	-	-	-
8	Chatfield Reallocation	1,198,680	1,198,680	1,198,680	1,198,680	1,198,680
9	Rehabilitation of Alluvial Well Fields	60,000	155,000	150,000	120,000	300,000
10	O&M Center Building	-	-	-	-	-
11	Admin/Customer Service Building	-	-	627,940	-	-
12	Utilities Site Improvements	87,566	-	-	456,907	-
13	Machinery & Equipment	-	-	-	-	-
14	ASR Program	500,000	-	-	500,000	-
15	ASR Program Baski Valve Removal & Replacement	-	-	-	-	-
16	PC Central Well Field Lateral Arms	1,500,000	-	-	-	-
17	PC South Well Field Lateral Arms and Well 78 Installation	2,000,000	-	-	-	-
18	PC Diversion #1 Installation	100,000	-	-	-	-
19	Membrane Rack Remove and Replace (Installed in 2013)	-	-	-	-	-
20	Dewatering Facility at PCWPF (Phase I)	2,000,000	-	-	-	-
21	Advanced Treatment Facility (Phase I)	6,878,485	6,878,485	-	-	-
22	PCWPF Membrane Expansion (Phase I)	1,028,904	-	-	-	-
23	Generator at PCWPF	897,300	-	-	-	-
24	Membrane Rack Remove and Replace (Installed in 2018)	-	-	-	-	-
25	PCWPF Advanced Treatment Expansion (Phase 2) and Membrane Expansion (Phase 2)	-	-	-	-	-
26	PCWPF Pretreatment Expansion (Phase 2)	-	-	-	-	-
27	PCWPF Membrane & High Service Pump Expansion (Phase 2)	-	-	-	-	-
28	Dewatering Facility at PCWPF (Phase 2)	-	-	-	-	-
29	PCWPF Expansion (Phase 2) Membrane Rack Remove and Replace	-	-	-	-	-
30	PCWPF Expansion (Phase 3)	-	-	-	-	-
31	PCWPF Expansion (Phase 3) Membrane Rack Remove and Replace	-	-	-	-	-
32	PCWPF Expansion (Phase 4)	-	-	-	-	-
33	PCWPF Expansion (Phase 4) Membrane Rack Remove and Replace	-	-	-	-	-
34	Purchase Capacity in PWSD Rueter-Hess Water Treatment Plant (RHWT)	-	-	-	-	-
35	Groundwater Facilities in Cherry Creek Basin	-	-	-	-	-
36	Chatfield Raw Pipeline and Pump Station	100,000	-	-	-	-
37	Newlin Gulch Pipeline and Pump Station	2,555,300	-	-	-	-
38	PCWRA Upgrades for Newlin Gulch Pipeline	3,000,000	-	-	-	-
39	Box Elder Creek Properties Option Payments	575,000	-	-	-	-
40	Box Elder Creek Properties Property Purchase	8,457,000	-	-	-	-
41	Box Elder Creek Project Due Diligence	100,000	100,000	-	-	-
42	Water Rights Purchase	4,000,000	4,000,000	4,000,000	1,100,000	-
43	New Box Elder Creek Farm Alluvial Wells	-	-	-	-	-
44	Treatment of Box Elder Alluvial Water (RO Treatment and Brine Disposal) through either new	100,000	-	-	-	-
45	Water Pipeline from BEC Well Field to ECCV Northern WTP	-	-	-	-	-
46	Firm Capacity in ECCV Northern Line	-	-	-	-	-
47	Firm capacity in ECCV North and South Pump Stations	-	-	-	-	-
48	Raw Water Pipeline from South Platte to Box Elder Creek Farms	-	-	-	-	-
49	Western Pipeline Purchase & Modifications	-	-	-	-	-
50	ECCV Title Cleanup Credit	-	-	143,024	-	-
51	Binney Connection	200,000	400,000	3,400,000	-	-
52	WISE Project Subscription Fee (aka DIA Connection Fee)	150,000	150,000	150,000	150,000	163,810
53	Castle Rock Delivery Infrastructure (Outer Marker Road to Ray Waterman)	625,714	-	-	-	-
54	WISE Local Infrastructure (in partnership with Parker)*	8,300,000	-	-	-	-
55	Dechlorination at RHR	-	-	-	-	-
56	WISE Local Infrastructure (Western Side of RHR) - Phase I	-	-	-	-	-
57	WISE Operating Expenses	103,560	103,560	103,560	103,560	103,560
58	Operational Reserve	180,000	180,000	-	-	-
59	WISE Water Delivery - Facilities Capital	-	-	-	-	-
60	Total Capital Improvements	56,664,897	13,165,725	9,773,204	3,629,147	1,766,050

# APPENDIX D

Wastewater Fund Long-Term Financial Plan – With Capital  
Improvement Program



**Table 1**  
**Town of Castle Rock**  
**Wastewater**  
**Proforma - Operating Fund**

Line No.	Description	FY2017	FY2018	FY2019	FY2020	FY2021
Revenues						
1	Rate Revenues	\$ 10,696,262	\$ 11,056,772	\$ 11,417,282	\$ 11,777,792	\$ 12,138,302
2	Rate Revenues from Increase	-	-	-	-	-
3	Miscellaneous Revenue	159,904	159,904	159,904	159,904	159,904
4	Transfers In	-	-	-	-	-
5	Interest Income	11,314	32,501	54,334	57,328	56,788
6	Total Revenues	\$ 10,867,479	\$ 11,249,177	\$ 11,631,519	\$ 11,995,024	\$ 12,354,994
Revenue Requirements						
7	Operating Expenses	\$ 5,167,766	\$ 5,392,772	\$ 5,604,147	\$ 5,888,586	\$ 6,114,891
8	Non-Operating Expenses	-	-	-	-	-
9	Transfers Out	67,001	67,076	67,076	9,743,518	2,048,369
10	Minor Capital Expense	76,750	84,750	79,750	79,750	79,750
Debt Service						
11	Existing Debt Service	333,258	333,546	335,274	331,356	333,660
12	New-Revenue Bond	-	-	-	-	-
13	New-General Obligation Bond	-	-	-	-	-
14	New-State Revolving Loan Fund	-	-	-	-	-
15	Total Debt Service	\$ 333,258	\$ 333,546	\$ 335,274	\$ 331,356	\$ 333,660
16	Capital Projects Funded with Cash	-	-	-	-	-
17	Total Revenue Requirements	\$ 5,644,775	\$ 5,878,144	\$ 6,086,247	\$ 16,043,210	\$ 8,576,670
18	Revenues Over (Under) Expenses	\$ 5,222,704	\$ 5,371,033	\$ 5,545,272	\$ (4,048,187)	\$ 3,778,323
19	Beginning Balance	\$ 217,040	\$ 5,439,745	\$ 10,810,778	\$ 16,356,050	\$ 12,307,863
20	Revenues Over (Under) Expenses	5,222,704	5,371,033	5,545,272	(4,048,187)	3,778,323
21	Ending Balance	\$ 5,439,745	\$ 10,810,778	\$ 16,356,050	\$ 12,307,863	\$ 16,086,186

**Table 2**  
**Town of Castle Rock**  
**Wastewater**  
**Projected Rate Revenue Requirements**

Line No.	Description	Category	1	2	3	4	5
			FY2017	FY2018	FY2019	FY2020	FY2021
1	Operation and Maintenance Expense		\$ 5,167,766	\$ 5,392,772	\$ 5,604,147	\$ 5,888,586	\$ 6,114,891
	Capital Expenditures						
2	Debt Service		\$ 333,258	\$ 333,546	\$ 335,274	\$ 331,356	\$ 333,660
3	Transfers Out		67,001	138,404	156,470	10,302,620	2,139,363
4	Minor Capital Outlay		76,750	84,750	79,750	79,750	79,750
5	Pay-Go Cash Funded Capital		<u>5,636,243</u>	<u>4,339,389</u>	<u>5,059,692</u>	<u>25,406,647</u>	<u>5,603,132</u>
6	Total Capital Expenditures		\$ 6,113,252	\$ 4,896,089	\$ 5,631,186	\$ 36,120,373	\$ 8,155,905
7	Total O&M and Capital Expenses		\$ 11,281,018	\$ 10,288,861	\$ 11,235,333	\$ 42,008,959	\$ 14,270,796
	Less Revenue From Other Sources						
8	Miscellaneous Revenue	O&M	\$ 159,904	\$ 159,904	\$ 159,904	\$ 159,904	\$ 159,904
9	System Development Fee Revenue	Capital	2,999,666	2,734,397	3,394,547	3,611,438	3,713,256
10	Transfers From Restricted Fund	Capital	-	-	-	-	-
11	Interest Income	O&M	84,347	97,184	112,400	67,313	56,827
12	Sources & Uses of Funds	Capital	<u>(2,659,160)</u>	<u>(3,759,395)</u>	<u>(3,848,799)</u>	<u>16,716,531</u>	<u>(3,778,324)</u>
13	Rate Revenue Requirement		\$ 10,696,262	\$ 11,056,772	\$ 11,417,282	\$ 21,453,773	\$ 14,119,134
	Adjustment for Revenue From Other Sources						
14	Operation and Maintenance Expenses		\$ 4,923,516	\$ 5,135,684	\$ 5,331,843	\$ 5,661,370	\$ 5,898,160
15	Capital Expenses		<u>5,772,746</u>	<u>5,921,088</u>	<u>6,085,439</u>	<u>15,792,403</u>	<u>8,220,974</u>
16	Total Rate Revenue Requirement		\$ 10,696,262	\$ 11,056,772	\$ 11,417,282	\$ 21,453,773	\$ 14,119,134

Town of Castle Rock  
e-Forecast Version 3.0

Wastewater

Capital Improvement Program - Alternative 1 (Priority 1, 2 and 3)

	=Rank 1
	=Rank 2
	=Rank 3
	= Not Ranked

Line No	Description	1	2	3	4	5
		2017	2018	2019	2020	2021
1	<b>Recurring Projects</b>					
2	Lift Station Rehab/Replacement	25,000	25,000	25,000	25,000	25,000
3	Sewer Line Rehab/Replacement	350,000	350,000	350,000	350,000	350,000
4	Security Improvements	25,000	25,000	25,000	25,000	25,000
5	SCADA System Improvements (Existing Improvements in SCADA Div)	25,000	25,000	25,000	25,000	25,000
6	Lift Station Pump and Motor Replacements	35,000	40,000	50,000	50,000	50,000
7	WW Facility VFD replacement	110,000	110,000	110,000	110,000	110,000
8	PCWRA Capital Buy-in (Debt Service + Capital Exp/Replacement)	2,404,007	2,500,167	2,600,174	2,704,181	2,002,051
9	<b>Capital Improvement Projects</b>					
10	RV Dump Station	0	0	0	0	0
11	Castle Oaks Lift Station Improvements	200,000	0	0	0	0
12	Lift Station Mixing Improvements	32,000	32,000	32,000	32,000	32,000
13	North Meadows Ext Sewer Crossing/Upsize	0	0	0	0	0
14	Craig & Gould North Infrastructure Improvements	0	0	250,000	105,000	0
15	Gordon Dr Sewer Improvements	35,000	390,000	0	0	0
16	Kinner Street Bottleneck	0	0	0	0	2,117,000
17	SH85 Crossing at Castleton (\$252K carried over from 2014)	0	0	0	0	0
18	Plum Creek Interceptor Upsize (additional funding for revised scope)	0	0	0	0	0
19	Plum Creek Interceptor PCWA Upsize	0	0	0	0	0
20	Plum Creek Interceptor North Upsize	0	0	0	0	0
21	Plum Creek Interceptor South Upsize - Phase I	0	0	0	0	0
22	Plum Creek Interceptor South Upsize - Phase II	0	0	0	0	0
23	Plum Creek Interceptor Old WWTP Upsize	0	0	0	0	0
24	Malibu Street Upsize	0	0	0	0	0
25	Prairie Hawk Interceptor	0	0	0	0	0
26	Dawson Ridge Interceptor - Phase I	0	0	0	0	0
27	Dawson Ridge Interceptor - Phase II	0	0	0	0	0
28	Dawson Ridge Interceptor Modified (replace ph I and ph II)	0	0	0	0	0
29	Meadows 17 Lift Station Access Road paving (1060x15x4)	65,400	0	0	0	0
30	Castlewood Lift Station #1 Access Road Paving (200x15x4)	0	0	0	0	0
31	Castlewood Lift Station #2 Access Road Paving (450x15x4)	27,000	0	0	0	0
32	Maier Lift Station Access Road Paving (500x15x4)	0	0	0	0	0
33	Ditch Three at PCWRA (Meadows Capital Reserve?)	233,469	233,469	233,469	233,469	-
34	Manganese Control at PCWRA (Meadows Capital Reserve?)	200,000	200,000	200,000	200,000	-
35	Rehab/Replacement at PCWRA	284,000	284,000	284,000	355,000	250,000
36	PCWRA Capacity Expansion	1,500,000	-	-	18,500,000	-
37	Machinery and Equipment	0	0	0	0	0
38	O&M Center Building	0	0	0	0	0
39	Admin/Customer Service Building	0	0	588,308	0	0
40	Site Improvements	85,367	0	0	563,140	0
41	<b>Total Capital Improvements</b>	<b>5,636,243</b>	<b>4,214,636</b>	<b>4,772,951</b>	<b>23,277,790</b>	<b>4,986,051</b>

# APPENDIX E

Stormwater Fund Long-Term Financial Plan – With Capital  
Improvement Program





**Table 1**  
**Town of Castle Rock**  
**Stormwater**  
**Proforma - Operating Fund**

Line No.	Description	FY2017	FY2018	FY2019	FY2020	FY2021
Revenues						
1	Rate Revenues	\$ 2,776,875	\$ 2,969,752	\$ 3,181,365	\$ 3,385,012	\$ 3,621,243
2	Rate Revenues from Increase	111,075	118,790	127,255	135,400	144,850
3	Miscellaneous Revenue	981,203	1,004,826	1,028,854	1,036,110	1,061,614
4	Transfers In	-	-	-	-	-
5	Interest Income	12,258	14,524	13,368	12,624	14,372
6	Total Revenues	\$ 3,881,411	\$ 4,107,892	\$ 4,350,841	\$ 4,569,146	\$ 4,842,078
Revenue Requirements						
7	Operating Expenses	\$ 2,164,123	\$ 2,311,947	\$ 2,407,899	\$ 2,675,132	\$ 2,773,663
8	Non-Operating Expenses	-	-	-	-	-
9	Transfers Out	191,622	2,177,283	2,128,772	2,069,037	1,008,743
10	Minor Capital Expense	5,500	5,500	5,500	5,500	5,500
Debt Service						
11	Existing Debt Service	-	-	-	-	-
12	New-Revenue Bond	-	-	-	-	-
13	New-General Obligation Bond	-	-	-	-	-
14	New-State Revolving Loan Fund	-	-	-	-	-
15	Total Debt Service	\$ -	\$ -	\$ -	\$ -	\$ -
16	Capital Projects Funded with Cash	-	-	-	-	-
17	Total Revenue Requirements	\$ 2,361,245	\$ 4,494,730	\$ 4,542,171	\$ 4,749,669	\$ 3,787,906
18	Revenues Over (Under) Expenses	\$ 1,520,166	\$ (386,838)	\$ (191,330)	\$ (180,523)	\$ 1,054,172
19	Beginning Balance	\$ 2,304,317	\$ 3,824,482	\$ 3,437,644	\$ 3,246,314	\$ 3,065,791
20	Revenues Over (Under) Expenses	1,520,166	(386,838)	(191,330)	(180,523)	1,054,172
21	Ending Balance	\$ 3,824,482	\$ 3,437,644	\$ 3,246,314	\$ 3,065,791	\$ 4,119,963
Debt Service Coverage						
	Debt Service Coverage Test 1	N/A	N/A	N/A	N/A	N/A
	Debt Service Coverage Test 2	N/A	N/A	N/A	N/A	N/A

**Table 2**  
**Town of Castle Rock**  
**Stormwater**  
**Projected Rate Revenue Requirements**

Line No.	Description	Category	1	2	3	4	5
			FY2017	FY2018	FY2019	FY2020	FY2021
1	Operation and Maintenance Expense		\$ 2,164,123	\$ 2,311,947	\$ 2,407,899	\$ 2,675,132	\$ 2,773,663
	Capital Expenditures						
2	Debt Service		\$ -	\$ -	\$ -	\$ -	\$ -
3	Transfers Out		191,622	2,177,283	2,128,772	2,069,037	1,008,743
4	Minor Capital Outlay		5,500	5,500	5,500	5,500	5,500
5	Pay-Go Cash Funded Capital		2,180,161	2,647,994	2,593,161	3,405,460	2,385,567
6	Total Capital Expenditures		\$ 2,377,283	\$ 4,830,777	\$ 4,727,432	\$ 5,479,998	\$ 3,399,809
7	Total O&M and Capital Expenses		\$ 4,541,406	\$ 7,142,725	\$ 7,135,332	\$ 8,155,129	\$ 6,173,473
	Less Revenue From Other Sources						
8	Miscellaneous Revenue	O&M	981,203	1,004,826	1,028,854	1,036,110	1,061,614
9	Stormwater DIF Revenue	Capital	1,216,755	1,264,807	1,249,065	1,436,379	1,476,598
10	Transfers From Restricted Fund	Capital	-	-	-	-	-
11	Interest Income	O&M	15,886	14,524	13,368	12,624	14,554
12	Sources & Uses of Funds	Capital	(633,251)	386,838	191,330	180,523	(1,054,172)
13	Rate Revenue Requirement		\$ 2,960,812	\$ 4,471,730	\$ 4,652,715	\$ 5,489,494	\$ 4,674,879
	Adjustment for Revenue From Other Sources						
14	Operation and Maintenance Expenses		\$ 1,167,034	\$ 1,292,598	\$ 1,365,678	\$ 1,626,397	\$ 1,697,495
15	Capital Expenses		1,793,778	3,179,132	3,287,037	3,863,096	2,977,384
16	Total Rate Revenue Requirement		\$ 2,960,812	\$ 4,471,730	\$ 4,652,715	\$ 5,489,494	\$ 4,674,879

Town of Castle Rock  
e-Forecast Version 3.0  
Stormwater  
Capital Improvement Program - Alternative 1

	=Rank 1
	=Rank 2
	=Rank 3
	= Not Ranked

Line No	Description	1 2017	2 2018	3 2019	4 2020	5 2021
1	6400 West Trib	\$ 132,675	\$ -	\$ -	\$ -	\$ -
2	6400 East Trib	\$ -	\$ 322,533	\$ -	\$ -	\$ -
3	6400 South Trib	\$ -	\$ -	\$ -	\$ 212,280	\$ -
4	6400 South Trib	\$ -	\$ -	\$ -	\$ 132,675	\$ -
5	Hangmans Gulch	\$ 533,361	\$ 242,438	\$ -	\$ 196,192	\$ -
6	Parkview Trib	\$ 789,547	\$ -	\$ -	\$ -	\$ -
7	Omni Trib	\$ -	\$ -	\$ -	\$ 259,210	\$ -
8	Omni Trib	\$ 100,000	\$ -	\$ -	\$ 27,899	\$ 29,012
9	Industrial Trib	\$ -	\$ -	\$ 527,374	\$ -	\$ -
10	Industrial Trib	\$ -	\$ -	\$ 1,313,483	\$ -	\$ -
11	Douglas Lane Trib	\$ 450,000	\$ -	\$ -	\$ -	\$ -
12	E. Plum Creek	\$ -	\$ 389,180	\$ 36,972	\$ 147,712	\$ 229,970
13	E. Plum Creek	\$ -	\$ 785,967	\$ 297,192	\$ 986,394	\$ 550,159
14	McMurdo Gulch	\$ -	\$ 48,648	\$ -	\$ 245,891	\$ 138,690
15	McMurdo Gulch	\$ -	\$ 706,751	\$ -	\$ 188,399	\$ 185,745
16	Cherry Creek	\$ -	\$ -	\$ -	\$ -	\$ 442,250
17	Craig & Gould North	\$ -	\$ -	\$ 133,625	\$ 1,066,375	\$ -
18	Gordon Drive	\$ 44,000	\$ 456,000	\$ -	\$ -	\$ -
19	Chase Drain Installations/Rehab	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000
20	Minor Drainageway Stabilization	\$ 57,582	\$ 57,582	\$ 57,582	\$ 57,582	\$ 57,582
21	Minor Drainageway Stabilization	\$ 27,097	\$ 27,097	\$ 27,097	\$ 27,097	\$ 27,097
22	Minor Drainageway Stabilization	\$ 39,558	\$ 39,558	\$ 39,558	\$ 39,558	\$ 39,558
23	Minor Drainageway Stabilization	\$ 31,081	\$ 31,081	\$ 31,081	\$ 31,081	\$ 31,081
24	Detention Pond Retrofits	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000
25	CMP Rehabilitation	\$ -	\$ -	\$ -	\$ -	\$ 240,000
26	Master Plan GIS Database Tool	\$ -	\$ -	\$ -	\$ -	\$ 29,485
27	Master Plan GIS Database Tool	\$ -	\$ -	\$ -	\$ -	\$ 20,515
28	Watershed MP Updates (4 EA)	\$ -	\$ -	\$ -	\$ -	\$ 117,939
29	Watershed MP Updates (4 EA)	\$ -	\$ -	\$ -	\$ -	\$ 82,061
30	Minor Drainageway MP	\$ -	\$ -	\$ -	\$ -	\$ 44,644
31	Minor Drainageway MP	\$ -	\$ -	\$ -	\$ -	\$ 22,023
32	Admin/Customer Service Building 20	\$ -	\$ -	\$ 643,724	\$ -	\$ -
33	Site Improvements at 175 Kellogg Cl	\$ 72,399	\$ -	\$ -	\$ 464,000	\$ -
34	<b>Total Capital Improvements</b>	<b>2,342,301</b>	<b>3,171,835</b>	<b>3,172,689</b>	<b>4,147,345</b>	<b>2,352,811</b>

# APPENDIX F

## Water Fund Cost-of-Service Study



Table 1  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Projected Water Sales and Peak-Use Characteristics by Customer Class  
FY2016

Customer Class	Total Annual Demands (kgal)	Average-Day Demands (MGD)	Peaking Factors		Peak Demands		Extra Capacity	
			Peak-Day	Peak-Hour	Peak-Day	Peak-Hour	Maximum-Day	Maximum-Hour
Residential	1,524,122	4.18	2.45	4.41	10.23	18.41	6.05	8.18
Multifamily	95,577	0.26	1.97	3.54	0.52	0.93	0.25	0.41
Commercial	134,061	0.37	2.00	3.60	0.73	1.32	0.37	0.59
Bulk	52,002	0.14	2.20	4.50	0.31	0.64	0.17	0.33
Irrigation	314,536	0.86	3.65	6.56	3.15	5.65	2.28	2.51
Multifamily Indoor Use Only	100,642	0.28	1.31	2.36	0.36	0.65	0.09	0.29
Commercial Indoor Use Only	129,331	0.35	1.45	2.60	0.51	0.92	0.16	0.41
Total	2,350,272	6.44	2.46	4.43	15.81	28.53	9.38	12.72

Table 2  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Projected Water Sales and Peak-Use Characteristics by Customer Class  
FY2017

Customer Class	Additional Flow (kgal)	Total Annual Demands (kgal)	Average-Day Demands (MGD)	Peaking Factors		Peak Demands		Extra Capacity	
				Peak-Day	Peak-Hour	Peak-Day	Peak-Hour	Maximum-Day	Maximum-Hour
Residential	74,496.00	1,598,618	4.38	2.45	4.41	10.73	19.31	6.35	8.58
Multifamily	-	95,577	0.26	1.97	3.54	0.52	0.93	0.25	0.41
Commercial	848.40	134,909	0.37	2.00	3.60	0.74	1.33	0.37	0.59
Bulk	-	52,002	0.14	2.20	4.50	0.31	0.64	0.17	0.33
Irrigation	120.24	314,657	0.86	3.65	6.56	3.15	5.66	2.28	2.51
Multifamily Indoor Use Only	17,671.68	118,314	0.32	1.31	2.36	0.42	0.76	0.10	0.34
Commercial Indoor Use Only	-	129,331	0.35	1.45	2.60	0.51	0.92	0.16	0.41
Total		2,443,408	6.69	2.45	4.41	16.38	29.55	9.69	13.17

Table 3  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Projected Water Sales and Peak-Use Characteristics by Customer Class  
FY2018

Customer Class	Additional Flow (kgal)	Total Annual Demands (kgal)	Average-Day Demands (MGD)	Peaking Factors		Peak Demands		Extra Capacity	
				Peak-Day	Peak-Hour	Peak-Day	Peak-Hour	Maximum-Day	Maximum-Hour
Residential	37,248.00	1,635,866	4.48	2.45	4.41	10.98	19.76	6.50	8.78
Multifamily	116,904.96	212,482	0.58	1.97	3.54	1.15	2.06	0.56	0.91
Commercial	424.20	135,334	0.37	2.00	3.60	0.74	1.33	0.37	0.59
Bulk	-	52,002	0.14	2.20	4.50	0.31	0.64	0.17	0.33
Irrigation	60.12	314,717	0.86	3.65	6.56	3.15	5.66	2.28	2.51
Multifamily Indoor Use Only	-	118,314	0.32	1.31	2.36	0.42	0.76	0.10	0.34
Total		2,598,046	7.12	2.43	4.38	17.27	31.14	10.15	13.88

Table 4  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Number of Meters and Equivalent Meters by Meter Size and Customer Class  
FY2016

Meter Size	Acct Growth	Equivalent 5/8" x 3/4" Ratios	Residential	Multifamily	Commercial	Bulk	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only	Total
Number of Customers										
3/4"	0.00%	1.00	17,296	14	131	32	137	100	108	17,818
1"	0.00%	3.40	12	25	71	0	85	64	71	328
1-1/2"	0.00%	7.73	0	55	48	0	115	86	54	358
2"	0.00%	11.12	0	15	24	0	82	40	40	201
3"	0.00%	18.91	0	2	5	2	8	0	13	30
4"	0.00%	61.21	0	1	0	0	2	0	2	5
6"	0.00%	88.83	0	0	1	0	0	0	1	2
Total			17,308	112	280	34	429	290	289	18,742
Number of Equivalent Meters										
3/4"			17,296	14	131	32	137	100	108	17,818
1"			41	85	241	0	289	218	241	1,115
1-1/2"			0	425	371	0	889	665	417	2,767
2"			0	167	267	0	912	445	445	2,235
3"			0	38	95	38	151	0	246	567
4"			0	61	0	0	122	0	122	306
6"			0	0	89	0	0	0	89	178
Total			17,337	790	1,194	70	2,500	1,427	1,669	24,987



Table 5  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Number of Meters and Equivalent Meters by Meter Size and Customer Class  
FY2017

Meter Size	Acct Growth	Equivalent 3/4" Ratios	Residential	Multifamily	Commercial	Bulk	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only	Total
Number of Customers										
3/4"	0.00%	1.00	18,896	14	131	32	143	516	108	19,840
1"	0.00%	3.40	12	25	79	0	85	64	71	336
1-1/2"	0.00%	7.73	0	55	48	0	115	86	54	358
2"	0.00%	11.12	0	15	30	0	82	40	40	207
3"	0.00%	18.91	0	2	5	2	8	0	13	30
4"	0.00%	61.21	0	1	0	0	2	0	2	5
6"	0.00%	88.83	0	0	1	0	0	0	1	2
Total			18,908	112	294	34	435	706	289	20,778
Number of Equivalent Meters										
3/4"			18,896	14	131	32	143	516	108	19,840
1"			41	85	269	0	289	218	241	1,142
1-1/2"			0	425	371	0	889	665	417	2,767
2"			0	167	334	0	912	445	445	2,302
3"			0	38	95	38	151	0	246	567
4"			0	61	0	0	122	0	122	306
6"			0	0	89	0	0	0	89	178
Total			18,937	790	1,288	70	2,506	1,843	1,669	27,103

Table 6  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Number of Meters and Equivalent Meters by Meter Size and Customer Class  
FY2018

Meter Size	Acct Growth	Equivalent 3/4" Ratios	Residential	Multifamily	Commercial	Bulk	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only	Total
Number of Customers										
3/4"	0.00%	1.00	19,696	206	131	32	146	516	108	20,835
1"	0.00%	3.40	12	25	83	0	85	64	71	340
1-1/2"	0.00%	7.73	0	55	48	0	115	86	54	358
2"	0.00%	11.12	0	15	33	0	82	40	40	210
3"	0.00%	18.91	0	2	5	2	8	0	13	30
4"	0.00%	61.21	0	1	0	0	2	0	2	5
6"	0.00%	88.83	0	0	1	0	0	0	1	2
			-----	-----	-----	-----	-----	-----	-----	-----
Total			19,708	304	301	34	438	706	289	21,780
Number of Equivalent Meters										
3/4"			19,696	206	131	32	146	516	108	20,835
1"			41	85	282	0	289	218	241	1,156
1-1/2"			0	425	371	0	889	665	417	2,767
2"			0	167	367	0	912	445	445	2,335
3"			0	38	95	38	151	0	246	567
4"			0	61	0	0	122	0	122	306
6"			0	0	89	0	0	0	89	178
			-----	-----	-----	-----	-----	-----	-----	-----
Total			19,737	982	1,335	70	2,509	1,843	1,669	28,145

Table 7  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Summary of Number of Customers by Customer Class

Customer Class	FY2016	FY2017	FY2018
Residential	17,308	18,908	19,708
Multifamily	112	112	304
Commercial	280	294	301
Bulk	34	34	34
Irrigation	429	435	438
Multifamily Indoor Use Only	290	706	706
Commercial Indoor Use Only	289	289	289
	-----	-----	-----
Total	18,742	20,778	21,780

Table 8  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Summary of Equivalent Meters by Customer Class

Customer Class	FY2016	FY2017	FY2018
Residential	17,337	18,937	19,737
Multifamily	790	790	982
Commercial	1,194	1,288	1,335
Bulk	70	70	70
Irrigation	2,500	2,506	2,509
Multifamily Indoor Use Only	1,427	1,843	1,843
Commercial Indoor Use Only	1,669	1,669	1,669
	-----	-----	-----
Total	24,987	27,103	28,145

Table 9  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Summary of Customer Characteristics  
FY2016

Customer Class	Base	Max-Day	Max-Hour	Customer	Meter
Residential	64.85%	64.58%	64.37%	92.35%	69.38%
Multifamily	4.07%	2.71%	3.23%	0.60%	3.16%
Commercial	5.70%	3.92%	4.62%	1.49%	4.78%
Bulk	2.21%	1.82%	2.58%	0.18%	0.28%
Irrigation	13.38%	24.36%	19.72%	2.29%	10.01%
Multifamily Indoor Use Only	4.28%	0.91%	2.28%	1.55%	5.71%
Commercial Indoor Use Only	5.50%	1.70%	3.20%	1.54%	6.68%
	-----	-----	-----	-----	-----
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Table 10  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Summary of Customer Characteristics  
FY2017

Customer Class	Base	Max-Day	Max-Hour	Customer	Meter
Residential	65.43%	65.54%	65.18%	91.00%	69.87%
Multifamily	3.91%	2.62%	3.12%	0.54%	2.91%
Commercial	5.52%	3.81%	4.49%	1.41%	4.75%
Bulk	2.13%	1.76%	2.49%	0.16%	0.26%
Irrigation	12.88%	23.58%	19.05%	2.09%	9.25%
Multifamily Indoor Use Only	4.84%	1.04%	2.58%	3.40%	6.80%
Commercial Indoor Use Only	5.29%	1.65%	3.09%	1.39%	6.16%
	-----	-----	-----	-----	-----
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Table 11  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Summary of Customer Characteristics  
FY2018

Customer Class	Base	Max-Day	Max-Hour	Customer	Meter
Residential	62.97%	64.03%	63.31%	90.49%	70.13%
Multifamily	8.18%	5.56%	6.59%	1.40%	3.49%
Commercial	5.21%	3.65%	4.28%	1.38%	4.74%
Bulk	2.00%	1.68%	2.36%	0.16%	0.25%
Irrigation	12.11%	22.51%	18.08%	2.01%	8.92%
Multifamily Indoor Use Only	4.55%	0.99%	2.45%	3.24%	6.55%
Commercial Indoor Use Only	4.98%	1.57%	2.94%	1.33%	5.93%
	-----	-----	-----	-----	-----
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Table 12  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Capital Costs

Item	FY2017	FY2018
Debt Service	\$ 1,740,767	\$ 1,746,879
Transfers Out	200,643	225,861
Minor Capital Outlay	984,182	1,017,882
Pay-Go Cash Funded Capital	5,378,920	2,764,951
	-----	-----
Total	\$8,304,512	\$5,755,573



Table 13  
Town of Castle Rock  
Water Cost-of-Service Analysis  
O&M and Capital Non-Rate Revenues

Item	FY2017	FY2018
O&M Related Non-Rate Revenues		
Miscellaneous Revenue	1,324,072	1,363,075
Interest Income	60,509	68,316
	-----	-----
Total	\$1,384,581	\$1,431,391
Capital Related Non-Rate Revenues		
System Development Fee Revenue	2,476,181	2,546,943
Transfers From Restricted Fund	2,557,750	695,250
Sources & Uses of Funds	(1,569,969)	(2,333,356)
	-----	-----
Total	\$3,463,962	\$908,837

Table 14  
Town of Castle Rock  
Water Cost-of-Service Analysis  
User Charge Revenue Requirements

Item	FY2017	FY2018
Total Revenue Requirements		
Operation & Maintenance	\$10,233,345	\$10,664,510
Capital	8,304,512	5,755,573
	-----	-----
Total	\$18,537,857	\$16,420,084
 User Charge Revenue Requirements		
Operation & Maintenance	\$8,848,764	\$9,233,120
Capital	4,840,550	4,846,736
	-----	-----
Total	\$13,689,314	\$14,079,856

Table 15  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Allocation of O&M Expenses to Customer Service Characteristics  
FY2017

Function	Base	Max-Day	Max-Hour	Customer	Meter	Total
Source of Supply	\$239,433	\$348,621	\$0	\$0	\$0	\$588,054
Treatment	226,800	330,227	0	0	0	557,027
Pumping	21,731	31,641	42,912	0	0	96,284
Transmission	85,042	123,824	167,935	0	0	376,802
Distribution	149,785	218,092	295,785	0	0	663,662
Storage	78,483	114,273	0	0	0	192,756
Buildings/ Improvements	0	0	0	0	0	0
Administration	0	0	0	0	0	0
Tools/Equip	0	0	0	0	0	0
Power & Chemicals	3,872,473	0	0	0	0	3,872,473
Meters & Services	0	0	0	0	1,078,890	1,078,890
Customer & Accounts	0	0	0	1,422,816	0	1,422,816
	-----	-----	-----	-----	-----	-----
Total	\$4,673,746	\$1,166,679	\$506,633	\$1,422,816	\$1,078,890	\$8,848,764

Table 16  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Allocation of O&M Expenses to Customer Service Characteristics  
FY2018

Function	Base	Max-Day	Max-Hour	Customer	Meter	Total
Source of Supply	\$244,759	\$356,377	\$0	\$0	\$0	\$601,136
Treatment	231,845	337,574	0	0	0	569,419
Pumping	22,214	32,345	43,867	0	0	98,426
Transmission	88,607	129,015	174,975	0	0	392,597
Distribution	154,447	224,879	304,990	0	0	684,317
Storage	90,171	131,292	0	0	0	221,462
Buildings/ Improvements	0	0	0	0	0	0
Administration	0	0	0	0	0	0
Tools/Equip	0	0	0	0	0	0
Power & Chemicals	4,065,595	0	0	0	0	4,065,595
Meters & Services	0	0	0	0	1,089,118	1,089,118
Customer & Accounts	0	0	0	1,511,050	0	1,511,050
	-----	-----	-----	-----	-----	-----
Total	\$4,897,638	\$1,211,481	\$523,832	\$1,511,050	\$1,089,118	\$9,233,120

Table 17  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Allocation of O&M Expenses to Customer Classes  
FY2017

Customer Classes	Base	Max-Day	Max-Hour	Customer	Meter	Total
Residential	\$3,057,833	\$764,648	\$330,204	\$1,294,764	\$753,829	\$6,201,278
Multifamily	182,820	30,583	15,814	7,669	31,447	268,334
Commercial	258,054	44,503	22,748	20,132	51,257	396,695
Bulk	99,469	20,585	12,605	2,328	2,779	137,766
Irrigation	601,874	275,063	96,496	29,788	99,777	1,102,998
Multifamily Indoor Use Only	226,311	12,099	13,092	48,345	73,373	373,219
Commercial Indoor Use Only	247,384	19,198	15,674	19,790	66,427	368,473
	-----	-----	-----	-----	-----	-----
Total	\$4,673,746	\$1,166,679	\$506,633	\$1,422,816	\$1,078,890	\$8,848,764

Table 18  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Allocation of O&M Expenses to Customer Classes  
FY2018

Customer Classes	Base	Max-Day	Max-Hour	Customer	Meter	Total
Residential	\$3,083,810	\$775,669	\$331,613	\$1,367,299	\$763,761	\$6,322,152
Multifamily	400,556	67,399	34,503	21,091	38,000	561,548
Commercial	255,121	44,255	22,395	20,883	51,645	394,299
Bulk	98,030	20,406	12,370	2,359	2,702	135,867
Irrigation	593,280	272,726	94,720	30,388	97,110	1,088,223
Multifamily Indoor Use Only	223,037	11,994	12,849	48,981	71,326	368,186
Commercial Indoor Use Only	243,805	19,032	15,383	20,050	64,574	362,843
	-----	-----	-----	-----	-----	-----
Total	\$4,897,638	\$1,211,481	\$523,832	\$1,511,050	\$1,089,118	\$9,233,120

Table 19  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Allocation of Net Plant-in-Service to Customer Service Characteristics  
FY2016

Plant-in-Service	Base	Max-Day	Max-Hour	Customer	Meter	Total
Source of Supply	\$9,109,250	\$13,263,353	\$0	\$0	\$0	\$22,372,603
Treatment	6,552,480	9,540,616	0	0	0	16,093,096
Pumping	633,931	923,023	1,251,839	0	0	2,808,793
Transmission	1,215,243	1,769,432	2,399,772	0	0	5,384,447
Distribution	2,226,695	3,242,138	4,397,113	0	0	9,865,947
Storage	3,752,826	5,464,232	0	0	0	9,217,059
Buildings/ Improvements	0	0	0	5,972,306	0	5,972,306
Administration	624,330	909,044	213,980	158,553	1,624	1,907,531
Tools/Equip	26,554	38,664	11,379	0	25,532	102,130
Power & Chemicals	0	0	0	0	0	0
Meters & Services	0	0	0	0	35,642	35,642
Customer & Accounts	0	0	0	0	0	0
	-----	-----	-----	-----	-----	-----
Total	\$24,141,309	\$35,150,501	\$8,274,084	\$6,130,859	\$62,799	\$73,759,552
Total Direct	\$23,516,979	\$34,241,457	\$8,060,104	\$5,972,306	\$61,175	\$71,852,021

Table 20  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Allocation of Net Plant-in-Service to Customer Service Characteristics  
FY2017

Plant-in-Service	Base	Max-Day	Max-Hour	Customer	Meter	Total
Source of Supply	\$6,582,193	\$9,583,879	\$0	\$0	\$0	\$16,166,073
Treatment	6,234,903	9,078,213	0	0	0	15,313,116
Pumping	597,397	869,828	1,179,695	0	0	2,646,919
Transmission	1,124,866	1,637,841	2,221,303	0	0	4,984,010
Distribution	2,136,086	3,110,208	4,218,185	0	0	9,464,478
Storage	3,549,463	5,168,129	0	0	0	8,717,593
Buildings/ Improvements	0	0	0	5,897,038	0	5,897,038
Administration	608,429	885,891	208,530	154,515	1,583	1,858,948
Tools/Equip	14,510	21,127	6,218	0	13,952	55,807
Power & Chemicals	0	0	0	0	0	0
Meters & Services	0	0	0	0	26,376	26,376
Customer & Accounts	0	0	0	0	0	0
	-----	-----	-----	-----	-----	-----
Total	\$20,847,847	\$30,355,117	\$7,833,930	\$6,051,553	\$41,910	\$65,130,357



Table 21  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Allocation of Net Plant-in-Service to Customer Service Characteristics  
FY2018

Plant-in-Service	Base	Max-Day	Max-Hour	Customer	Meter	Total
Source of Supply	\$8,393,457	\$12,221,136	\$0	\$0	\$0	\$20,614,594
Treatment	5,943,653	8,654,144	0	0	0	14,597,797
Pumping	567,617	826,469	1,120,889	0	0	2,514,975
Transmission	1,117,937	1,627,751	2,207,620	0	0	4,953,308
Distribution	2,067,385	3,010,177	4,082,519	0	0	9,160,081
Storage	3,369,872	4,906,638	0	0	0	8,276,510
Buildings/ Improvements	0	0	0	5,854,706	0	5,854,706
Administration	597,698	870,267	204,852	151,790	1,555	1,826,162
Tools/Equip	11,943	17,389	5,118	0	11,483	45,933
Power & Chemicals	0	0	0	0	0	0
Meters & Services	0	0	0	0	23,817	23,817
Customer & Accounts	0	0	0	0	0	0
	-----	-----	-----	-----	-----	-----
Total	\$22,069,562	\$32,133,972	\$7,620,998	\$6,006,496	\$36,855	\$67,867,883

Table 22  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Allocation of Net Plant-in-Service to Customer Classes  
FY2016

Customer Classes	Base	Max-Day	Max-Hour	Customer	Meter	Total
Residential	\$15,655,336	\$22,700,237	\$5,325,627	\$5,661,770	\$43,572	\$49,386,543
Multifamily	981,744	952,292	267,516	36,637	1,985	2,240,175
Commercial	1,377,036	1,377,036	382,400	91,593	3,000	3,231,065
Bulk	534,149	640,979	213,227	11,122	175	1,399,653
Irrigation	3,230,825	8,561,686	1,631,769	140,334	6,284	13,570,898
Multifamily Indoor Use Only	1,033,770	320,469	188,393	94,864	3,587	1,641,083
Commercial Indoor Use Only	1,328,449	597,802	265,152	94,537	4,194	2,290,134
	-----	-----	-----	-----	-----	-----
Total	\$24,141,309	\$35,150,501	\$8,274,084	\$6,130,859	\$62,799	\$73,759,552

Table 23  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Allocation of Net Plant-in-Service to Customer Classes  
FY2017

Customer Classes	Base	Max-Day	Max-Hour	Customer	Meter	Total
Residential	\$13,639,857	\$19,894,920	\$5,105,856	\$5,506,919	\$29,283	\$44,176,835
Multifamily	815,494	795,714	244,525	32,620	1,222	1,889,574
Commercial	1,151,085	1,157,902	351,747	85,627	1,991	2,748,352
Bulk	443,696	535,588	194,902	9,902	108	1,184,196
Irrigation	2,684,738	7,156,688	1,492,099	126,693	3,876	11,464,094
Multifamily Indoor Use Only	1,009,489	314,795	202,439	205,621	2,850	1,735,195
Commercial Indoor Use Only	1,103,487	499,510	242,364	84,171	2,580	1,932,112
	-----	-----	-----	-----	-----	-----
Total	\$20,847,847	\$30,355,117	\$7,833,930	\$6,051,553	\$41,910	\$65,130,357

Table 24  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Allocation of Net Plant-in-Service to Customer Classes  
FY2018

Customer Classes	Base	Max-Day	Max-Hour	Customer	Meter	Total
Residential	\$13,896,155	\$20,574,256	\$4,824,493	\$5,435,079	\$25,845	\$44,755,829
Multifamily	1,804,970	1,787,735	501,962	83,837	1,286	4,179,790
Commercial	1,149,616	1,173,854	325,817	83,010	1,748	2,734,045
Bulk	441,740	541,265	179,968	9,377	91	1,172,441
Irrigation	2,673,417	7,233,925	1,378,036	120,792	3,286	11,409,456
Multifamily Indoor Use Only	1,005,041	318,132	186,928	194,701	2,414	1,707,214
Commercial Indoor Use Only	1,098,624	504,804	223,794	79,701	2,185	1,909,108
	-----	-----	-----	-----	-----	-----
Total	\$22,069,562	\$32,133,972	\$7,620,998	\$6,006,496	\$36,855	\$67,867,883

Table 25  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Allocation of Capital Costs to Customer Classes  
FY2017

Customer Classes	Base	Max-Day	Max-Hour	Customer	Meter	Total
Residential	\$1,013,727	\$1,478,609	\$379,472	\$409,279	\$2,176	\$3,283,264
Multifamily	60,608	59,138	18,173	2,424	91	140,435
Commercial	85,550	86,056	26,142	6,364	148	204,260
Bulk	32,976	39,805	14,485	736	8	88,011
Irrigation	199,532	531,892	110,894	9,416	288	852,022
Multifamily Indoor Use Only	75,026	23,396	15,045	15,282	212	128,961
Commercial Indoor Use Only	82,012	37,124	18,013	6,256	192	143,596
	-----	-----	-----	-----	-----	-----
Total	\$1,549,432	\$2,256,021	\$582,225	\$449,757	\$3,115	\$4,840,550

Table 26  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Allocation of Capital Costs to Customer Classes  
FY2018

Customer Classes	Base	Max-Day	Max-Hour	Customer	Meter	Total
Residential	\$992,384	\$1,469,296	\$344,538	\$388,142	\$1,846	\$3,196,205
Multifamily	128,901	127,670	35,847	5,987	92	298,497
Commercial	82,099	83,830	23,268	5,928	125	195,250
Bulk	31,547	38,654	12,852	670	7	83,729
Irrigation	190,920	516,606	98,411	8,626	235	814,798
Multifamily Indoor Use Only	71,774	22,719	13,349	13,904	172	121,919
Commercial Indoor Use Only	78,457	36,050	15,982	5,692	156	136,338
	-----	-----	-----	-----	-----	-----
Total	\$1,576,082	\$2,294,825	\$544,248	\$428,950	\$2,632	\$4,846,736

Table 27  
Town of Castle Rock  
Water Cost-of-Service Analysis  
User Charge Revenue Requirements by Customer Service Characteristics

Parameter	Base	Max-Day	Max-Hour	Customer	Meter	Total
FY2017						
O&M	\$4,673,746	\$1,166,679	\$506,633	\$1,422,816	\$1,078,890	\$8,848,764
Capital	1,549,432	2,256,021	582,225	449,757	3,115	4,840,550
	-----	-----	-----	-----	-----	-----
Total	\$6,223,178	\$3,422,700	\$1,088,858	\$1,872,573	\$1,082,005	\$13,689,314
FY2018						
O&M	\$4,897,638	\$1,211,481	\$523,832	\$1,511,050	\$1,089,118	\$9,233,120
Capital	1,576,082	2,294,825	544,248	428,950	2,632	4,846,736
	-----	-----	-----	-----	-----	-----
Total	\$6,473,720	\$3,506,305	\$1,068,080	\$1,940,000	\$1,091,750	\$14,079,856

Table 28  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Percentage Allocation of Revenue Requirements for Rate Design

Allocation Percentages	Base	Max-Day	Max-Hour	Customer	Meter
O&M					
Base Rate	0.00%	0.00%	0.00%	100.00%	100.00%
Volume Charge	100.00%	100.00%	100.00%	0.00%	0.00%
	-----	-----	-----	-----	-----
Total	100.00%	100.00%	100.00%	100.00%	100.00%
Capital					
Base Rate	0.00%	0.00%	0.00%	100.00%	100.00%
Volume Charge	100.00%	100.00%	100.00%	0.00%	0.00%
	-----	-----	-----	-----	-----
Total	100.00%	100.00%	100.00%	100.00%	100.00%



Table 29  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Allocation of Revenue Requirements for Rate Design Purposes  
FY2017

Description	Base	Max-Day	Max-Hour	Customer	Meter	Total
O&M						
Base Rate	\$0	\$0	\$0	\$1,422,816	\$1,078,890	\$2,501,706
Volume Charge	4,673,746	1,166,679	506,633	0	0	6,347,058
	-----	-----	-----	-----	-----	-----
Subtotal	\$4,673,746	\$1,166,679	\$506,633	\$1,422,816	\$1,078,890	\$8,848,764
Capital						
Base Rate	\$0	\$0	\$0	\$449,757	\$3,115	\$452,872
Volume Charge	1,549,432	2,256,021	582,225	0	0	4,387,678
	-----	-----	-----	-----	-----	-----
Subtotal	\$1,549,432	\$2,256,021	\$582,225	\$449,757	\$3,115	\$4,840,550
Total						
Base Rate	\$0	\$0	\$0	\$1,872,573	\$1,082,005	\$2,954,578
Volume Charge	6,223,178	3,422,700	1,088,858	0	0	10,734,736
	-----	-----	-----	-----	-----	-----
Grand Total	\$6,223,178	\$3,422,700	\$1,088,858	\$1,872,573	\$1,082,005	\$13,689,314

Table 30  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Allocation of Revenue Requirements for Rate Design Purposes  
FY2018

Description	Base	Max-Day	Max-Hour	Customer	Meter	Total
O&M						
Base Rate	\$0	\$0	\$0	\$1,511,050	\$1,089,118	\$2,600,168
Volume Charge	4,897,638	1,211,481	523,832	0	0	6,632,951
	-----	-----	-----	-----	-----	-----
Subtotal	\$4,897,638	\$1,211,481	\$523,832	\$1,511,050	\$1,089,118	\$9,233,120
Capital						
Base Rate	\$0	\$0	\$0	\$428,950	\$2,632	\$431,582
Volume Charge	1,576,082	2,294,825	544,248	0	0	4,415,155
	-----	-----	-----	-----	-----	-----
Subtotal	\$1,576,082	\$2,294,825	\$544,248	\$428,950	\$2,632	\$4,846,736
Total						
Base Rate	\$0	\$0	\$0	\$1,940,000	\$1,091,750	\$3,031,750
Volume Charge	6,473,720	3,506,305	1,068,080	0	0	11,048,106
	-----	-----	-----	-----	-----	-----
Grand Total	\$6,473,720	\$3,506,305	\$1,068,080	\$1,940,000	\$1,091,750	\$14,079,856

Table 31  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Base Rate Costs by Customer Class

Customer Class	Base	Max-Day	Max-Hour	Customer	Meter	Total
FY2017:						
Residential	\$0	\$0	\$0	\$1,704,044	\$756,006	\$2,460,049
Multifamily	0	0	0	10,094	31,538	41,632
Commercial	0	0	0	26,496	51,405	77,901
Bulk	0	0	0	3,064	2,787	5,852
Irrigation	0	0	0	39,203	100,065	139,269
Multifamily Indoor Use Only	0	0	0	63,627	73,584	137,211
Commercial Indoor Use Only	0	0	0	26,046	66,619	92,664
	-----	-----	-----	-----	-----	-----
Total	\$0	\$0	\$0	\$1,872,573	\$1,082,005	\$2,954,578
FY2018:						
Residential	\$0	\$0	\$0	\$1,755,442	\$765,607	\$2,521,048
Multifamily	0	0	0	27,078	38,092	65,170
Commercial	0	0	0	26,811	51,769	78,580
Bulk	0	0	0	3,028	2,708	5,737
Irrigation	0	0	0	39,014	97,345	136,359
Multifamily Indoor Use Only	0	0	0	62,885	71,498	134,384
Commercial Indoor Use Only	0	0	0	25,742	64,730	90,472
	-----	-----	-----	-----	-----	-----
Total	\$0	\$0	\$0	\$1,940,000	\$1,091,750	\$3,031,750

Table 32  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Volume Charge Costs by Customer Class

Customer Class	Base	Max-Day	Max-Hour	Customer	Meter	Total
FY2017:						
Residential	\$4,071,560	\$2,243,257	\$709,676	\$0	\$0	\$7,024,493
Multifamily	243,429	89,721	33,987	0	0	367,137
Commercial	343,604	130,560	48,890	0	0	523,054
Bulk	132,445	60,390	27,090	0	0	219,925
Irrigation	801,407	806,954	207,391	0	0	1,815,752
Multifamily Indoor Use Only	301,337	35,495	28,137	0	0	364,970
Commercial Indoor Use Only	329,396	56,322	33,687	0	0	419,405
	-----	-----	-----	-----	-----	-----
Total	\$6,223,178	\$3,422,700	\$1,088,858	\$0	\$0	\$10,734,736
FY2018:						
Residential	\$4,076,194	\$2,244,964	\$676,151	\$0	\$0	\$6,997,310
Multifamily	529,456	195,069	70,350	0	0	794,875
Commercial	337,220	128,085	45,663	0	0	510,968
Bulk	129,577	59,060	25,222	0	0	213,859
Irrigation	784,200	789,331	193,131	0	0	1,766,663
Multifamily Indoor Use Only	294,811	34,713	26,198	0	0	355,722
Commercial Indoor Use Only	322,262	55,082	31,365	0	0	408,709
	-----	-----	-----	-----	-----	-----
Total	\$6,473,720	\$3,506,305	\$1,068,080	\$0	\$0	\$11,048,106

Table 33  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Summary of Cost of Service by Customer Class

Customer Class	Base	Max-Day	Max-Hour	Customer	Meter	Total
FY2017:						
Residential	\$4,071,560	\$2,243,257	\$709,676	\$1,704,044	\$756,006	\$9,484,542
Multifamily	243,429	89,721	33,987	10,094	31,538	408,769
Commercial	343,604	130,560	48,890	26,496	51,405	600,955
Bulk	132,445	60,390	27,090	3,064	2,787	225,777
Irrigation	801,407	806,954	207,391	39,203	100,065	1,955,021
Multifamily Indoor Use Only	301,337	35,495	28,137	63,627	73,584	502,181
Commercial Indoor Use Only	329,396	56,322	33,687	26,046	66,619	512,069
	-----	-----	-----	-----	-----	-----
Total	\$6,223,178	\$3,422,700	\$1,088,858	\$1,872,573	\$1,082,005	\$13,689,314
FY2018:						
Residential	\$4,076,194	\$2,244,964	\$676,151	\$1,755,442	\$765,607	\$9,518,358
Multifamily	529,456	195,069	70,350	27,078	38,092	860,045
Commercial	337,220	128,085	45,663	26,811	51,769	589,548
Bulk	129,577	59,060	25,222	3,028	2,708	219,596
Irrigation	784,200	789,331	193,131	39,014	97,345	1,903,022
Multifamily Indoor Use Only	294,811	34,713	26,198	62,885	71,498	490,106
Commercial Indoor Use Only	322,262	55,082	31,365	25,742	64,730	499,181
	-----	-----	-----	-----	-----	-----
Total	\$6,473,720	\$3,506,305	\$1,068,080	\$1,940,000	\$1,091,750	\$14,079,856

Table 34  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Calculation of Unit Costs by Customer Class  
FY2017

Customer Class	Base Per kgal	Max-Day Per kgal	Max-Hour Per kgal	Customer Per Account	Meter Per Equivalent Meter
Residential	\$2.55	\$1.40	\$0.44	\$7.51	\$3.33
Multifamily	2.55	0.94	0.36	7.51	3.33
Commercial	2.55	0.97	0.36	7.51	3.33
Bulk	2.55	1.16	0.52	7.51	3.33
Irrigation	2.55	2.56	0.66	7.51	3.33
Multifamily Indoor Use Only	2.55	0.30	0.24	7.51	3.33
Commercial Indoor Use Only	2.55	0.44	0.26	7.51	3.33

Table 35  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Calculation of Unit Costs by Customer Class  
FY2018

Customer Class	Base Per kgal	Max-Day Per kgal	Max-Hour Per kgal	Customer Per Account	Meter Per Equivalent Meter
Residential	\$2.49	\$1.37	\$0.41	\$7.42	\$3.23
Multifamily	2.49	0.92	0.33	7.42	3.23
Commercial	2.49	0.95	0.34	7.42	3.23
Bulk	2.49	1.14	0.49	7.42	3.23
Irrigation	2.49	2.51	0.61	7.42	3.23
Multifamily Indoor Use Only	2.49	0.29	0.22	7.42	3.23
Commercial Indoor Use Only	2.49	0.43	0.24	7.42	3.23

Table 36  
Town of Castle Rock  
Water Cost-of-Service Analysis  
COS Volume-Based Water Rates  
(\$/kgal)

Customer Class	Calculated Volume Rates		
	FY2016	FY2017	FY2018
Residential	\$2.78	\$4.39	\$4.28
Multifamily	2.55	3.84	3.74
Commercial	2.56	3.88	3.78
Bulk	2.72	4.23	4.11
Irrigation	3.35	5.77	5.61
Multifamily Indoor Use Only	2.23	3.08	3.01
Commercial Indoor Use Only	2.30	3.24	3.16
Average Rate	\$2.78	\$4.39	\$4.25



Table 37  
Town of Castle Rock  
Water Cost-of-Service Analysis  
COS Base Rate Charges

	Per Account per Month	Per Equiv.Meter per Month
Customer Class	Customer Charge	Meter Charge
FY2017:		
Residential	\$7.51	\$3.33
Multifamily	7.51	3.33
Commercial	7.51	3.33
Bulk	7.51	3.33
Irrigation	7.51	3.33
Multifamily Indoor Use Only	7.51	3.33
Commercial Indoor Use Only	7.51	3.33
FY2018:		
Residential	\$7.42	\$3.23
Multifamily	7.42	3.23
Commercial	7.42	3.23
Bulk	7.42	3.23
Irrigation	7.42	3.23
Multifamily Indoor Use Only	7.42	3.23
Commercial Indoor Use Only	7.42	3.23

Table 38  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Monthly Meter Charge by Meter Size

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only
FY2017:							
3/4"	\$3.33	\$3.33	\$3.33	\$3.33	\$3.33	\$3.33	\$3.33
1"	11.31	11.31	11.31	11.31	11.31	11.31	11.31
1-1/2"	25.72	25.72	25.72	25.72	25.72	25.72	25.72
2"	36.99	36.99	36.99	36.99	36.99	36.99	36.99
3"	62.91	62.91	62.91	62.91	62.91	62.91	62.91
4"	203.64	203.64	203.64	203.64	203.64	203.64	203.64
6"	295.53	295.53	295.53	295.53	295.53	295.53	295.53
FY2018:							
3/4"	\$3.23	\$3.23	\$3.23	\$3.23	\$3.23	\$3.23	\$3.23
1"	10.99	10.99	10.99	10.99	10.99	10.99	10.99
1-1/2"	24.99	24.99	24.99	24.99	24.99	24.99	24.99
2"	35.95	35.95	35.95	35.95	35.95	35.95	35.95
3"	61.13	61.13	61.13	61.13	61.13	61.13	61.13
4"	197.87	197.87	197.87	197.87	197.87	197.87	197.87
6"	287.15	287.15	287.15	287.15	287.15	287.15	287.15

Table 39  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Monthly Customer Charge by Meter Size

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only
FY2017:							
3/4"	\$7.51	\$7.51	\$7.51	\$7.51	\$7.51	\$7.51	\$7.51
1"	7.51	7.51	7.51	7.51	7.51	7.51	7.51
1-1/2"	7.51	7.51	7.51	7.51	7.51	7.51	7.51
2"	7.51	7.51	7.51	7.51	7.51	7.51	7.51
3"	7.51	7.51	7.51	7.51	7.51	7.51	7.51
4"	7.51	7.51	7.51	7.51	7.51	7.51	7.51
6"	7.51	7.51	7.51	7.51	7.51	7.51	7.51
FY2018:							
3/4"	\$7.42	\$7.42	\$7.42	\$7.42	\$7.42	\$7.42	\$7.42
1"	7.42	7.42	7.42	7.42	7.42	7.42	7.42
1-1/2"	7.42	7.42	7.42	7.42	7.42	7.42	7.42
2"	7.42	7.42	7.42	7.42	7.42	7.42	7.42
3"	7.42	7.42	7.42	7.42	7.42	7.42	7.42
4"	7.42	7.42	7.42	7.42	7.42	7.42	7.42
6"	7.42	7.42	7.42	7.42	7.42	7.42	7.42

Table 40  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Total Fixed Monthly Charge by Meter Size

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	Multifamily Indoor Use Only	Commercial Indoor Use Only
FY2017:							
3/4"	\$10.84	\$10.84	\$10.84	\$10.84	\$10.84	\$10.84	\$10.84
1"	18.82	18.82	18.82	18.82	18.82	18.82	18.82
1-1/2"	33.23	33.23	33.23	33.23	33.23	33.23	33.23
2"	44.51	44.51	44.51	44.51	44.51	44.51	44.51
3"	70.42	70.42	70.42	70.42	70.42	70.42	70.42
4"	211.15	211.15	211.15	211.15	211.15	211.15	211.15
6"	303.04	303.04	303.04	303.04	303.04	303.04	303.04
FY2018:							
3/4"	\$10.66	\$10.66	\$10.66	\$10.66	\$10.66	\$10.66	\$10.66
1"	18.41	18.41	18.41	18.41	18.41	18.41	18.41
1-1/2"	32.41	32.41	32.41	32.41	32.41	32.41	32.41
2"	43.37	43.37	43.37	43.37	43.37	43.37	43.37
3"	68.55	68.55	68.55	68.55	68.55	68.55	68.55
4"	205.29	205.29	205.29	205.29	205.29	205.29	205.29
6"	294.57	294.57	294.57	294.57	294.57	294.57	294.57

Table 41  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Revenues Generated by COS Rates  
FY2017

Customer Class	Base Monthly Charge	Volume Rate	Total Revenue	Revenue Requirement	Surplus/ (Deficiency)
Residential	\$2,460,049	\$7,024,493	\$9,484,542	\$9,484,542	\$0
Multifamily	41,632	367,137	408,769	408,769	0
Commercial	77,901	523,054	600,955	600,955	0
Bulk	5,852	219,925	225,777	225,777	0
Irrigation	139,269	1,815,752	1,955,021	1,955,021	0
Multifamily Indoor Use Only	137,211	364,970	502,181	502,181	0
Commercial Indoor Use Only	92,664	419,405	512,069	512,069	0
	-----	-----	-----	-----	-----
Total	\$2,954,578	\$10,734,736	\$13,689,314	\$13,689,314	\$0

Table 42  
Town of Castle Rock  
Water Cost-of-Service Analysis  
Revenues Generated by COS Rates  
FY2018

Customer Class	Base Monthly Charge	Volume Rate	Total Revenue	Revenue Requirement	Surplus/ (Deficiency)
Residential	\$2,521,048	\$6,997,310	\$9,518,358	\$9,518,358	\$0
Multifamily	65,170	794,875	860,045	860,045	0
Commercial	78,580	510,968	589,548	589,548	0
Bulk	5,737	213,859	219,596	219,596	0
Irrigation	136,359	1,766,663	1,903,022	1,903,022	0
Multifamily Indoor Use Only	134,384	355,722	490,106	490,106	0
Commercial Indoor Use Only	90,472	408,709	499,181	499,181	0
	-----	-----	-----	-----	-----
Total	\$3,031,750	\$11,048,106	\$14,079,856	\$14,079,856	\$0

# APPENDIX G

## Wastewater Fund Cost-of-Service Study



Table 1  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Projected Wastewater Flows and Loadings by Class (MG/Year)  
FY2016

Customer Class	Annual Flows (MG)	mg/l		Pounds	
		BOD	TSS	BOD	TSS
Residential	664.7	344	432	1,908,303	2,396,473
Commercial	73.8	344	432	211,948	266,167
Commercial Indoor Use Only	108.6	344	432	311,732	391,477
Multifamily	63.1	344	432	181,103	227,432
Mutifamily Indoor Use Only	89.6	344	432	257,117	322,891
Total	999.8	344	432	2,870,203	3,604,441



Table 2  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Projected Wastewater Flows and Loadings by Class (MG/Year)  
FY2017

Customer Class		Additional Flow (MG)	Annual Flow (MG)	mg/l		Pounds	
				BOD	TSS	BOD	TSS
Residential		65.18	729.886	344	432	2,095,270	2,631,270
Commercial		0.85	74.674	344	432	214,366	269,204
Commercial Indoor Use Only		-	108.583	344	432	311,707	391,446
Multifamily		-	63.082	344	432	181,088	227,413
Mutifamily Indoor Use Only		17.67	107.231	344	432	307,826	386,572
Total		83.7	1,083.457	1,720	2,160	3,110,258	3,905,905

Table 3  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Projected Wastewater Flows and Loadings by Class (MG/Year)  
FY2018

Customer Class		Additional Flow (MG)	Annual Flow (MG)	mg/l		Pounds	
				BOD	TSS	BOD	TSS
Residential		37.25	767.1	344	432	2,202,197	2,765,550
Commercial		0.42	75.1	344	432	215,584	270,733
Commercial Indoor Use Only		-	108.6	344	432	311,707	391,446
Multifamily		116.90	180.0	344	432	516,685	648,860
Mutifamily Indoor Use Only		-	107.2	344	432	307,826	386,572
Total		154.6	1,238.0	1,720	2,160	3,553,999	4,463,162

Table 4  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Number of Customers and Equivalent Meters by Meter Size and Customer Class  
FY2016

Meter Size	Equivalent 5/8" x 3/4" Ratios	Residential	Commercial	Commercial Indoor Use Only	Multifamily	Mutifamily Indoor Use Only	Total
Number of Customers							
3/4"	1.00	17,141	128	101	14	100	17,484
1"	4.06	11	68	66	25	64	234
1-1/2"	9.18	0	47	53	55	86	241
2"	13.19	0	24	38	15	40	117
3"	19.92	0	5	12	2	0	19
4"	81.19	0	0	1	1	0	2
6"	102.67	0	1	1	0	0	2
		-----	-----	-----	-----	-----	-----
Total		17,152	273	272	112	290	18,099
Number of Equivalent Meters							
3/4"		17,141	128	101	14	100	17,484
1"		45	276	268	102	260	950
1-1/2"		0	431	487	505	789	2,212
2"		0	317	501	198	528	1,543
3"		0	100	239	40	0	378
4"		0	0	81	81	0	162
6"		0	103	103	0	0	205
		-----	-----	-----	-----	-----	-----
Total		17,186	1,354	1,780	939	1,677	22,936

Table 5  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Number of Customers and Equivalent Meters by Meter Size and Customer Class  
FY2017

Meter Size	Equivalent 3/4" Ratios	Residential	Commercial	Commercial Indoor Use Only	Multifamily	Mutifamily Indoor Use Only	Total
Number of Customers							
3/4"	1.0	18,541	128	101	14	516	19,300
1"	4.1	11	76	66	25	64	242
1-1/2"	9.2	0	47	53	55	86	241
2"	13.2	0	30	38	15	40	123
3"	19.9	0	5	12	2	0	19
4"	81.2	0	0	1	1	0	2
6"	102.7	0	1	1	0	0	2
		-----	-----	-----	-----	-----	-----
Total		18,552	287	272	112	706	19,929
Number of Equivalent Meters							
3/4"		18,541	128	101	14	516	19,300
1"		45	309	268	102	260	983
1-1/2"		0	431	487	505	789	2,212
2"		0	396	501	198	528	1,622
3"		0	100	239	40	0	378
4"		0	0	81	81	0	162
6"		0	103	103	0	0	205
		-----	-----	-----	-----	-----	-----
Total		18,586	1,466	1,780	939	2,093	24,863

Table 6  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Number of Customers and Equivalent Meters by Meter Size and Customer Class  
FY2018

Meter Size	Equivalent 3/4" Ratios	Residential	Commercial	Commercial Indoor Use Only	Multifamily	Mutifamily Indoor Use Only	Total
Number of Customers							
3/4"	1.0	19,341	128	101	206	516	20,292
1"	4.1	11	80	66	25	64	246
1-1/2"	9.2	0	47	53	55	86	241
2"	13.2	0	33	38	15	40	126
3"	19.9	0	5	12	2	0	19
4"	81.2	0	0	1	1	0	2
6"	102.7	0	1	1	0	0	2
		-----	-----	-----	-----	-----	-----
Total		19,352	294	272	304	706	20,928
Number of Equivalent Meters							
3/4"		19,341	128	101	206	516	20,292
1"		45	325	268	102	260	999
1-1/2"		0	431	487	505	789	2,212
2"		0	435	501	198	528	1,662
3"		0	100	239	40	0	378
4"		0	0	81	81	0	162
6"		0	103	103	0	0	205
		-----	-----	-----	-----	-----	-----
Total		19,386	1,522	1,780	1,131	2,093	25,911

Table 7  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Summary of Number of Customers by Customer Class

Customer Class	FY2016	FY2017	FY2018
Residential	17,152	18,552	19,352
Commercial	273	287	294
Commercial Indoor Use Only	272	272	272
Multifamily	112	112	304
Mutifamily Indoor Use Only	290	706	706
	-----	-----	-----
Total	18,099	19,929	20,928

Table 8  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Summary of Equivalent Meters by Customer Class

Customer Class	FY2016	FY2017	FY2018
Residential	17,186	18,586	19,386
Commercial	1,354	1,466	1,522
Commercial Indoor Use Only	1,780	1,780	1,780
Multifamily	939	939	1,131
Mutifamily Indoor Use Only	1,677	2,093	2,093
	-----	-----	-----
Total	22,936	24,863	25,911

Table 9  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Summary of Customer Characteristics  
FY2016

Customer Class	Flow	BOD	TSS	Customer	Demand
Residential	66.49%	66.49%	66.49%	94.77%	74.93%
Commercial	7.38%	7.38%	7.38%	1.51%	5.91%
Commercial Indoor Use Only	10.86%	10.86%	10.86%	1.50%	7.76%
Multifamily	6.31%	6.31%	6.31%	0.62%	4.10%
Mutifamily Indoor Use Only	8.96%	8.96%	8.96%	1.60%	7.31%
	-----	-----	-----	-----	-----
Total	100.00%	100.00%	100.00%	100.00%	100.00%



Table 10  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Summary of Customer Characteristics  
FY2017

Customer Class	Flow	BOD	TSS	Customer	Demand
Residential	67.37%	67.37%	67.37%	93.09%	74.75%
Commercial	6.89%	6.89%	6.89%	1.44%	5.90%
Commercial Indoor Use Only	10.02%	10.02%	10.02%	1.36%	7.16%
Multifamily	5.82%	5.82%	5.82%	0.56%	3.78%
Mutifamily Indoor Use Only	9.90%	9.90%	9.90%	3.54%	8.42%
	-----	-----	-----	-----	-----
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Table 11  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Summary of Customer Characteristics  
FY2018

Customer Class	Flow	BOD	TSS	Customer	Demand
Residential	61.96%	61.96%	61.96%	92.47%	74.82%
Commercial	6.07%	6.07%	6.07%	1.40%	5.87%
Commercial Indoor Use Only	8.77%	8.77%	8.77%	1.30%	6.87%
Multifamily	14.54%	14.54%	14.54%	1.45%	4.37%
Mutifamily Indoor Use Only	8.66%	8.66%	8.66%	3.37%	8.08%
	-----	-----	-----	-----	-----
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Table 12  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Capital Expenditures

Item	FY2017	FY2018
Debt Service	\$ 333,258	\$ 333,546
Transfers Out	\$ 67,001	\$ 138,404
Minor Capital Outlay	\$ 76,750	\$ 84,750
Pay-Go Cash Funded Capital	\$ 5,636,243	\$ 4,339,389
	-----	-----
Total	\$6,113,252	\$4,896,089

Table 13  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
O&M Non-Rate Revenues

Item	FY2017	FY2018
Miscellaneous Revenue	\$ 159,904	\$ 159,904
Interest Income	84,347	97,184
	-----	-----
Total	\$244,251	\$257,088

Table 14  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Capital Non-Rate Revenues

Item	FY2017	FY2018
System Development Fee Revenue	2,999,666	2,734,397
Transfers From Restricted Fund	0	0
Sources & Uses of Funds	(2,659,160)	(3,759,395)
	-----	-----
Total	\$340,506	(\$1,024,999)

Table 15  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
User Charge Revenue Requirements

Item	FY2017	FY2018
Total Revenue Requirements		
O&M	\$5,167,766	\$5,392,772
Capital	6,113,252	4,896,089
	-----	-----
Total	\$11,281,018	\$10,288,861
User Charge Revenue Requirements		
O&M	\$4,923,516	\$5,135,684
Capital	5,772,746	5,921,088
	-----	-----
Total	\$10,696,262	\$11,056,772

Table 16  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Net O&M Expenses by Unit Process

O&M Expenses	FY2016	FY2017	FY2018
Treatment by Others	\$2,627,250	\$2,522,808	\$2,625,966
Collection	749,054	757,566	790,916
Interceptor	293,923	297,264	310,350
Lift Station	454,887	476,798	504,308
Admin	0	0	0
Customer Accounts	835,594	869,079	904,144
Meters and Services	0	0	0
Buildings/ Improvements	0	0	0
Tools/ Equipment	0	0	0
Treatment Plant	0	0	0
	-----	-----	-----
Total	\$4,960,709	\$4,923,516	\$5,135,684

Table 17  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Percent Allocation of O&M Expenses to Customer Service Characteristics

Unit Process	Flow	BOD	TSS	Customer	Total	Check
Treatment by Others	37.2%	40.3%	22.4%	0.0%	100.0%	O.K.
Collection	100.0%	0.0%	0.0%	0.0%	100.0%	O.K.
Interceptor	100.0%	0.0%	0.0%	0.0%	100.0%	O.K.
Lift Station	100.0%	0.0%	0.0%	0.0%	100.0%	O.K.
Admin	0.0%	0.0%	0.0%	100.0%	100.0%	O.K.
Customer Accounts	0.0%	0.0%	0.0%	100.0%	100.0%	O.K.
Meters and Services	0.0%	0.0%	0.0%	100.0%	100.0%	O.K.
Buildings/ Improvements	0.0%	0.0%	0.0%	0.0%	0.0%	No Allocation
Tools/ Equipment	0.0%	0.0%	0.0%	0.0%	0.0%	No Allocation
Treatment Plant	0.0%	0.0%	0.0%	0.0%	0.0%	No Allocation



Table 18  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Allocation of O&M Expenses to Customer Service Characteristics  
FY2016

Unit Process	Flow	BOD	TSS	Customer	Total
Treatment by Others	\$977,914	\$1,060,001	\$589,335	\$0	\$2,627,250
Collection	749,054	0	0	0	749,054
Interceptor	293,923	0	0	0	293,923
Lift Station	454,887	0	0	0	454,887
Admin	0	0	0	0	0
Customer Accounts	0	0	0	835,594	835,594
Meters and Services	0	0	0	0	0
Buildings/ Improvements	0	0	0	0	0
Tools/ Equipment	0	0	0	0	0
Treatment Plant	0	0	0	0	0
	-----	-----	-----	-----	-----
Total	\$2,475,779	\$1,060,001	\$589,335	\$835,594	\$4,960,709

Table 19  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Allocation of O&M Expenses to Customer Service Characteristics  
FY2017

Unit Process	Flow	BOD	TSS	Customer	Total
Treatment by Others	\$939,038	\$1,017,863	\$565,907	\$0	\$2,522,808
Collection	757,566	0	0	0	757,566
Interceptor	297,264	0	0	0	297,264
Lift Station	476,798	0	0	0	476,798
Admin	0	0	0	0	0
Customer Accounts	0	0	0	869,079	869,079
Meters and Services	0	0	0	0	0
Buildings/ Improvements	0	0	0	0	0
Tools/ Equipment	0	0	0	0	0
Treatment Plant	0	0	0	0	0
	-----	-----	-----	-----	-----
Total	\$2,470,667	\$1,017,863	\$565,907	\$869,079	\$4,923,516

Table 20  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Allocation of O&M Expenses to Customer Service Characteristics  
FY2018

Unit Process	Flow	BOD	TSS	Customer	Total
Treatment by Others	\$977,436	\$1,059,483	\$589,047	\$0	\$2,625,966
Collection	790,916	0	0	0	790,916
Interceptor	310,350	0	0	0	310,350
Lift Station	504,308	0	0	0	504,308
Admin	0	0	0	0	0
Customer Accounts	0	0	0	904,144	904,144
Meters and Services	0	0	0	0	0
Buildings/ Improvements	0	0	0	0	0
Tools/ Equipment	0	0	0	0	0
Treatment Plant	0	0	0	0	0
	-----	-----	-----	-----	-----
Total	\$2,583,010	\$1,059,483	\$589,047	\$904,144	\$5,135,684

Table 21  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Allocation of O&M Expenses to Customer Classes  
FY2016

Customer Classes	Flow	BOD	TSS	Customer	Total
Residential	\$1,646,063	\$704,760	\$391,829	\$791,873	\$3,534,525
Commercial	182,822	78,275	43,519	12,604	317,220
Commercial Indoor Use Only	268,894	115,126	64,008	12,558	460,585
Multifamily	156,216	66,884	37,186	5,171	265,456
Mutifamily Indoor Use Only	221,784	94,957	52,794	13,389	382,923
	-----	-----	-----	-----	-----
Total	\$2,475,779	\$1,060,001	\$589,335	\$835,594	\$4,960,709

Table 22  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Allocation of O&M Expenses to Customer Classes  
FY2017

Customer Classes	Flow	BOD	TSS	Customer	Total
Residential	\$1,664,401	\$685,698	\$381,232	\$809,030	\$3,540,360
Commercial	170,284	70,153	39,004	12,516	291,957
Commercial Indoor Use Only	247,608	102,009	56,715	11,862	418,193
Multifamily	143,849	59,263	32,949	4,884	240,945
Mutifamily Indoor Use Only	244,525	100,739	56,009	30,788	432,060
	-----	-----	-----	-----	-----
Total	\$2,470,667	\$1,017,863	\$565,907	\$869,079	\$4,923,516

Table 23  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Allocation of O&M Expenses to Customer Classes  
FY2018

Customer Classes	Flow	BOD	TSS	Customer	Total
Residential	\$1,600,534	\$656,497	\$364,997	\$836,056	\$3,458,085
Commercial	156,684	64,268	35,731	12,702	269,385
Commercial Indoor Use Only	226,545	92,923	51,663	11,751	382,882
Multifamily	375,521	154,029	85,636	13,134	628,320
Mutifamily Indoor Use Only	223,725	91,766	51,020	30,501	397,012
	-----	-----	-----	-----	-----
Total	\$2,583,010	\$1,059,483	\$589,047	\$904,144	\$5,135,684

Table 24  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Summary of Net Plant-in-Service Allocated to System Unit Processes

Unit Process	FY2016	FY2017	FY2018
Treatment by Others	\$0	\$0	\$0
Collection	15,270,478	14,815,226	14,359,975
Interceptor	5,961,222	5,813,389	5,665,557
Lift Station	2,635,817	2,532,122	2,428,427
Admin	963,375	935,392	907,408
Customer Accounts	0	0	0
Meters and Services	0	0	0
Buildings/ Improvements	617,782	579,343	540,903
Tools/ Equipment	221,757	181,940	142,123
Treatment Plant	29,174	28,445	27,715
	-----	-----	-----
Total	\$25,699,606	\$24,885,857	\$24,072,109

Table 25  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Percent Allocation of Net Plant-in-Service to Customer Service Characteristics

Unit Process	Flow	BOD	TSS	Customer	Total
Treatment by Others	37.2%	40.3%	22.4%	0.0%	100.00%
Collection	100.0%	0.0%	0.0%	0.0%	100.00%
Interceptor	100.0%	0.0%	0.0%	0.0%	100.00%
Lift Station	100.0%	0.0%	0.0%	0.0%	100.00%
Admin	0.0%	0.0%	0.0%	100.0%	100.00%
Customer Accounts	0.0%	0.0%	0.0%	100.0%	100.00%
Meters and Services	0.0%	0.0%	0.0%	100.0%	100.00%
Buildings/ Improvements	0.0%	0.0%	0.0%	100.0%	100.00%
Tools/ Equipment	0.0%	0.0%	0.0%	100.0%	100.00%
Treatment Plant	37.2%	40.3%	22.4%	0.0%	100.00%



Table 26  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Allocation of Net Plant-in-Service to Customer Service Characteristics  
FY2017

Unit Process	Flow	BOD	TSS	Customer	Total
Treatment by Others	\$0	\$0	\$0	\$0	\$0
Collection	14,815,226	0	0	0	14,815,226
Interceptor	5,813,389	0	0	0	5,813,389
Lift Station	2,532,122	0	0	0	2,532,122
Admin	0	0	0	935,392	935,392
Customer Accounts	0	0	0	0	0
Meters and Services	0	0	0	0	0
Buildings/ Improvements	0	0	0	579,343	579,343
Tools/ Equipment	0	0	0	181,940	181,940
Treatment Plant	10,588	11,476	6,381	0	28,445
	-----	-----	-----	-----	-----
Total	\$23,171,326	\$11,476	\$6,381	\$1,696,675	\$24,885,857

Table 27  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Allocation of Net Plant-in-Service to Customer Service Characteristics  
FY2018

Unit Process	Flow	BOD	TSS	Customer	Total
Treatment by Others	\$0	\$0	\$0	\$0	\$0
Collection	14,359,975	0	0	0	14,359,975
Interceptor	5,665,557	0	0	0	5,665,557
Lift Station	2,428,427	0	0	0	2,428,427
Admin	0	0	0	907,408	907,408
Customer Accounts	0	0	0	0	0
Meters and Services	0	0	0	0	0
Buildings/ Improvements	0	0	0	540,903	540,903
Tools/ Equipment	0	0	0	142,123	142,123
Treatment Plant	10,316	11,182	6,217	0	27,715
	-----	-----	-----	-----	-----
Total	\$22,464,275	\$11,182	\$6,217	\$1,590,435	\$24,072,109

Table 28  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Allocation of Net Plant-in-Service to Customer Classes  
FY2017

Customer Classes	Flow	BOD	TSS	Customer	Total
Residential	\$15,609,700	\$7,731	\$4,298	\$1,579,442	\$17,201,172
Commercial	1,597,022	791	440	24,434	1,622,687
Commercial Indoor Use Only	2,322,206	1,150	639	23,157	2,347,152
Multifamily	1,349,102	668	371	9,535	1,359,677
Mutifamily Indoor Use Only	2,293,295	1,136	631	60,106	2,355,169
	-----	-----	-----	-----	-----
Total	\$23,171,326	\$11,476	\$6,381	\$1,696,675	\$24,885,857

Table 29  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Allocation of Net Plant-in-Service to Customer Classes  
FY2018

Customer Classes	Flow	BOD	TSS	Customer	Total
Residential	\$13,919,746	\$6,929	\$3,852	\$1,470,666	\$15,401,193
Commercial	1,362,673	678	377	22,343	1,386,071
Commercial Indoor Use Only	1,970,250	981	545	20,671	1,992,447
Multifamily	3,265,885	1,626	904	23,103	3,291,517
Mutifamily Indoor Use Only	1,945,721	969	538	53,653	2,000,881
	-----	-----	-----	-----	-----
Total	\$22,464,275	\$11,182	\$6,217	\$1,590,435	\$24,072,109

Table 30

Town of Castle Rock

Wastewater Cost-of-Service Analysis

Percent Allocation of Capital Costs to Customer Classes (Based on Net Plant-in-Service to Customer Classes)

FY2017

Customer Classes	Flow	BOD	TSS	Customer	Total
Residential	62.73%	0.03%	0.02%	6.35%	69.12%
Commercial	6.42%	0.00%	0.00%	0.10%	6.52%
Commercial Indoor Use Only	9.33%	0.00%	0.00%	0.09%	9.43%
Multifamily	5.42%	0.00%	0.00%	0.04%	5.46%
Mutifamily Indoor Use Only	9.22%	0.00%	0.00%	0.24%	9.46%
	-----	-----	-----	-----	-----
Total	93.11%	0.05%	0.03%	6.82%	100.00%

Table 31  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Percent Allocation of Capital Costs to Customer Classes (Based on Net Plant-in-Service to Customer Classes)  
FY2018

Customer Classes	Flow	BOD	TSS	Customer	Total
Residential	57.83%	0.03%	0.02%	6.11%	63.98%
Commercial	5.66%	0.00%	0.00%	0.09%	5.76%
Commercial Indoor Use Only	8.18%	0.00%	0.00%	0.09%	8.28%
Multifamily	13.57%	0.01%	0.00%	0.10%	13.67%
Mutifamily Indoor Use Only	8.08%	0.00%	0.00%	0.22%	8.31%
	-----	-----	-----	-----	-----
Total	93.32%	0.05%	0.03%	6.61%	100.00%

Table 32  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Allocation of Capital Costs to Customer Classes  
FY2017

Customer Classes	Flow	BOD	TSS	Customer	Total
Residential	\$3,620,966	\$1,793	\$997	\$366,382	\$3,990,138
Commercial	370,460	183	102	5,668	376,413
Commercial Indoor Use Only	538,680	267	148	5,372	544,467
Multifamily	312,950	155	86	2,212	315,403
Mutifamily Indoor Use Only	531,973	263	146	13,943	546,326
	-----	-----	-----	-----	-----
Total	\$5,375,028	\$2,662	\$1,480	\$393,576	\$5,772,746

Table 33  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Allocation of Capital Costs to Customer Classes  
FY2018

Customer Classes	Flow	BOD	TSS	Customer	Total
Residential	\$3,423,881	\$1,704	\$948	\$361,744	\$3,788,277
Commercial	335,181	167	93	5,496	340,936
Commercial Indoor Use Only	484,628	241	134	5,084	490,088
Multifamily	803,319	400	222	5,683	809,624
Mutifamily Indoor Use Only	478,595	238	132	13,197	492,163
	-----	-----	-----	-----	-----
Total	\$5,525,604	\$2,751	\$1,529	\$391,204	\$5,921,088



Table 34  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
User Charge Revenue Requirements by Customer Service Characteristics

Description	Flow	BOD	TSS	Customer	Total
FY2017					
O&M	\$2,470,667	\$1,017,863	\$565,907	\$869,079	\$4,923,516
Capital	5,375,028	2,662	1,480	393,576	5,772,746
	-----	-----	-----	-----	-----
Total	\$7,845,695	\$1,020,525	\$567,387	\$1,262,655	\$10,696,262
FY2018					
O&M	\$2,583,010	\$1,059,483	\$589,047	\$904,144	\$5,135,684
Capital	5,525,604	2,751	1,529	391,204	5,921,088
	-----	-----	-----	-----	-----
Total	\$8,108,614	\$1,062,234	\$590,576	\$1,295,347	\$11,056,772

Table 35  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Percentage Allocation of Revenue Requirements for Rate Design

Description	Flow	BOD	TSS	Customer
O&M				
Base Charge	0.00%	0.00%	0.00%	100.00%
Demand Charge	0.00%	0.00%	0.00%	0.00%
Volume Rate	100.00%	100.00%	100.00%	0.00%
	-----	-----	-----	-----
Total	100.00%	100.00%	100.00%	100.00%
Capital				
Base Charge	0.00%	0.00%	0.00%	100.00%
Demand Charge	20.00%	20.00%	20.00%	0.00%
Volume Rate	80.00%	80.00%	80.00%	0.00%
	-----	-----	-----	-----
Total	100.00%	100.00%	100.00%	100.00%

Table 36  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Allocation of Revenue Requirements for Rate Design  
FY2017

Description	Flow	BOD	TSS	Customer	Total
O&M					
Base Charge	\$0	\$0	\$0	\$869,079	\$869,079
Demand Charge	0	0	0	0	0
Volume Rate	2,470,667	1,017,863	565,907	0	4,054,437
	-----	-----	-----	-----	-----
Subtotal	\$2,470,667	\$1,017,863	\$565,907	\$869,079	\$4,923,516
Capital					
Base Charge	\$0	\$0	\$0	\$393,576	\$393,576
Demand Charge	1,075,006	532	296	0	1,075,834
Volume Rate	4,300,023	2,130	1,184	0	4,303,336
	-----	-----	-----	-----	-----
Subtotal	\$5,375,028	\$2,662	\$1,480	\$393,576	\$5,772,746
Total					
Base Charge	\$0	\$0	\$0	\$1,262,655	\$1,262,655
Demand Charge	1,075,006	532	296	0	1,075,834
Volume Rate	6,770,690	1,019,992	567,091	0	8,357,773
	-----	-----	-----	-----	-----
Grand Total	\$7,845,695	\$1,020,525	\$567,387	\$1,262,655	\$10,696,262

Table 37  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Allocation of Revenue Requirements for Rate Design  
FY2018

Description	Flow	BOD	TSS	Customer	Total
O&M					
Base Charge	\$0	\$0	\$0	\$904,144	\$904,144
Demand Charge	0	0	0	0	0
Volume Rate	2,583,010	1,059,483	589,047	0	4,231,540
	-----	-----	-----	-----	-----
Subtotal	\$2,583,010	\$1,059,483	\$589,047	\$904,144	\$5,135,684
Capital					
Base Charge	\$0	\$0	\$0	\$391,204	\$391,204
Demand Charge	1,105,121	550	306	0	1,105,977
Volume Rate	4,420,483	2,200	1,223	0	4,423,907
	-----	-----	-----	-----	-----
Subtotal	\$5,525,604	\$2,751	\$1,529	\$391,204	\$5,921,088
Total					
Base Charge	\$0	\$0	\$0	\$1,295,347	\$1,295,347
Demand Charge	1,105,121	550	306	0	1,105,977
Volume Rate	7,003,493	1,061,684	590,271	0	8,655,448
	-----	-----	-----	-----	-----
Grand Total	\$8,108,614	\$1,062,234	\$590,576	\$1,295,347	\$11,056,772

Table 38  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Base Rate Costs by Class

Customer Class	Flow	BOD	TSS	Customer	Total
FY2017:					
Residential	\$0	\$0	\$0	\$1,175,411	\$1,175,411
Commercial	0	0	0	18,184	18,184
Commercial Indoor Use Only	0	0	0	17,233	17,233
Multifamily	0	0	0	7,096	7,096
Mutifamily Indoor Use Only	0	0	0	44,731	44,731
	-----	-----	-----	-----	-----
Total	\$0	\$0	\$0	\$1,262,655	\$1,262,655
FY2018:					
Residential	\$0	\$0	\$0	\$1,197,800	\$1,197,800
Commercial	0	0	0	18,197	18,197
Commercial Indoor Use Only	0	0	0	16,836	16,836
Multifamily	0	0	0	18,816	18,816
Mutifamily Indoor Use Only	0	0	0	43,698	43,698
	-----	-----	-----	-----	-----
Total	\$0	\$0	\$0	\$1,295,347	\$1,295,347

Table 39  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Demand Charge Costs by Class

Customer Class	Flow	BOD	TSS	Customer	Total
FY2017:					
Residential	\$724,193	\$359	\$199	\$0	\$724,751
Commercial	74,092	37	20	0	74,149
Commercial Indoor Use Only	107,736	53	30	0	107,819
Multifamily	62,590	31	17	0	62,638
Mutifamily Indoor Use Only	106,395	53	29	0	106,477
	-----	-----	-----	-----	-----
Total	\$1,075,006	\$532	\$296	\$0	\$1,075,834
FY2018:					
Residential	\$684,776	\$341	\$190	\$0	\$685,307
Commercial	67,036	33	19	0	67,088
Commercial Indoor Use Only	96,926	48	27	0	97,001
Multifamily	160,664	80	44	0	160,788
Mutifamily Indoor Use Only	95,719	48	26	0	95,793
	-----	-----	-----	-----	-----
Total	\$1,105,121	\$550	\$306	\$0	\$1,105,977

Table 40  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Volume Charge Costs by Class

Customer Class	Flow	BOD	TSS	Customer	Total
FY2017:					
Residential	\$4,561,173	\$687,133	\$382,029	\$0	\$5,630,335
Commercial	466,652	70,300	39,085	0	576,037
Commercial Indoor Use Only	678,551	102,223	56,833	0	837,607
Multifamily	394,209	59,387	33,018	0	486,614
Mutifamily Indoor Use Only	670,104	100,950	56,126	0	827,179
	-----	-----	-----	-----	-----
Total	\$6,770,690	\$1,019,992	\$567,091	\$0	\$8,357,773
FY2018:					
Residential	\$4,339,639	\$657,861	\$365,755	\$0	\$5,363,255
Commercial	424,829	64,401	35,806	0	525,036
Commercial Indoor Use Only	614,248	93,116	51,770	0	759,134
Multifamily	1,018,177	154,349	85,814	0	1,258,340
Mutifamily Indoor Use Only	606,601	91,957	51,126	0	749,683
	-----	-----	-----	-----	-----
Total	\$7,003,493	\$1,061,684	\$590,271	\$0	\$8,655,448

Table 41  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Summary of Cost of Service by Customer Class

Customer Class	Flow	BOD	TSS	Customer	Total
FY2017:					
Residential	\$5,285,367	\$687,491	\$382,229	\$1,175,411	\$7,530,498
Commercial	540,744	70,337	39,106	18,184	668,370
Commercial Indoor Use Only	786,287	102,276	56,863	17,233	962,659
Multifamily	456,799	59,418	33,035	7,096	556,348
Mutifamily Indoor Use Only	776,498	101,003	56,155	44,731	978,386
	-----	-----	-----	-----	-----
Total	\$7,845,695	\$1,020,525	\$567,387	\$1,262,655	\$10,696,262
FY2018:					
Residential	\$5,024,416	\$658,202	\$365,944	\$1,197,800	\$7,246,362
Commercial	491,865	64,435	35,824	18,197	610,321
Commercial Indoor Use Only	711,173	93,164	51,797	16,836	872,970
Multifamily	1,178,841	154,429	85,859	18,816	1,437,945
Mutifamily Indoor Use Only	702,320	92,004	51,152	43,698	889,174
	-----	-----	-----	-----	-----
Total	\$8,108,614	\$1,062,234	\$590,576	\$1,295,347	\$11,056,772



Table 42  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Calculation of Unit Costs by Customer Class  
FY2017

Customer Class	Flow Per kgal	BOD Per Pound	TSS Per Pound	Customer Per Bill
Residential	\$7.24	\$0.33	\$0.15	\$5.28
Commercial	7.24	0.33	0.15	5.28
Commercial Indoor Use Only	7.24	0.33	0.15	5.28
Multifamily	7.24	0.33	0.15	5.28
Mutifamily Indoor Use Only	7.24	0.33	0.15	5.28

Table 43  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Calculation of Unit Costs by Customer Class  
FY2018

Customer Class	Flow Per kgal	BOD Per Pound	TSS Per Pound	Customer Per Bill
Residential	\$6.55	\$0.30	\$0.13	\$5.16
Commercial	6.55	0.30	0.13	5.16
Commercial Indoor Use Only	6.55	0.30	0.13	5.16
Multifamily	6.55	0.30	0.13	5.16
Mutifamily Indoor Use Only	6.55	0.30	0.13	5.16

Table 44  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Proposed Wastewater Volume Charges  
(\$/kgal)

Customer Class	FY2016	FY2017	FY2018
Residential	\$4.13	\$7.71	\$6.99
Commercial	4.13	7.71	6.99
Commercial Indoor Use Only	4.13	7.71	6.99
Multifamily	4.13	7.71	6.99
Mutifamily Indoor Use Only	4.13	7.71	6.99
Average Rate	\$4.13	\$7.71	\$6.99

Table 45  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Monthly Service Charges

Customer Class	Demand Charge per Equiv Meter	Customer Charge per Acct
FY2017:		
Residential	\$3.61	\$5.28
Commercial	3.61	5.28
Commercial Indoor Use Only	3.61	5.28
Multifamily	3.61	5.28
Mutifamily Indoor Use Only	3.61	5.28
FY2018:		
Residential	\$3.56	\$5.16
Commercial	3.56	5.16
Commercial Indoor Use Only	3.56	5.16
Multifamily	3.56	5.16
Mutifamily Indoor Use Only	3.56	5.16

Table 46  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Monthly Base Rate by Meter Size

Meter Size	Residential	Commercial	Commercial Indoor Use Only	Multifamily	Mutifamily Indoor Use Only
FY2017:					
3/4"	\$5.28	\$5.28	\$5.28	\$5.28	\$5.28
1"	5.28	5.28	5.28	5.28	5.28
1-1/2"	0.00	5.28	5.28	5.28	5.28
2"	0.00	5.28	5.28	5.28	5.28
3"	0.00	5.28	5.28	5.28	0.00
4"	0.00	0.00	5.28	5.28	0.00
6"	0.00	5.28	5.28	0.00	0.00
FY2018:					
3/4"	\$5.16	\$5.16	\$5.16	\$5.16	\$5.16
1"	5.16	5.16	5.16	5.16	5.16
1-1/2"	0.00	5.16	5.16	5.16	5.16
2"	0.00	5.16	5.16	5.16	5.16
3"	0.00	5.16	5.16	5.16	0.00
4"	0.00	0.00	5.16	5.16	0.00
6"	0.00	5.16	5.16	0.00	0.00

Table 47  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Monthly Demand Charge by Meter Size

Meter Size	Residential	Commercial	Commercial	Multifamily	Mutifamily Indoor
FY2017:					
3/4"	\$3.61	\$3.61	\$3.61	\$3.61	\$3.61
1"	14.64	14.64	14.64	14.64	14.64
1-1/2"	0.00	33.10	33.10	33.10	33.10
2"	0.00	47.56	47.56	47.56	47.56
3"	0.00	71.83	71.83	71.83	0.00
4"	0.00	0.00	292.76	292.76	0.00
6"	0.00	370.21	370.21	0.00	0.00
FY2018:					
3/4"	\$3.56	\$3.56	\$3.56	\$3.56	\$3.56
1"	14.44	14.44	14.44	14.44	14.44
1-1/2"	0.00	32.65	32.65	32.65	32.65
2"	0.00	46.92	46.92	46.92	46.92
3"	0.00	70.85	70.85	70.85	0.00
4"	0.00	0.00	288.79	288.79	0.00
6"	0.00	365.19	365.19	0.00	0.00

Table 48  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Total Monthly Service Charges by Meter Size

Meter Size		Residential	Commercial	Commercial	Multifamily	Mutifamily Indoor
FY2017:						
3/4"		\$8.89	\$8.89	\$8.89	\$8.89	\$8.89
1"	2.24	19.92	19.92	19.92	19.92	19.92
1-1/2"	1.93	0.00	38.38	38.38	38.38	38.38
2"	1.38	0.00	52.84	52.84	52.84	52.84
3"	1.46	0.00	77.11	77.11	77.11	0.00
4"	3.87	0.00	0.00	298.04	298.04	0.00
6"	1.26	0.00	375.49	375.49	0.00	0.00
FY2018:						
3/4"		\$8.71	\$8.71	\$8.71	\$8.71	\$8.71
1"	2.25	19.60	19.60	19.60	19.60	19.60
1-1/2"	1.93	0.00	37.81	37.81	37.81	37.81
2"	1.38	0.00	52.07	52.07	52.07	52.07
3"	1.46	0.00	76.01	76.01	76.01	0.00
4"	3.87	0.00	0.00	293.95	293.95	0.00
6"	1.26	0.00	370.35	370.35	0.00	0.00

Table 49  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Revenues Generated by COS Rates  
FY2016

Customer Class	Monthly Service Charge	Volume Charge	Total Revenue	Revenue Requirement	Surplus/ (Deficiency)
Residential	\$791,873	\$2,742,652	\$3,534,525	\$3,534,525	\$0
Commercial	12,604	304,616	317,220	317,220	0
Commercial Indoor Use Only	12,558	448,028	460,585	460,585	0
Multifamily	5,171	260,285	265,456	265,456	0
Mutifamily Indoor Use Only	13,389	369,534	382,923	382,923	0
	-----	-----	-----	-----	-----
Total	\$835,594	\$4,125,115	\$4,960,709	\$4,960,709	\$0



Table 50  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Revenues Generated by COS Rates  
FY2017

Customer Class	Monthly Service Charge	Volume Charge	Total Revenue	Revenue Requirement	Surplus/ (Deficiency)
Residential	\$1,979,607	\$5,630,335	\$7,609,942	\$7,530,498	\$79,444
Commercial	81,617	576,037	657,654	668,370	(10,716)
Commercial Indoor Use Only	94,237	837,607	931,844	962,659	(30,815)
Multifamily	47,738	486,614	534,352	556,348	(21,996)
Mutifamily Indoor Use Only	135,290	827,179	962,470	978,386	(15,917)
	-----	-----	-----	-----	-----
Total	\$2,338,489	\$8,357,773	\$10,696,262	\$10,696,262	(\$0)

Table 51  
Town of Castle Rock  
Wastewater Cost-of-Service Analysis  
Revenues Generated by COS Rates  
FY2018

Customer Class	Monthly Service Charge	Volume Charge	Total Revenue	Revenue Requirement	Surplus/ (Deficiency)
Residential	\$2,025,243	\$5,363,255	\$7,388,498	\$7,246,362	\$142,136
Commercial	83,153	525,036	608,188	610,321	(2,133)
Commercial Indoor Use Only	92,795	759,134	851,929	872,970	(21,041)
Multifamily	67,103	1,258,340	1,325,443	1,437,945	(112,502)
Mutifamily Indoor Use Only	133,031	749,683	882,714	889,174	(6,461)
	-----	-----	-----	-----	-----
Total	\$2,401,324	\$8,655,448	\$11,056,772	\$11,056,772	(\$0)

# APPENDIX H

Customer Characteristics Analysis Technical Memorandum





## TECHNICAL MEMORANDUM

**To:** Jennifer Ivey, Arcadis U.S., Inc. **Date:** September 1, 2016

**From:** Anne Glassman, Business Solutions Manager  
Jennifer Thompson, Enterprise Fund Analyst

**Re:** Customer Characteristics Analysis – 2016

Town of Castle Rock usage data has been internally prepared and analyzed for the cost-of-service 2016 Rates and Fees Study. Data was analyzed to determine assumptions such as the number of accounts by meter size and customer class along with their associated meter equivalency ratios. We calculated the representative customer by customer class to be used in presenting the comparison of adopted versus proposed rates on a representative customer's total annual utility bill. Data was also prepared to show water consumption by customer class by rate tier over time.

All tables in this study have been restated to show the actual number of meters versus the average number of meters and the actual consumption tables have been restated to show actual consumption versus the average consumption.

### **Water Utility Customers by Meter Size and Customer Class**

Table 1 shows the number of meters by meter size and customer class using 12 months of billing data (Jan15-Dec15). This shows that 18,737 customers were receiving Town water services during this capture period. The FY2014 accounts based on 12 months of billing data (Jan14-Dec14) showed 17,961 customers were receiving Town water services. There are 776 more accounts in the 2016 study versus the 2015 study.

<sup>1</sup> Latigo Multifamily Indoor Only 1.5-inch meter customers have been moved to 1-inch meter size for the Customer characteristics analysis in all tables presented in this document.

**Table 1: Water Utility Meters by Meter Size  
FY2015 Accounts based on 12 months of billing data (Jan15-Dec15)**

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	MultiFamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	502	-	4	-	19	-	-	525
3/4"	16,794	14	127	27	118	100	108	17,288
1"	12	25	71	-	85	64	71	328
1.5"	-	55	48	-	115	86	54	358
2"	-	15	24	-	82	40	40	201
3"	-	2	5	2	8	-	13	30
4"	-	1	-	-	2	-	2	5
6"	-	-	1	-	-	-	1	2
<b>Total</b>	<b>17,308</b>	<b>112</b>	<b>280</b>	<b>29</b>	<b>429</b>	<b>290</b>	<b>289</b>	<b>18,737</b>

**Table 2: Water Utility Meters by Meter Size  
FY2014 Accounts based on 12 months of billing data (Jan14-Dec14)**

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	MultiFamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	331	-	3	-	16	-	-	350
3/4"	16,224	14	127	28	116	100	105	16,714
1"	9	25	72	-	84	64	69	323
1.5"	-	54	48	-	109	79	48	338
2"	-	15	24	-	81	39	39	198
3"	-	2	5	3	8	-	13	31
4"	-	1	-	-	2	-	2	5
6"	-	-	1	-	-	-	1	2
<b>Total</b>	<b>16,564</b>	<b>111</b>	<b>280</b>	<b>31</b>	<b>416</b>	<b>282</b>	<b>277</b>	<b>17,961</b>

The difference in accounts is primarily due to an additional 744 residential accounts reported in the FY2015 billing data.

**Table 3: Water Utility Meters by Meter Size  
FY2017 Projected accounts based on 12 months of billing data (Jan15-Dec15)  
Plus projected growth for FY2016 & FY2017**

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	MultiFamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	694	-	4	-	21	416	-	1,135
3/4"	18,202	14	127	55	122	100	108	18,728
1"	12	25	79	-	85	64	71	336
1.5"	-	55	48	-	115	86	54	358
2"	-	15	30	-	82	40	40	207
3"	-	2	5	2	8	-	13	30
4"	-	1	-	-	2	-	2	5
6"	-	-	1	-	-	-	1	2
<b>Total</b>	<b>18,908</b>	<b>112</b>	<b>294</b>	<b>57</b>	<b>435</b>	<b>706</b>	<b>289</b>	<b>20,801</b>

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Table 3 shows FY2017 projected water utility accounts using 2015 billing data plus projected growth for 2016 and 2017. The FY2017 water accounts are projected to equal 20,773. Growth is projected for the following classes:

**2016:**

- 96 Residential 5/8"x 3/4" meter accounts
- 704 Residential 3/4" meter accounts (all single family detached units)
- 316 Multi-Family 5/8"x 3/4" meter accounts
- 4 Commercial 1" accounts
- 3 Commercial 2" accounts
- 1 Irrigation 5/8" x 3/4" accounts
- 2 Irrigation 3/4" x 3/4" accounts
- 28 Bulk 3/4" x 3/4" accounts
- 1,154 Total

**2017:**

- 96 Residential 5/8"x 3/4" meter accounts
- 704 Residential 3/4" meter accounts (all single family detached units)
- 100 Multi-Family 5/8"x 3/4" meter accounts
- 4 Commercial 1" accounts
- 3 Commercial 2" accounts
- 1 Irrigation 5/8" x 3/4" accounts
- 2 Irrigation 3/4" x 3/4" accounts
- 910 Total

Total growth of 1,154 accounts is projected for 2016 and 910 accounts for 2017 for a total of 2,064 projected for the water fund thru FY2017.

**Wastewater Utility Customers by Meter Size and Customer Class**

Table 4 shows customer meters by meter size and customer class using 12 months of billing data (Jan15-Dec15). This shows that 18,099 customers are receiving Town wastewater services. The FY2014 accounts based on 12 months of billing data (Jan14-Dec14) shows that 17,335 customers received Town wastewater services. There are 764 more accounts in the 2016 study versus the 2015 study.

**Table 4: Wastewater Utility Meters by Meter Size  
FY2015 Accounts based on 12 months of billing data (Jan15-Dec15)**

Meter Size	Residential	Multifamily	Commercial	MultiFamily	Commercial	Total
				Indoor Use Only	Indoor Use Only	
5/8"	502	-	4	-	-	506
3/4"	16,639	14	124	100	101	16,978
1"	11	25	68	64	66	234
1.5"	-	55	47	86	53	241
2"	-	15	24	40	38	117
3"	-	2	5	-	12	19
4"	-	1	-	-	1	2
6"	-	-	1	-	1	2
<b>Total</b>	<b>17,152</b>	<b>112</b>	<b>273</b>	<b>290</b>	<b>272</b>	<b>18,099</b>

**Table 5: Wastewater Utility Meters by Meter Size  
FY2014 Accounts based on 12 months of data (Jan14-Dec14)**

Meter Size	Residential	Multifamily	Commercial	MultiFamily	Commercial	Total
				Indoor Use Only	Indoor Use Only	
5/8"	331	-	3	-	-	334
3/4"	16,070	14	124	100	99	16,407
1"	8	25	69	64	64	230
1.5"	-	54	47	79	46	226
2"	-	15	24	39	37	115
3"	-	2	5	-	12	19
4"	-	1	-	-	1	2
6"	-	-	1	-	1	2
<b>Total</b>	<b>16,409</b>	<b>111</b>	<b>273</b>	<b>282</b>	<b>260</b>	<b>17,335</b>

Similar to the Water Fund, an additional 743 residential accounts were reported in the most recent billing data.

**Table 6: Wastewater Utility Meters by Meter Size**  
**FY2017 Projected accounts based on 12 months of billing data (Jan15-Dec15)**  
**Plus projected growth for FY2016 & FY2017**

Meter Size	Residential	Multifamily	Commercial	MultiFamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	694	-	4	416	-	1,114
3/4"	18,047	14	124	100	101	18,386
1"	11	25	76	64	66	242
1.5"	-	55	47	86	53	241
2"	-	15	30	40	38	123
3"	-	2	5	-	12	19
4"	-	1	-	-	1	2
6"	-	-	1	-	1	2
<b>Total</b>	<b>18,752</b>	<b>112</b>	<b>287</b>	<b>706</b>	<b>272</b>	<b>20,129</b>

Table 6 shows projected wastewater utility accounts using billing data (Jan15-Dec15) plus projected growth for 2016 and 2017. The FY2017 wastewater accounts are projected to equal 20,129. Growth is projected for the following classes:

**2016:**

- 96 Residential 5/8"x 3/4" meter accounts
- 704 Residential 3/4" meter accounts (all single family detached units)
- 316 Multi-Family 5/8"x 3/4" meter accounts
- 4 Commercial 1" accounts
- 3 Commercial 2" accounts
- 1,123 Total

**2017:**

- 96 Residential 5/8"x 3/4" meter accounts
- 704 Residential 3/4" meter accounts (all single family detached units)
- 100 Multi-Family 5/8"x 3/4" meter accounts
- 4 Commercial 1" accounts
- 3 Commercial 2" accounts
- 907 Total

Total growth of 1,123 accounts is projected for 2016 and 907 for 2017 for a total of 2,030 projected for the wastewater fund thru FY2017.



### **Water Resources Utility Customers by Meter Size and Customer Class**

Table 7 shows Water Resources customer meters by meter size and customer class based on 12 months of billing data (Jan15-Dec15). Table 8 shows Water Resources customer meters by meter size based on 12 months of billing data (Jan14-Dec14). There are 773 more accounts in the 2016 study versus the 2015 study.

**Table 7: Water Resources Utility Meters by Meter Size  
FY2015 Accounts based on 12 months of billing data (Jan15-Dec15)**

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	MultiFamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	502	-	4	-	19	-	-	525
3/4"	16,793	14	127	27	118	100	108	17,287
1"	12	25	71	-	85	64	70	327
1.5"	-	55	48	-	110	86	54	353
2"	-	15	24	-	77	40	40	196
3"	-	2	5	2	7	-	13	29
4"	-	1	-	-	2	-	1	4
6"	-	-	1	-	-	-	1	2
<b>Total</b>	<b>17,307</b>	<b>112</b>	<b>280</b>	<b>29</b>	<b>418</b>	<b>290</b>	<b>287</b>	<b>18,723</b>

**Table 8: Water Resources Utility Meters by Meter Size  
FY2014 Accounts based on 12 months of billing data (Jan14-Dec14)**

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	MultiFamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	331	-	3	-	16	-	-	350
3/4"	16,223	14	127	28	116	100	105	16,713
1"	9	25	72	-	84	64	68	322
1.5"	-	54	48	-	106	79	48	335
2"	-	15	24	-	77	39	39	194
3"	-	2	5	3	7	-	13	30
4"	-	1	-	-	2	-	1	4
6"	-	-	1	-	-	-	1	2
<b>Total</b>	<b>16,563</b>	<b>111</b>	<b>280</b>	<b>31</b>	<b>408</b>	<b>282</b>	<b>275</b>	<b>17,950</b>

**Table 9: Water Resources Utility Meters by Meter Size  
FY2017 Projected accounts based on 12 months of data (Jan15-Dec15)  
Plus projected growth for FY2016 & FY2017**

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	MultiFamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	694	-	4	-	21	416	-	1,135
3/4"	18,201	14	127	27	122	100	108	18,699
1"	12	25	79	-	85	64	70	335
1.5"	-	55	48	-	110	86	54	353
2"	-	15	30	-	77	40	40	202
3"	-	2	5	2	7	-	13	29
4"	-	1	-	-	2	-	1	4
6"	-	-	1	-	-	-	1	2
<b>Total</b>	<b>18,907</b>	<b>112</b>	<b>294</b>	<b>29</b>	<b>424</b>	<b>706</b>	<b>287</b>	<b>20,759</b>

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Table 9 shows FY2017 projected water resources fund accounts based on billing data (Jan15-Dec15) plus projected growth for 2016 and 2017. The FY2017 water resources accounts are projected to equal 20,759. Growth is projected for the following classes:

**2016:**

- 96 Residential 5/8"x 3/4" meter accounts
- 704 Residential 3/4" meter accounts (all single family detached units)
- 316 Multi-Family 5/8"x 3/4" meter accounts
- 4 Commercial 1" accounts
- 3 Commercial 2" accounts
- 1 Irrigation 5/8" x 3/4" accounts
- 2 Irrigation 3/4" x 3/4" accounts
- 1,126 Total

**2017:**

- 96 Residential 5/8"x 3/4" meter accounts
- 704 Residential 3/4" meter accounts (all single family detached units)
- 100 Multi-Family 5/8"x 3/4" meter accounts
- 4 Commercial 1" accounts
- 3 Commercial 2" accounts
- 1 Irrigation 5/8" x 3/4" accounts
- 2 Irrigation 3/4" x 3/4" accounts
- 910 Total

Total growth of 1,126 accounts is projected for 2016 and 910 for 2017 for a total of 2,036 projected for the water resources fund thru FY2017.

**Stormwater Utility SFEs**

Table 10 shows stormwater average monthly SFEs accounts based on 12 months of billing data (Jan15-Dec15). Table 11 shows Stormwater average monthly SFEs accounts based on 12 months of billing data (Jan14-Dec14).

**Table 10: Stormwater Utility Average Monthly SFEs for Billing Purposes  
2015 Accounts based on 12 months of billing data (Jan15-Dec15)**

Total Monthly SFE	
Residential	17,142
Non-Residential	13,747
Stormwater Customers	30,889

**Table 11: Stormwater Utility Average Monthly SFEs for Billing Purposes  
2014 Accounts based on 12 months of billing data (Jan14-Dec14)**

Total Monthly SFE	
Residential	16,388
Non-Residential	13,441
Stormwater Customers	29,828

**Table 12: Stormwater Utility Average Monthly SFEs for Billing Purposes  
FY2017 Projected accounts based on 12 months of billing data (Jan15-Dec15)  
Plus growth projections for FY2016 & FY2017**

Total Monthly SFE	
Residential	19,158
Non-Residential	14,087
Stormwater Customers	33,245

Table 12 shows FY2017 projected stormwater accounts based on 12 months of billing data (Jan15-Dec15) plus projected growth for 2016 and 2017. The FY2017 Stormwater SFE's are projected to equal 33,245. Growth is projected for the following classes:

**2016:**

- 1,116 Residential SFEs accounts
  - 80 Detached SFEs in Cherry Creek Basin
  - 1036 Detached SFEs in Plum Creek Basin
- 170 Commercial SFEs in the Plum Creek Basin

**2017:**

- 900 Residential SFEs accounts
  - 112 Detached SFEs in Cherry Creek Basin
  - 788 Detached SFEs in Plum Creek Basin
- 170 Commercial SFEs in the Plum Creek Basin

Total growth of 1,286 SFEs are projected for the Stormwater fund in 2016 and 1,070 SFEs are projected for 2017; SFE counts in Tables 10 through 12 have been rounded.

### **Water Usage Data for Meter Equivalency Factors**

The Town implemented an actual use meter equivalency schedule for assessing monthly service charges for water, wastewater, and water resources in 2010. Analysis of three years of water consumption by meter size serves as the basis for the actual use equivalencies. Equivalency factors were calculated by establishing the average use for all ¾" meters as the base unit and dividing the average use for larger meter sizes by the average use for ¾" meters.

Table 13 shows average water consumption by class and meter size for the updated 2016 analysis. Our analysis includes a three-year rolling average of water utility billing data. The latest data includes years 2013, 2014 and 2015. Table 14 shows the same data for years 2012, 2013 and 2014. Table 15 is the change between the 2015 and 2016 study.

**Table 13: 3 Yr. Average Water Consumption per Bill by Customer Class by Meter Size (2013, 2014, 2015 Calendar Year Billing Data)**

Meter Size	Residential	Multifamily	Commercial	Irrigation	MultiFamily	Commercial
					Indoor Use Only	Indoor Use Only
¾"	6.16	19.33	7.16	14.47	3.57	6.38
1"	11.72	32.69	29.26	27.16	13.23	28.72
1.5"	-	69.99	51.76	72.79	39.48	35.26
2"	-	80.86	82.44	88.11	75.98	72.98
3"	-	325.96	139.05	178.89	-	75.67
4"	-	470.55	-	472.81	-	514.77
6"	-	-	1,164.38	-	-	100.24

**Table 14: 3 Yr. Average Water Consumption per Bill by Customer Class by Meter Size (2012, 2013, 2014 Calendar Year Billing Data)**

Meter Size	Residential	Multifamily	Commercial	Irrigation	MultiFamily	Commercial
					Indoor Use Only	Indoor Use Only
¾"	6.54	19.48	6.83	14.06	3.61	6.77
1"	10.30	32.95	28.35	31.24	13.51	22.78
1.5"	-	66.88	53.46	72.41	39.73	35.31
2"	-	81.86	93.88	100.20	71.26	75.71
3"	-	325.17	152.20	192.18	-	79.77
4"	-	468.96	-	681.29	-	435.33
6"	-	-	1,172.50	-	-	109.52

**Table 15: Change in 3 Yr. Average Water Consumption per Bill by Customer Class by Meter Size (Change in Data from Table 13 and 14 above)**

Meter Size	Residential	Multifamily	Commercial	Irrigation	MultiFamily	Commercial
					Indoor Use Only	Indoor Use Only
3/4"	(0.38)	(0.15)	0.33	0.41	(0.05)	(0.39)
1"	1.43	(0.26)	0.91	(4.08)	(0.28)	5.94
1.5"	-	3.11	(1.70)	0.38	(0.25)	(0.05)
2"	-	(1.01)	(11.44)	(12.10)	4.72	(2.73)
3"	-	0.79	(13.15)	(13.28)	-	(4.10)
4"	-	1.59	-	(208.49)	-	79.44
6"	-	-	(8.12)	-	-	(9.29)

### **Meter Equivalencies Discussion**

Tables 16 through 18 provide a comparison of average consumption by meter size for accounts including the irrigation class compared with the average consumption excluding the irrigation class. Table 16 represents the results for the 2016 rate study data. Table 17 represents the results for the average consumption by meter size used in the 2015 rate study. Finally, Table 18 compares the two tables to determine if the current data is significantly different from what was analyzed in the 2015 rate study.

Tables 19 through 21 calculate and compare equivalency factors by customer class and meter size based on a ¾" single family residential customer. Equivalency factors are compared between the 2015 rate study results and the 2016 rate study update.

**Table 16: Average Water Consumption by Meter Size  
2016 Rate Study Update (2013, 2014, 2015 Calendar Year Billing Data)**

Meter Size	With Irrigation	Without Irrigation
3/4"	8.52	3.89
1"	35.32	14.75
1.5"	83.62	29.74
2"	122.36	40.74
3"	171.44	73.98
4"	511.97	488.09
6"	770.60	494.02

**Table 17: Average Water Consumption by Meter Size  
2015 Rate Study Update (2012, 2013, 2014 Calendar Year Billing Data)**

<b>Meter Size</b>	<b>With Irrigation</b>	<b>Without Irrigation</b>
<b>3/4"</b>	9.16	4.00
<b>1"</b>	35.69	14.44
<b>1.5"</b>	81.59	30.48
<b>2"</b>	127.12	46.46
<b>3"</b>	190.28	77.03
<b>4"</b>	520.36	372.72
<b>6"</b>	801.43	480.60

**Table 18: Change in Average Water Consumption by Meter Size  
(Change in Data from Table 16 to Table 17)**

<b>Meter Size</b>	<b>With Irrigation</b>	<b>Without Irrigation</b>
<b>3/4"</b>	(0.64)	(0.11)
<b>1"</b>	(0.37)	0.31
<b>1.5"</b>	2.03	(0.74)
<b>2"</b>	(4.76)	(5.71)
<b>3"</b>	(18.84)	(3.04)
<b>4"</b>	(8.39)	115.37
<b>6"</b>	(30.83)	13.43

**Table 19: Actual Use Equivalency Factors  
2016 Rate Study  
(2013, 2014, 2015 Calendar Year Billing Data)**

<b>Meter Size</b>	<b>Residential</b>	<b>Multifamily</b>	<b>Commercial</b>	<b>Irrigation</b>	<b>MultiFamily Indoor Use Only</b>	<b>Commercial Indoor Use Only</b>	<b>Equivalency Factor</b>
3/4"	1.00	3.14	1.16	2.35	0.58	1.04	1.00
1"	1.90	5.31	4.75	4.41	2.15	4.66	4.06
1.5"	-	11.36	8.40	11.82	6.41	5.73	9.18
2"	-	13.13	13.39	14.31	12.34	11.85	13.19
3"	-	52.93	22.58	29.05	-	12.29	19.92
4"	-	76.40	-	76.77	-	83.58	81.19
6"	-	-	189.06	-	-	16.28	102.67

**Table 20: Actual Use Equivalency Factors  
2015 Rate Study Update  
(2012, 2013, 2014 Calendar Year Billing Data)**

Meter Size	Residential	Multifamily	Commercial	Irrigation	MultiFamily	Commercial	Equivalency Factor
					Indoor Use Only	Indoor Use Only	
3/4"	1.00	2.98	1.04	2.15	0.55	1.03	1.00
1"	1.57	5.04	4.33	4.77	2.06	3.48	3.82
1.5"	-	10.22	8.17	11.07	6.07	5.40	8.55
2"	-	12.51	14.35	15.31	10.89	11.57	13.22
3"	-	49.70	23.26	29.37	-	12.19	20.43
4"	-	71.67	-	104.12	-	66.53	68.25
6"	-	-	179.20	-	-	16.74	97.97

**Table 21: Actual Use Equivalency Factors  
(Change in Data from Table 19 and Table 20)**

Meter Size	Residential	Multifamily	Commercial	Irrigation	MultiFamily	Commercial	Equivalency Factor
					Indoor Use Only	Indoor Use Only	
3/4"	-	0.16	0.12	0.20	0.03	0.00	0.00
1"	0.33	0.27	0.42	(0.36)	0.08	1.18	0.24
1.5"	-	1.14	0.23	0.75	0.34	0.33	0.63
2"	-	0.62	(0.96)	(1.01)	1.45	0.28	(0.03)
3"	-	3.23	(0.68)	(0.32)	-	0.09	(0.50)
4"	-	4.73	-	(27.35)	-	17.05	12.94
6"	-	-	9.86	-	-	(0.46)	4.70

Customers with atypical consumption skew the calculation of the equivalency factor, so therefore they are excluded from this data.

### **Calculating Representative Customers by Class**

The Town analyzed customer data for the years 2013, 2014 & 2015 to determine an average representative customer by class that will be used to represent the comparison of adopted rates versus proposed rates on representative customers' bills. The process included the following steps:

- Calculate and report the average consumption, total consumption, and consumption for irrigation season and winter season based on the most recent calendar year of water billing data (Jan15-Dec15).
- Select the most common meter size within each customer class and associated average consumption based on customer class and meter size.
- Select one customer per class from the data sample with both irrigation and winter period consumption to be a representative customer for those classes.
- Customers with atypical consumption have been removed from the calculation for a representative customer by class.

Results of the representative customer analysis are shown in Table 22. Average Winter Monthly Consumption (AWMC) is calculated for each customer by dividing the total water used in the months of November, December, January and February by four. This represents the amount of water for indoor use (Tier 1) and the amount of wastewater treated each month. The AWMC is reset annually on the April statement. For new customers until an individual AWMC is established, the customer class average is assigned for water and a \$36/SFE monthly fee is charged for wastewater. During this study period, for single-family residential customers, the average AWMC is 5,000 gallons (water available at Tier 1) and the monthly wastewater charge is \$36/SFE.

**Table 22: Representative Customer by Class**  
**2016 Rate Study based on 2015 Calendar Year Water Billing Data**

Customer Class	Meter Size	Total Consumption (kgal)	Average Monthly Consumption (Jan-Dec 2015) (kgal)	Average Winter Monthly Consumption (kgal)	Average Irrigation Monthly Consumption (kgal)
Residential	3/4"	68.48	6.16	3.88	8.44
Multifamily (with irrigation)	1.5"	962.49	69.99	50.74	89.25
Commercial (with irrigation)	3/4"	101.88	7.16	5.05	9.32
Irrigation	3/4"	183.35	14.47	1.67	27.35
Multifamily Indoor Use Only	3/4"	53.59	3.57	3.54	3.59
Commercial Indoor Use Only	3/4"	76.89	6.38	6.01	6.77

Table 22 uses 2015 calendar year water billing data to determine an average total consumption by customer class. Table 23 uses 2014 calendar year water billing data to determine an average total consumption by customer class. Table 24 is the change between the 2015 and 2016 study.

**Table 23: Representative Customer by Class**  
**2015 Rate Study based on 2014 Calendar Year Water Billing Data**

Customer Class	Meter Size	Total Consumption (kgal)	Average Monthly Consumption (Jan-Dec 2014) (kgal)	Average Winter Monthly Consumption (kgal)	Average Irrigation Monthly Consumption (kgal)
Residential	3/4"	71.67	6.54	4.00	9.10
Multifamily (with irrigation)	1.5"	776.24	66.88	49.95	83.81
Commercial (with irrigation)	3/4"	111.74	6.83	4.81	8.85
Irrigation	3/4"	181.25	14.06	1.73	26.57
Multifamily Indoor Use Only	3/4"	61.32	3.61	3.51	3.72
Commercial Indoor Use Only	3/4"	78.92	6.77	6.10	7.46



**Table 24: Representative Customer by Class  
(Change in Data from Table 22 and Table 23)**

Customer Class	Meter Size	Total Consumption (kgal)	Average Monthly Consumption (Jan-Dec 2013) (kgal)	Average Winter Monthly Consumption (kgal)	Average Irrigation Monthly Consumption (kgal)
Residential	3/4"	-3.19	-0.38	-0.12	-0.66
Multifamily (with irrigation)	1.5"	186.25	3.11	0.79	5.44
Commercial (with irrigation)	3/4"	-9.86	0.33	0.24	0.47
Irrigation	3/4"	2.10	0.41	-0.06	0.78
Multifamily Indoor Use Only	3/4"	-7.73	-0.04	0.03	-0.13
Commercial Indoor Use Only	3/4"	-2.03	-0.39	-0.09	-0.69

### Water Consumption by Tier

To compare the total water usage by rate tier over time, the following tables were prepared from 2013-2015 calendar year data. The comparison shows overall changes in customers' consumption characteristics and will be used to evaluate the composition of rate revenue by tier for future studies.

Billed usage is shown by customer class and tier. Revenues from billed usage in Tier 4 are directed to water conservation programs accounted for separately in the Water Resources Fund.

**Table 25: Billed Usage by Customer by Class and Tier in kgals  
January 2015 through December 2015 Billing Data**

<b>Winter</b>					
Class	Tier 1	Tier 2	Tier 3	Total	Tier 4
Commercial	38,474	9,309	-	47,783	-
Commercial w/ Irrigation	26,934	5,842	-	32,776	-
Irrigation	-	703	1,232	1,935	-
MultiFamily	32,673	5,123	-	37,796	-
MultiFamily w/ Irrigation	24,184	3,494	-	27,678	-
Residential	307,870	33,976	10	341,856	444
<b>Total Kgals</b>	<b>430,135</b>	<b>58,448</b>	<b>1,242</b>	<b>489,824</b>	<b>444</b>
Block % of Total	88%	12%	0%	100%	
<b>Irrigation</b>					
Class	Tier 1	Tier 2	Tier 3	Total	Tier 4
Commercial	55,452	18,845	-	74,297	-
Commercial w/ Irrigation	42,006	31,801	19,947	93,754	15
Irrigation	-	254,193	40,774	294,967	-
MultiFamily	47,922	9,282	-	57,204	-
MultiFamily w/ Irrigation	36,486	17,871	8,184	62,541	-
Residential	498,101	507,892	82,007	1,088,000	8,372
<b>Total Kgals</b>	<b>679,967</b>	<b>839,885</b>	<b>150,912</b>	<b>1,670,763</b>	<b>8,387</b>
Block % of Total	41%	50%	9%	100%	

**Table 26: Billed Usage by Customer by Class and Tier in kgals  
January 2014 through December 2014 Billing Data**

<b>Winter</b>					
Class	Tier 1	Tier 2	Tier 3	Total	Tier 4
Commercial	32,970	10,214	-	43,184	-
Commercial w/ Irrigation	26,163	5,352	-	31,515	-
MultiFamily	31,071	4,217	-	35,288	-
MultiFamily w/ Irrigation	24,091	3,011	-	27,102	-
Residential	297,046	30,113	15	327,174	1,016
<b>Total Kgals</b>	<b>411,342</b>	<b>53,822</b>	<b>1,847</b>	<b>467,011</b>	<b>1,016</b>
Block % of Total	88%	12%	0%	100%	
<b>Irrigation</b>					
Class	Tier 1	Tier 2	Tier 3	Total	Tier 4
Commercial	52,349	17,174	-	69,523	-
Commercial w/ Irrigation	38,818	31,320	17,002	87,140	25
MultiFamily	44,643	7,658	-	52,301	-
MultiFamily w/ Irrigation	35,458	18,202	5,742	59,402	-
Residential	480,987	482,378	46,472	1,009,837	6,497
<b>Total Kgals</b>	<b>709,483</b>	<b>735,081</b>	<b>87,746</b>	<b>1,532,310</b>	<b>6,522</b>
Block % of Total	46%	48%	6%	100%	

**Table 27: Billed Usage by Customer by Class and Tier in kgals  
January 2013 through December 2013 Billing Data**

<b>Winter</b>					
Class	Tier 1	Tier 2	Tier 3	Total	Tier 4
Commercial	28,752	7,148	-	35,900	-
Commercial w/ Irrigation	27,732	3,280	-	31,012	-
MultiFamily	31,181	3,847	-	35,028	-
MultiFamily w/ Irrigation	23,627	2,767	-	26,394	-
Residential	286,615	29,961	0	316,576	339
<b>Total Kgals</b>	<b>397,908</b>	<b>47,063</b>	<b>1,398</b>	<b>446,369</b>	<b>339</b>
Block % of Total	89%	11%	0%	100%	
<b>Irrigation</b>					
Class	Tier 1	Tier 2	Tier 3	Total	Tier 4
Commercial	42,184	24,558	-	66,742	-
Commercial w/ Irrigation	41,083	31,585	14,028	86,696	-
MultiFamily	44,984	6,468	29	51,481	-
MultiFamily w/ Irrigation	35,117	19,535	6,061	60,713	-
Residential	466,114	517,054	61,941	1,045,108	16,578
<b>Total Kgals</b>	<b>688,492</b>	<b>782,888</b>	<b>103,217</b>	<b>1,574,597</b>	<b>16,578</b>
Block % of Total	44%	50%	7%	100%	

**Table 28: Billed Usage by Customer by Class and Tier in kgals  
Calendar Year 2015 vs. Calendar Year 2014 Billing Data**

<b>Winter</b>					
Class	Tier 1	Tier 2	Tier 3	Total	Tier 4
Commercial	5,504	(905)	-	4,599	-
Commercial w/ Irrig.	771	490	-	1,261	-
Irrigation	(1)	(212)	(600)	(813)	-
MultiFamily	1,602	906	-	2,508	-
MultiFamily w/ Irrig.	93	483	-	576	-
Residential	10,824	3,863	(5)	14,682	(572)
<b>Total Kgals</b>	<b>18,793</b>	<b>4,625</b>	<b>(605)</b>	<b>22,813</b>	<b>(572)</b>
Block % of Total	0%	0%	0%	0%	
<b>Irrigation</b>					
Class	Tier 1	Tier 2	Tier 3	Total	Tier 4
Commercial	3,103	1,671	-	4,774	-
Commercial w/ Irrig.	3,188	481	2,945	6,614	(10)
Irrigation	(57,228)	75,845	22,243	40,860	-
MultiFamily	3,279	1,624	-	4,903	-
MultiFamily w/ Irrig.	1,028	(331)	2,442	3,139	-
Residential	17,114	25,514	35,535	78,163	1,875
<b>Total Kgals</b>	<b>(29,516)</b>	<b>104,804</b>	<b>63,165</b>	<b>138,453</b>	<b>1,865</b>
Block % of Total	-6%	2%	3%	0%	

**Table 29: Billed Usage by Customer by Class and Tier in kgals  
Calendar Year 2015 vs. Calendar Year 2013 Billing Data**

<b>Winter</b>					
Class	Tier 1	Tier 2	Tier 3	Total	Tier 4
Commercial	9,722	2,161	-	11,883	-
Commercial w/ Irrig.	(798)	2,562	-	1,764	-
Irrigation	(1)	643	(166)	476	-
MultiFamily	1,492	1,276	-	2,768	-
MultiFamily w/ Irrig.	557	727	-	1,284	-
Residential	21,255	4,016	9	25,280	105
<b>Total Kgals</b>	<b>32,227</b>	<b>11,385</b>	<b>(157)</b>	<b>43,455</b>	<b>105</b>
Block % of Total	-1%	1%	0%	0%	
<b>Irrigation</b>					
Class	Tier 1	Tier 2	Tier 3	Total	Tier 4
Commercial	13,268	(5,713)	-	7,555	-
Commercial w/ Irrig.	923	216	5,919	7,058	15
Irrigation	(59,011)	70,506	19,615	31,110	-
MultiFamily	2,938	2,814	(29)	5,723	-
MultiFamily w/ Irrig.	1,369	(1,664)	2,123	1,828	-
Residential	31,987	(9,162)	20,066	42,892	(8,207)
<b>Total Kgals</b>	<b>(8,525)</b>	<b>56,997</b>	<b>47,694</b>	<b>96,166</b>	<b>(8,192)</b>
Block % of Total	-3%	1%	2%	0%	