2017
RATES AND FEES STUDY UPDATE

VOLUME 1 OF 2

2018-2022 RATES

Prepared by Castle Rock Water
Business Solutions

Final Report

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Executive Summary

On an annual basis, Castle Rock Water (CRW) conducts a comprehensive rates and fees study for water, water resources, wastewater, and stormwater funds.

Project Purpose

The purpose of the rates and fees study is to calculate the cost-of-service (COS) based rates for each enterprise fund that meets the financial goals while being defensible and promoting water conservation. The annual rates and fees study update ensures that any changes in revenue requirements are accounted for based on changes in customer characteristics and both operational and capital costs.

Financial Management Plan

Starting in 2015, CRW prepared a Financial Management Plan (FMP) which has since been updated on an annual basis as part of this study. The FMP was completed to assist CRW in achieving 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 and variable revenues with expenses 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 our 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

Cost-of Service Analysis

Revenue Requirements

A long term financial plan is prepared to project the revenues required for each of CRW's four enterprise funds. The long-term financial plan allows the integration of debt, accumulation/use of reserves, and other assumptions to forecast financing of CRW's water system operations and maintenance (O&M) expenses and capital improvements for each respective enterprise. For each enterprise fund, the financial plan calculates the annual service charge revenue requirements. The projection period developed for each enterprise financial plan was driven by the length of the capital improvement program (CIP) and ends in 2055.

Although the projection period extends to 2055, revenue requirements and capital improvement programs are presented in this report only for the 2018 through 2022 study period for all four enterprise funds. The estimated 2018 total revenue requirements from rates are shown below.

2018 Total Revenue Requirements from Rates	
Water Fund	$14.2 Million
Water Resources	$9.1 Million
Wastewater	$10.4 Million
Stormwater	$3.0 Million

Rates and Fees Analysis

CRW updated COS rates for the water and wastewater enterprises, and monthly service charges for the water resources and stormwater enterprises, to meet the annual service charge revenue requirements. The rates and fees meet CRW's financial objectives while being defensible. The CRW's rates and fees goals as described in the FMP include:

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

CRW's rates are based on the cost of providing services and CRW's comprehensive review of current customer characteristics. A summary of the customer characteristics analysis is presented in Appendix C.

2017 Adopted Rates vs 2018 Proposed Rates by Fund

CRW's adopted rates for 2017 versus proposed rates for 2018 are listed in Tables 1 through 5. Given the financial plan and COS updates, CRW is not proposing an increase in monthly charges for 2018. CRW's water rate structure includes both a fixed monthly service charge by meter size and a volumetric charge based on tiered usage. Volumetric rates are stated per 1,000 gallons (Kgal). In the following tables Tier 1 is labeled AWMC, which stands for Average Winter Monthly Consumption.

Table 1 Water Fund 2017 Adopted vs 2018 Proposed Monthly Service Charges		
Meter Size	**2017 Adopted Monthly Charges**	**2018 Proposed Monthly Charges**
5/8" x ¾"	$9.54	$9.54
¾"	$9.54	$9.54
1"	$13.72	$13.72
1.5"	$18.78	$18.78
"	$26.00	$26.00
3"	$41.78	$41.78
4"	$94.12	$94.12
6"	$147.26	$147.26
Bulk Water Customers*	$9.54	$9.54

*Bulk water monthly service charge is equivalent to a ¾" meter size monthly service charge.

Tiered Rate Structure

Each account pays a fixed monthly water service charge, water resources charge and wastewater charge based on their individual meter size.
The volumetric water rate structure consists of three increasing tiered rates:

- Tier 1 = AWMC or Average Winter Monthly Consumption = Base COS rate (Typically considered indoor use)
- Tier 2 = Outdoor Usage = Base plus extra capacity rates by customer class (Typically considered outdoor use)
- Tier 3 = Excess use rate to recover the remaining revenue requirements

Residential accounts are subject to a water conservation surcharge for usage greater than 40 kgal per month (Tier 4). This surcharge is intended to send a conservation price signal to customers with excessive usage. The revenue collected from this tier is then used to fund conservation rebate programs.

For the volumetric rates shown in Table 2 below there is no proposed change from 2017 Adopted Rates to 2018 Proposed Rates.

Table 2 Water Fund 2017 Adopted and 2018 Proposed Volumetric Rates by Tier				
Irrigation Season (April 1 through October 31 Consumption)				
Customer Class	**Tier 1 AWMC**	**Tier 2 Outdoor**	**Tier 3 Excess**	**Tier 4 Surcharge**
Residential	$2.82	$5.53	$8.29	$8.29
Multi-Family	$2.82	N/A	$3.57	N/A
Multi-Family w/Irrigation	$2.82	$4.70	$7.04	N/A
Commercial	$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 Water	$5.07	N/A	N/A	N/A
Winter Season (November 1 through March 31 Consumption)				
Customer Class	**Tier 1 AWMC**	**Tier 2 Outdoor**	**Tier 3 Excess**	**Tier 4 Surcharge**
Residential	$2.82	N/A	$5.53	$8.29
Multi-Family	$2.82	N/A	$3.57	N/A
Multi-Family w/Irrigation	$2.82	N/A	$4.70	N/A
Commercial	$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 Water	$5.07	N/A	N/A	N/A

Table 3 Water Resources Fund 2017 Adopted vs 2018 Proposed Monthly Service Charges & Volumetric Rate		
Meter Size	**2017 Adopted Monthly Service Charges**	**2018 Proposed Monthly Service Charges**
5/8" x ¾"	$17.52	$17.52
¾"	$26.15	$26.15
1"	$99.11	$99.11
1.5"	$187.50	$187.50
2"	$313.54	$313.54
3"	$588.90	$588.90
4"	$1,502.32	$1,502.32
6"	$2,429.34	$2,429.34
Volumetric Rate - Bulk Water Customer, Per Kgal	$0.24	$0.24

Table 4 Wastewater Fund 2017 Adopted vs 2018 Proposed Monthly Service Charges and Volumetric Rate		
Meter Size	**2017 Adopted Monthly Service Charges**	**2018 Proposed Monthly Service Charges**
5/8" x ¾"	$9.30	$9.30
¾"	$9.30	$9.30
1"	$14.80	$14.80
1.5"	$21.46	$21.46
2"	$30.96	$30.96
3"	$51.72	$51.72
4"	$120.58	$120.58
6"	$190.48	$190.48
Volumetric Rate - All Customers, Per Kgal	$6.59	$6.59

Table 5 Stormwater Fund 2017 Adopted vs 2018 Proposed Monthly Service Charge		
	2017 Adopted Monthly Service Charge	**2018 Proposed Monthly Service Charge**
All Customers, per Single Family Equivalent (SFE)	$7.12	$7.12
SFE Assignment		
Customer Class	**Impervious Sq. Ft.**	**SFE**
Single Family Attached & Detached Customers	3,255	1
Non-Single Family (Multi-Family & Commercial Customers)	Parcel size times 80% imperviousness divided by 3,255 impervious sq. ft. per SFE = # of SFE's	

Proposed Rates for 2018 Through 2022

Rates for the five year study period (2018-2022) were projected using the cost of service model results for water and wastewater as well as the percentage rate revenue increases projected by the financial plan models for all four funds. Table 6 represents proposed rate revenue changes for 2018 through 2022.

Table 6 All Enterprise Funds Proposed Rate Revenue Percentage Increases 2018-2022				
Year	**Water**	**Water Resources**	**Wastewater**	**Stormwater**
2018	0%	0%	0%	0%
2019	0-3%	3.5%	0-3%	0-3%
2020	0-3%	3.5%	0-3%	0-3%
2021	0-3%	3.5%	0-3%	0-3%
2022	0-3%	3.5%	0-3%	0-3%

Long Term Financial Planning

Background

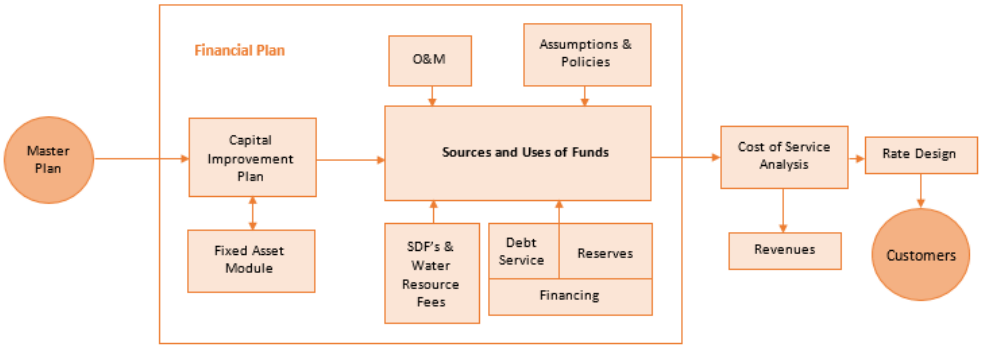
Castle Rock Water engaged Stantec Consulting Services, Inc. (Stantec) to assist in updating the comprehensive utility-specific financial plans that examine revenues, expenditures, debt service requirements, cash flows, reserve requirements, fund balances and capital project costs for the study period. The financial plan is used as the basis for projecting utility specific revenue requirements for the water, water resources, wastewater, and stormwater funds. 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 modeling assumptions is therefore vitally important in qualifying study results. The following sections discuss both the planning assumptions and methods of calculating revenue requirements for the purpose of the study.

Financial Planning Overview

The main function of the financial plan is to balance the sources and 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. CRW has an explicit financial goal to minimize risk by balancing fixed and variable revenues with expenses as appropriate. By identifying the planned uses of funds, CRW 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 2018. CRW's fiscal year is January 1, 2018 to December 31, 2018. The model includes projections of sources and uses of funds throughout the study period. Figure 1 provides a visual overview of the financial planning process followed by CRW and reviewed by Stantec. In addition to forecast assumptions, historical revenues and expenses, existing and planned debt service, and the current CIP serve as the basis for revenue requirement projections. Each step of the financial planning process is described individually in greater detail in the following sections.

Figure 1: Financial Planning Flowchart



Capital Improvements

Capital improvements are the planned investments in capital projects specific to each fund that are projected for the term of the corresponding utility's financial plan. Capital includes physical assets and infrastructure with a useful life greater than one year that meet all of CRW's established capitalization policy criteria. CRW also established a measureable goal to keep costs at or under budget for capital budgets each year by enterprise fund. Detailed CIPs were developed by CRW Engineers.

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, CRW also aims to keep costs at or under budget for operational budgets each year by fund and continuously strives towards more efficient operations.

Other Capital Funding Costs

Planned capital expenditures include monies needed to fund the major infrastructure projects for each fund through the study period. Capital funding costs are cash expenditures that the respective 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 projects' costs and the cost of funding repair and replacement reserves. A critical assumption for the water, water resources, and stormwater funds during the study period is that no new debt will be issued. Debt options are being explored in wastewater to finance the wastewater treatment plant expansion. The capital funding costs presented in this report include the impacts of the 3,500 acre-feet (AF) Hybrid renewable water supply option which Town Council approved in October 2012.

Revenue Requirements

Revenue requirements define the total amount of income CRW 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
2. The Revenues Required from Rates (Service Charge Revenue Requirements)

The revenue requirements of each enterprise 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.

Calibration of Financial Plan

There are five major tools one can utilize in optimizing the financial plan to meet revenue requirements while remaining aligned with CRW 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
5. Inter-Fund Loans

CRW has determined no new debt is expected to be issued for the water, water resources and stormwater funds in the near term, while possible new debt issuance is being explored in wastewater to fund the wastewater treatment plant expansion.

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 enterprise funds.

Table 7 represents projected system growth for each of the four enterprise funds. These assumptions were developed using projections given from the Town's Development Services Department which are updated each year.

Table 7 Projected SFEs and Percentage Growth by Fund								
	Water Fund		Water Resources Fund		Wastewater Fund		Stormwater Fund	
Year	SFEs	Percentage Growth	SFEs	Percentage Growth	SFEs	Percentage Growth	SFEs	Percentage Growth
2018	922	4.51%	922	4.51%	777	3.96%	1,058	3.19%
2019	921	4.31%	921	4.31%	776	3.80%	837	2.44%
2020	708	3.18%	708	3.18%	863	2.66%	1,062	3.03%
2021	846	3.68%	846	3.68%	701	3.22%	1,115	3.09%
2022	747	3.13%	747	3.13%	602	2.68%	1,062	2.85%

The escalation factors used in this study are defined in Appendix B.

Water Fund

The water fund financial plan projects the water fund's sources and uses of funds from 2018-2055. The water fund financial model developed for this study contains four sub-funds:

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

Sources of Funds

Sources of funds include all cash inflows to the water fund. These include service charge revenues, miscellaneous income, contributed cash-capital, and interest earnings. The assumptions for specific sources of funding are provided below. Detailed definitions are given in Appendix B.

- System Growth – Table 7 represents projected system growth for water.
- Rate Revenue Increases – Rate revenues are projected to increase each year based on Town growth and usage. Rate increases are not a factor for rate revenue increase for the water fund.
- System Development Fee (SDF) Revenues – SDFs are projected to increase each year based on growth in the Town. These are shown in more detail in Volume 2.
- Revenue Bonds – No new debt is planned for water in the study period.
- Inter-Fund Loans – The 2014 Inter-Fund loan from water to stormwater will be paid back in 2019.

- Other Revenues – For the study period, the water fund other revenues are presented in Table 8 below and include the following categories:
    - Other Charges for Service/Fees include costs for bulk hydrant backflow inspections, bulk hydrant meter calibrations, bulk hydrant meter repairs, bulk hydrant permit fees, disconnect/reconnect fees, curb stop variance fees, meter test fees, service transfer fees, etc.
    - Contributions and Donations include revenues from developer contributions.
    - Fines and Forfeitures include disconnection notice fees, late charges, lien administrative fees, lien filing fees, NSF charges and shut off fees.
    - IGA Revenues include revenues received from various IGAs.
    - Miscellaneous Revenues include proceeds from sale of assets, reimbursements, sale of recycled materials, tower leases, water leases and vending machine commission.
    - Interest Earnings include interest received on balances in the bank assumed at 0.40%.

Table 8
Water Fund
Other Revenues

Other Revenues	FY2018	FY2019	FY2020	FY2021	FY2022
Other Charges for Service/Fees	$530,786	$549,364	$568,591	$588,492	$609,089
Contributions and Donations	$30,000	$31,050	$32,137	$33,262	$34,426
Fines and Forfeitures	$369,700	$382,640	$396,032	$409,893	$424,239
IGA Revenues	$125,000	$129,375	$133,903	$138,590	$143,440
Miscellaneous Revenues	$193,160	$199,920	$206,917	$214,160	$221,655
Interest Earnings	$39,949	$40,369	$41,744	$40,854	$50,080
Total	**$1,288,594**	**$1,332,717**	**$1,379,324**	**$1,425,250**	**$1,482,930**

- Fund Balances – The water fund is projected to have a reserve fund balance of approximately $7.6 million at the beginning of 2018, not including capital reserve funds. Each reserve 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 Reserve – 60 days of O&M; increasing from approximately $2.5 to $2.8 million throughout the study period.
    - Capital Reserve – Obligated reserves vary from year to year, depending on the Capital Improvement Plan. The fund maintains a minimum unobligated reserve balance of $1.0 million throughout the study period.
    - Catastrophic Failure Reserve – Approximately 2% of original fixed asset value, averaging $3.8 million throughout the study period.

- Rate Revenue Stabilization Reserve – Based upon 10% of metered water sales; averaging approximately $1.3 million in the study period. The 10% is consistent with the variance in rainfall from year to year.

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

Uses of Funds

Uses of funds include all expenditures, either operating or capital and any reserve requirement or increase in fund balance CRW plans to achieve. The major assumptions for uses of funds are as follows. Detailed definitions for each are located in Appendix B.

- Operating Expenses – For the water fund most operating costs are fixed; meaning not varying based on the volume of water sold; with the exception of energy, treatment chemicals and certain other supplies, which vary with production.
- Personnel Services – The water fund projects about 9 new FTEs throughout the study period.
- Supplies – The supplies for the water fund are expected to remain consistent over the five year study period at about $1.3 million a year.
- Energy Costs – Over the 5 year study period these are expected to increase at a rate higher than inflation at approximately 7%.
- Capital Improvements – Total water system capital improvement costs from 2018-2022 are expected to be $29.9 million in today's dollars. Only improvements that provide benefits to existing customers are included in revenue requirements. Improvements to serve growth are funded from SDFs.
- Capital Replacement and Rehabilitation – These are capital costs to replace existing capital assets. Total capital costs for existing customers over the five year study period are approximately $10.0 million.
- Inter-Fund Loans – The water fund does not have an Inter-Fund loan balance that it is paying on at this time as an expense.
- Transfers Out – These include the costs for the vehicle replacement fund which is transferred to the fleet department and is about $1.0 million over the five year period.
- PCWPF Water Treatment Charges – These are the charges that are transferred to and paid for by the Water Resources fund.
- Fund Balances – When fund balances are drawn down from initial balances, the use of those funds is a source of funding to cover water fund expenses. When it is building the fund balance it is a use of funds as cash is added to the water operating fund. These are projected to be kept at an acceptable level of working capital, which is a minimum of 60 days O&M in the operating reserve. This also conforms to the FMP goal to keep adequate reserves and maintain fund balances between minimums and maximums.
- Debt Service – 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 through 2023 and then drops down to approximately $700,000 through 2026.

- Debt Service Coverage – The debt service coverage ratio in the model is set to 1.2 times the total annual debt service amount, which is about $2.1 million. This is a bond covenant requirement.

Service 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 service charge revenue 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 9 represents the water fund service charge revenue requirements for 2018-2022.

Table 9
Water Fund
Service Charge Revenue Requirements

Other Revenues	FY2018	FY2019	FY2020	FY2021	FY2022
Operating and Maintenance	$8,955,178	$9,359,979	$9,977,007	$10,250,756	$10,750,922
PCWPF Water Treatment Charges	$1,560,167	$1,651,517	$1,785,128	$1,837,035	$1,971,001
Debt Service	$1,746,879	$1,752,251	$1,734,394	$1,741,190	$1,740,010
Transfers Out	$244,502	$246,195	$24,768	$249,757	$254,112
Cash Funded Capital	$6,536,152	$330,200	$5,991,573	$834,127	$901,850
Minor Capital Outlay	$226,482	$226,532	$226,532	$226,532	$226,532
Change in Fund Balance	($3,042,076)	$3,307,580	($3,032,651)	$2,176,265	$2,025,925
Total Expenditures	**$16,227,283**	**$16,874,254**	**$16,706,751**	**$17,315,663**	**$17,870,353**
Non-Rate Revenues	($1,288,594)	($1,332,717)	($1,379,324)	($1,425,250)	($1,482,930)
Transfers In	($695,250)	($685,125)	$0	$0	$0
Revenues Required from Rates	**$14,244,516**	**$14,858,309**	**$15,330,149**	**$15,893,959**	**$16,391,790**

Water Resources Fund

The water resources fund financial plan projects the fund's sources and uses of funds from fiscal year 2018 through 2055. As noted previously, the results presented for the water resources fund include the impacts of the renewable water supply plan for the 3,500 AF Hybrid proposal authorized by Town Council in October 2012. The water resources fund financial model developed in this study has three sub-funds:

- Operating Reserve
- Capital Reserve
- Catastrophic Failure Reserve

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

Sources of Funds

The sources of funds include all cash inflows to the operating funds. These include service charge revenues, miscellaneous income, contributed cash-capital, and interest earnings. The major assumptions for specific sources of funding are provided below and detailed definitions are given in Appendix B.

- System Growth – Table 7 represents the projected system growth for water resources.
- Rate Revenue Increases – There are no rate revenue increases for 2018 with 3.5% projected increases from 2019 to 2022.
- SDF Revenues – Please see Volume 2 for current projections.
- Revenue Bonds – During the 2018-2022 study period no new debt is planned.
- Inter-Fund Loans – There were no loans payable to the water resources fund.
- Other Revenues – For the study period the water resources fund other revenues are presented in Table 10 below.
    - PCWPF Reimbursement Revenue is a transfer in from the water fund for costs related to PCWPF.
    - Fines and Forfeitures include the lien administrative fee, the water surcharge and water violation revenues.
    - Miscellaneous Revenues includes lease interest, miscellaneous revenues and vending machine commission.
    - Interest Earnings include interest received on balances in the bank assumed at 0.40%.

Table 10 Water Resources Fund Other Revenues					
Other Revenues	**FY2018**	**FY2019**	**FY2020**	**FY2021**	**FY2022**
PCWPF Reimbursement Revenue	$1,560,167	$1,651,517	$1,785,128	$1,837,035	$1,971,001
Fines and Forfeitures	$12,000	$12,420	$12,855	$13,305	$13,770
Miscellaneous Revenues	$130,202	$134,759	$139,476	$144,357	$149,410
Interest Earnings	$96,927	$49,385	$78,626	$113,937	$163,623
Market Change	($211,425)	($211,425)	($211,425)	($211,425)	($211,425)
Total	**$1,587,871**	**$1,636,656**	**$1,804,659**	**$1,897,209**	**$2,086,379**

- Fund Balances – The water resources fund was projected to have a reserve of approximately $38.9 million at the beginning of 2018, 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 Reserve – 60 days of O&M; increasing from approximately $1.8 million to $2.3 million in the study period.
    - Capital Reserve – Obligated reserves vary from year to year; depending on the CIP. The fund maintains a minimum unobligated reserve of $500,000 throughout the study period.
    - Catastrophic Failure Reserve – Approximately 2% of original fixed asset value averaging about $1.1 million in the study period.

The financial plan calls for maintaining the balances above and using net available capital reserve fund balance to offset short-term capital needs.

Uses of Funds

Uses of funds include all the same components as listed above in the water fund. The major assumptions for uses of funds are shown below. For detailed definitions see Appendix B.

- Operating Costs – For the water resources fund most operating costs are fixed.
- Personnel Services – The water resources fund projects about 9 new FTEs throughout the study period.
- Supplies – For the water resources fund supplies are projected to be $365,000 per year over the five year study period.
- Capital Improvements – Total water resources system capital improvement costs from 2018-2022 are expected to be $71.5 million in today's dollars. Only improvements that

provide benefits to existing customers are included in revenue requirements. Improvements to serve growth are funded from SDFs.

- Capital Replacement and Rehabilitation – These are capital costs to replace existing capital assets. Total capital costs for existing customers over the five year study period are approximately $1.5 million.
- Inter-Fund Loans – The fund does not have an inter-fund loan balance at this time.
- Transfers Out – These include the costs for the vehicle replacement fund which is transferred to the fleet department and is about $25,000 over the five year period.
- Fund Balances – For the study, it is assumed that the fund balances will not drop below the requirements presented in the above section.
- Debt Service – The fund currently has the 2016 revenue bonds which refunded the 2008 Certificates of Participation (COPs). The existing debt service amounts to an average of $4.5 million per year from 2018 to 2034.
- Debt Service Coverage – The debt service coverage ratio in the model is set to 1.2 times the total annual debt service amount, which is about $5.1 million.

Service Charge Revenue Requirements

Table 11 represents the water resources fund service charge revenue requirements for the study period 2018 through 2022.

Table 11
Water Resources Fund
Service Charge Revenue Requirements

Other Revenues	FY2018	FY2019	FY2020	FY2021	FY2022
Operating and Maintenance	$7,856,652	$8,550,350	$9,190,925	$10,000,118	$10,648,838
Debt Service	$4,265,747	$4,288,247	$4,315,247	$4,328,247	$4,353,022
Transfers Out	$4,951	$4,951	$4,951	$4,951	$4,951
Cash Funded Capital	$30,114,832	$0	$0	$0	$0
Change in Fund Balance	($31,586,863)	($1,417,421)	($1,252,404)	($1,217,979)	($945,784)
Total Expenditures	**$10,655,319**	**$11,426,119**	**$12,258,711**	**$13,115,328**	**$14,061,019**
Non-Rate Revenues	($27,704)	$14,861	($19,531)	($60,174)	($115,377)
PCWPF Reimbursement	($1,560,167)	($1,651,517)	($1,785,128)	($1,837,035)	($1,971,001)
Revenues Required from Rates	**$9,067,449**	**$9,789,463**	**$10,454,051**	**$11,218,119**	**$11,974,640**

Wastewater Fund

The wastewater fund financial plan projects the fund's source and uses of funds from 2018 through 2055. The three sub-funds include:

- Operating Reserve
- Capital Reserve
- Catastrophic Failure Reserve

Sources of Funds

The sources of funds include all cash inflows to the operating funds. These include service charge revenues, miscellaneous income, contributed cash-capital, and interest earnings. The major assumptions for specific sources of funding are provided below and detailed definitions are given in Appendix B.

- System Growth – Table 7 represents the projected system growth for wastewater.
- Rate Revenue Increases – There are no rate revenue increases planned for 2018 to 2022.
- SDF Revenues – Please see Volume 2 for current projections.
- Revenue Bonds – During 2018-2022 possible new debt options are being reviewed to help fund the wastewater treatment plant expansion.
- Inter-Fund Loans – There are currently no existing or projected loans payable to the fund.
- Other Revenues - For the study period, the wastewater fund other revenues are presented in Table 12 below.
    - Contributions and Donations include developer contributions expected.
    - Fines and Forfeitures include lien administrative fees.
    - Miscellaneous Revenues include reimbursements, vending machine commissions and other miscellaneous revenues.
    - Interest Earnings include interest received on balances in the bank assumed at 0.40%.

Table 12
Wastewater Fund
Other Revenues

Other Revenues	FY2018	FY2019	FY2020	FY2021	FY2022
Contributions and Donations	$29,510	$30,543	$31,612	$32,718	$33,863
Fines and Forfeitures	$100	$104	$107	$111	$115
Miscellaneous Revenues	$132,240	$136,868	$141,659	$146,617	$151,748
Interest Earnings	$51,891	$19,587	$21,078	$33,336	$50,585
Total	**$213,741**	**$187,101**	**$194,455**	**$212,782**	**$236,311**

- Fund Balances – The wastewater fund was projected to have a reserve of approximately $1.1 million at the beginning of 2018, not including capital reserve funds. Each of the sub-funds in the financial plan have 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 Reserve – 60 days of O&M; increasing from approximately $2.4 million in the study period.
    - Capital Reserve – Obligated reserves vary from year to year; depending on the CIP. The fund maintains a minimum unobligated reserve of $1.0 million throughout the study period.
    - Catastrophic Failure Reserve – Approximately 2% of original fixed asset value averaging about $1.5 million in the study period.

The financial plan calls for maintaining these balances above and using net available capital reserve fund balance to offset short-term capital needs.

Uses of Funds

Uses of funds include all the same components as listed above in the water fund. The major assumptions for uses of funds are shown below. For detailed definitions see Appendix B.

- Operating Costs – For the wastewater fund most operating costs are fixed.
- Personnel Services – The wastewater fund projects about 4 new FTEs throughout the study period.
- Energy Costs – Over the 5 year study period these are expected to increase at a rate higher than inflation at about 7%.
- Capital Improvements – Total wastewater system capital improvement costs from 2018-2022 are expected to be $40.8 million in today's dollars. Only improvements that provide benefits to existing customers are included in revenue requirements. Improvements to serve growth are funded from SDFs.
- Capital Replacement and Rehabilitation – These are capital costs to replace existing capital assets. Total capital costs for existing customers over the five year study period are approximately $4.6 million.
- Inter-Fund Loans – The fund does not have an inter-fund loan balance at this time.
- Transfers Out – These include the costs for the vehicle replacement fund which is transferred to the fleet department and is about $375,000 over the five year study period.
- Fund Balances – For the study, it is assumed that the fund balances will not drop below the requirements presented in the above section.
- Debt Service – The fund currently has the 2012 revenue bond, which is a refinancing of a 2004 revenue bond series. The principal and interest payments equal approximately $333,000 annually from 2018 through 2024. New debt is possible in 2019 to fund the wastewater treatment plant expansion.
- Debt Service Coverage – The debt service coverage ratio in the model is set to 1.2 times the total annual debt service amount, which is about $400,000. This is a bond requirement.

Service Charge Revenue Requirements

Table 13 represents the wastewater fund service charge revenue requirements for the study period 2018 through 2022.

Table 13 Wastewater Fund Service Charge Revenue Requirements					
Other Revenues	**FY2018**	**FY2019**	**FY2020**	**FY2021**	**FY2022**
Operating and Maintenance	$8,019,331	$8,425,079	$8,905,025	$8,581,754	$7,355,462
Debt Service	$333,546	$335,274	$331,356	$333,660	$332,040
Transfers Out	$72,243	$72,243	$72,644	$72,644	$72,644
Cash Funded Capital	$0	$14,092,686	$0	$0	$0
Minor Capital Outlay	$94,750	$79,750	$79,750	$79,750	$79,750
Change in Fund Balance	$2,044,944	($72,117)	$1,838,333	$2,534,489	$4,092,655
Total Expenditures	**$10,564,814**	**$22,932,916**	**$11,227,109**	**$11,602,296**	**$11,932,551**
Non-Rate Revenues	($213,902)	($12,188,572)	($197,324)	($217,104)	($242,145)
Transfers In	$0	$0	$0	$0	$0
Revenues Required from Rates	**$10,350,912**	**$10,744,344**	**$11,029,785**	**$11,385,192**	**$11,690,406**

Stormwater Fund

The stormwater fund financial plan projects the fund's source and uses of funds from 2018 through 2055. The three sub-funds include:

- Operating Reserve
- Capital Reserve
- Catastrophic Failure Reserve

Sources of Funds

The sources of funds include all cash inflows to the operating funds. These include service charge revenues, miscellaneous income, contributed cash-capital, and interest earnings. The major assumptions for specific sources of funding are provided below and definitions are given in Appendix B.

- System Growth – Table 7 represents the projected system growth for stormwater.

- Rate Revenue Increases – There are no rate revenue increases planned for 2018 to 2022.
- System Development Fee (SDF) Revenues - Please see Volume 2 for current projections.
- Revenue Bonds – During 2018-2022 no new debt is planned.
- Inter-Fund Loans – There were no loans payable to the fund.
- Other Revenues – For the study period, the stormwater fund other revenues are presented in Table 19 below.
    - DESC/GESC Fees include DESC inspection fees, GESC inspection fees, and GESC plan check fees.
    - Other Fees include inspection fees, stormwater capital charge and stormwater charges.
    - Developer Contributions include contributions from developers.
    - Fines and Forfeitures include the lien administrative fee.
    - Miscellaneous Revenues include vending machine commissions and other miscellaneous revenues.
    - Interest Earnings include interest received on balances in the bank assumed at 0.40%.

Table 19
Stormwater Fund
Other Revenues

Other Revenues	FY2018	FY2019	FY2020	FY2021	FY2022
DESC/GESC Fees	$293,237	$303,500	$314,123	$325,117	$336,496
Other Fees	$27,495	$28,457	$29,453	$30,484	$31,551
Developer Contributions	$2,315	$2,396	$2,480	$2,567	$2,657
Fines and Forfeitures	$150	$155	$161	$166	$172
Miscellaneous Revenues	$7,652	$7,920	$8,197	$8,484	$8,781
Interest Earnings	$24,443	$23,818	$24,703	$28,783	$28,951
Market Change	$29,759	$29,759	$29,759	$29,759	$29,759
Total	**$383,631**	**$391,712**	**$401,628**	**$415,064**	**$424,927**

- Fund Balances – The stormwater fund was projected to have a reserve of approximately $2.2 million at the beginning of 2018, not including capital reserve funds. Each of the sub-funds in the financial plan have 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 Reserve – 60 days of O&M; increasing from approximately $950,000 in the study period.

- Capital Reserve – Obligated reserves vary from year to year; depending on the CIP. The fund maintains a minimum unobligated reserve of $500,000 throughout the study period.
- Catastrophic Failure Reserve – Approximately 2% of original fixed asset value averaging about $900,000 in the study period.

The financial plan calls for maintaining these balances above and using net available capital reserve fund balance to offset short-term capital needs.

Uses of Funds

Uses of funds include all the same components as listed above in the water fund. The major assumptions for uses of funds are shown below. For detailed definitions see Appendix B.

- Operating Costs – For the stormwater fund most operating costs are fixed.
- Personnel Services – The stormwater fund projects about 5 new FTEs throughout the study period.
- Supplies – The supplies for the water fund are expected to remain consistent over the five year study period at about $85,000 a year.
- Energy Costs – Over the 5 year study period these are expected to increase at a rate higher than inflation at about 7%.
- Capital Improvements – Total stormwater system capital improvement costs from 2018-2022 are expected to be $16.4 million in today's dollars. Only improvements that provide benefits to existing customers are included in revenue requirements. Improvements to serve growth are funded from SDFs.
- Capital Replacement and Rehabilitation – These are capital costs to replace existing capital assets. Total capital costs for existing customers over the five year study period are approximately $775,000.
- Transfers Out – These include the costs for the vehicle replacement fund which is transferred to the fleet department and is about $550,000 over the five year study period.
- Inter-Fund Loans – The 2014 inter-fund loan to stormwater from water is scheduled to be repaid in 2019, see Transfers Out in Table 20.
- Fund Balances – For the study, it is assumed that the fund balances will not drop 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.

Service Charge Revenue Requirements

Table 15 represents the stormwater fund service charge revenue requirements for the study period 2018 through 2022.

Table 15 Stormwater Fund Service Charge Revenue Requirements					
Other Revenues	**FY2018**	**FY2019**	**FY2020**	**FY2021**	**FY2022**
Operating and Maintenance	$2,397,576	$2,504,695	$2,668,254	$2,795,862	$3,073,648
Transfers Out	$806,478	$796,486	$111,729	$111,729	$118,475
Cash Funded Capital	$0	$0	$0	$513,379	$1,643,367
Change in Fund Balance	$224,465	$209,859	$835,448	$307,084	($1,003,099)
Total Expenditures	**$3,428,519**	**$3,511,040**	**$3,615,431**	**$3,728,054**	**$3,832,392**
Non-Rate Revenues	($355,292)	($366,247)	($379,117)	($395,601)	($408,608)
Transfers In	$0	$0	$0	$0	$0
Revenues Required from Rates	**$3,044,888**	**$3,119,328**	**$3,213,803**	**$3,312,990**	**$3,407,465**

Water and Wastewater Cost-of-Service Analysis

Introduction

Part of the study 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 volumetric rates by customer class that equitably distribute the ongoing water and wastewater costs across customer classes.

Cost-of-Service Methodology

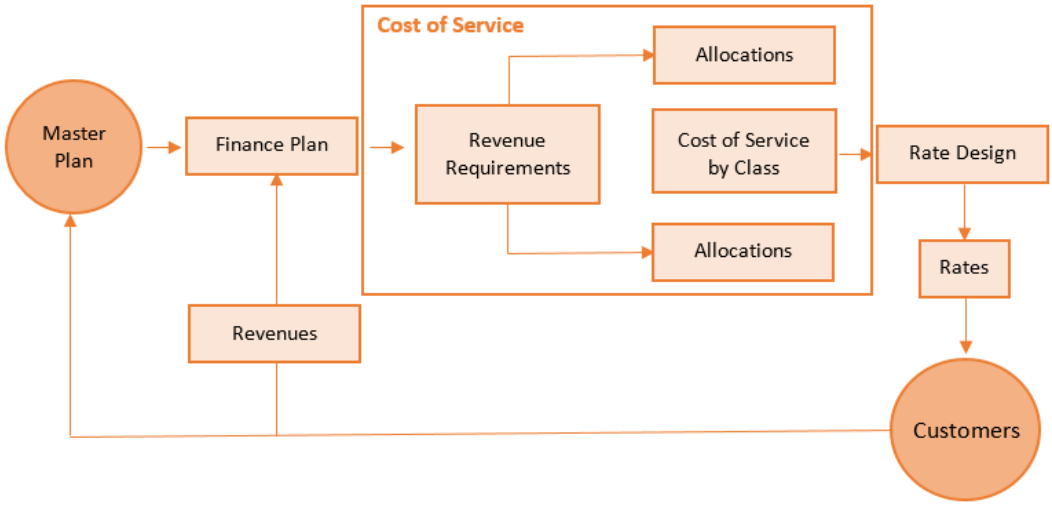
The basic philosophy behind a COS methodology is that utilities should be self-sustaining enterprises that are adequately financed with rates that are based on sound engineering and economic principles. In addition, rates should be equitable and proportionate to the costs of providing service to a given 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 2 illustrates the flow of information involved in developing COS rates. More specifically, the steps required to develop COS rates include:

- Determination of the systems' annual revenue requirements (i.e., costs)

- Determination of service charge revenue requirements
- Analysis of customer demands and characteristics
- Allocation of service charge revenue requirements by type of customer classes

- Design of rates Figure 2: Cost-of-Service Process



The COS process utilizes information generated in the financial plan, as discussed above in the water and wastewater sections. 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. One key function of the financial plan is to give management a tool to evaluate the impact of the costs of capital projects on service charges, debt, fund balances, etc. A major result of the financial plan is the annual service 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 service charge revenue requirements among CRW's customer classes to determine the cost of service by class.

The financial plan attempts to balance cash sources and uses through 2055; however, the analysis focuses on the water and wastewater system revenue requirements for a single test year with two projected years. The main goal was to determine rates for recommendation in 2018. Revenue requirements for 2018 through 2022 were obtained from the financial plans developed for CRW.

The steps of the COS process area as follows.

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-need approach followed by most governmental-type entities, total revenue requirements typically equal:

- O&M Expenses
- Debt Service
- Cash-Funded Capital Expenditures
- Transfers to Reserves

Determination of Service 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 revenue or other system revenue. Other system revenues are defined as all revenues except those derived from water and wastewater rates.

Analysis of Flows and Usage Characteristics

Analyzing annual consumption and flows in the system and other usage characteristics begins with a review of the individual customer classes. CRW currently provides water services to seven customer classes:

- Residential
- Multifamily (with irrigation)
- Multifamily Indoor Use Only
- Commercial (with irrigation)
- Commercial Indoor Use Only
- Irrigation
- Bulk Water

CRW currently provides wastewater to five customer classes:

- Residential
- Multifamily (with irrigation)
- Multifamily Indoor Use Only
- Commercial (with irrigation)
- Commercial Indoor Use Only

The commercial class includes such customers as schools, churches and the non-irrigation accounts. The irrigation class includes all irrigation-only accounts.

To equitably allocate the service 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, AWMC, average summer monthly consumption and the number of customers by meter size and customer class are analyzed.

Customer Characteristics

CRW's customer characteristics that are analyzed in the study include the following for the water system. These are further defined in Appendix C.

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

For wastewater the analyzed customer characteristics are shown below and are further defined in Appendix C.

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

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

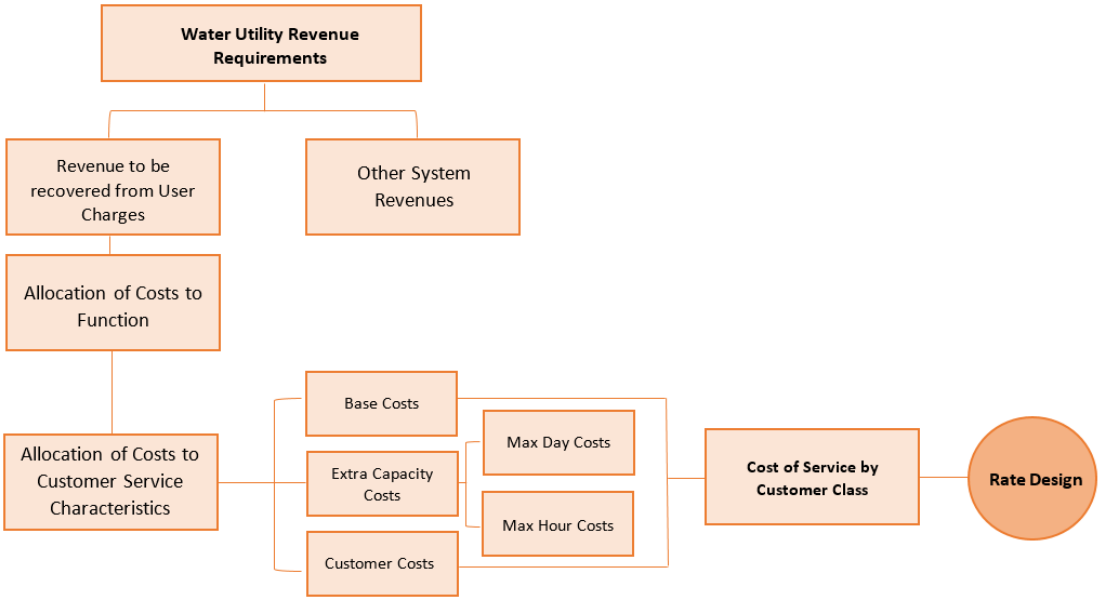
Allocation Costs to Customer Classes

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

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

Figure 3 illustrates how the separate cost allocation steps fit into the overall process of setting rates for the water system.

Figure 3: Rate Setting Process



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. The O&M expenditures for the water system were allocated to the following system functions based on fixed asset allocations and direction from CRW Staff:

- Source of Supply
- Treatment
- Pumping
- Transmission
- Distribution
- Storage
- Buildings/Improvements
- Administration
- Tools/Equipment
- Power and Chemicals
- Meters and Services
- Customers and Accounts

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

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

Allocation of Costs to Customer Characteristics

The assignment of costs to customer characteristics varies with the allocation methodology used. In the method of COS allocation used, costs are typically assigned to the following customer characteristics for water, which are defined in Appendix B.

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

In the method of cost allocation followed, costs are typically assigned to the following customer characteristics for wastewater, which are also defined in Appendix B.

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

Distribution of Costs to Customer Classes

The projections of customer class consumption and their respective usage characteristics are calculated in this step. Each class listed above in the report for water and wastewater 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.

Capital Costs

Under the cash basis approach to calculating revenue requirements, capital costs consist of non-debt funded capital expenditures (capital outlays), debt service and transfers to reserve funds. It is important to note that capital costs for improvements to serve new growth are not included in these costs. 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 customers to functions (called unit processes in the wastewater fund).
2. Allocate assets by functions to customer characteristics.
3. Allocate assets to customer classes based on each class' proportion of the customer characteristics.
4. Distribute the capital costs to each class of customers based on each class' proportionate use of the allocated assets.

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 cost of service and meets CRW's objectives identified by the community.

Water Cost-of-Service Analysis Results

The steps described above to conduct the water COS analysis were followed. The results presented in this section summarize the cost of service for each of the water system's customer classes for 2018.

Estimated Water System Revenue Requirements

The first two steps of the analysis determine the test year revenue requirements and service charge revenue requirements or revenues to be recovered from the calculated water rates. Based on the O&M and capital budget and financial planning assumptions, Table 16 represents the water fund revenue requirements for 2018.

Table 16
Water Fund
2018 Revenue Requirements

Description	2018
O&M Expenses:	
Admin	$1,560,513
Customer Billing	$229,188
Meter Services	$1,198,391
Meters Retrofit / AMI	$75,000
Engineering	$361,844
Mapping	$104,298
Field Services	$812,611
Facility Maintenance	$598,628
Water Plant Operations	$3,793,064
SCADA	$529,377
Reg & Water Compliance	$153,566
PCWPF Water Treatment Charges	$1,560,167
Subtotal O&M	**$10,986,328**
Less :Transfers	($1,804,669)
Less: Minor Capital	($226,482)
Total O&M	**$8,955,178**
Capital Expenses	
Transfer to Capital Fund	$1,804,669
Debt Service	$1,746,879
Cash Funded Capital	$6,536,152
Minor Capital Outlay	$226,482
Subtotal Capital	**$10,314,182**
Total Revenue Requirements	**$19,269,359**
Less: O&M Related Non-Rate Revenue	($569,657)
Less: Capital Related Non-Rate Revenue	($4,455,186)
Service Charge Revenue Requirement	**$14,244,516**

After subtracting non-rate revenues and calculating the service charge revenue requirements for 2018 the amount to recover is approximately $14.2 million.

Customer characteristics are estimated for 2018 based on consumption for the most recent twelve months ending December 2016 from CRW's billing records, peaking factors calculated by CRW, plus the projected minimum additional flow by customer class. Minimum additional flow per class is calculated based on a representative customer's annualized AWMC multiplied by projected growth. Table 17 summarizes the projected customer characteristics that calculate the equivalent meters used for the study as well as the consumption patterns used. Table 18 shows the percentages allocated to each customer characteristic from the COS model that is projected for 2018 for each customer class.

Table 17
Water Fund
Customer Characteristics by Customer Class (2018 Projected)

Customer Class	Base Consumption (Kgal)	Max Day Extra Capacity (MGD)	Max Hour Extra Capacity (MGD)	Customers	Equivalent Meter
Residential	1,789,185	7.11	9.61	19,448	19,494
Multifamily w/ Irrigation	97,618	0.26	0.42	112	790
Commercial w/ Irrigation	150,074	0.41	0.66	285	1,308
Bulk	71,200	0.23	0.45	105	105
Irrigation	39,836	0.29	0.32	533	2,673
Multifamily Indoor Use Only	110,298	0.09	0.32	380	1,544
Commercial Indoor Use Only	150,818	0.19	0.48	370	1,759
Total	**2,409,028**	**8.58**	**12.24**	**21,233**	**27,672**

Table 18 Water Fund Customer Characteristics (2018 Projected)					
Customer Class	**Base**	**Max Day**	**Max Hour**	**Customer**	**Meter**
Residential	74.27%	82.83%	78.47%	91.59%	70.45%
Multifamily w/ Irrigation	4.05%	3.02%	3.43%	0.53%	2.85%
Commercial w/ Irrigation	6.23%	4.79%	5.37%	1.34%	4.73%
Bulk	2.96%	2.73%	3.66%	0.49%	0.38%
Irrigation	1.65%	3.37%	2.59%	2.51%	9.66%
Multifamily Indoor Use Only	4.58%	1.09%	2.59%	1.79%	5.58%
Commercial Indoor Use Only	6.26%	2.17%	3.88%	1.74%	6.36%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

The service charge revenue requirements reported in Table 16 of $14.2 million are allocated first among functions, then to customer characteristics and finally to each customer class based on the percentages presented in Table 18 above. These results are the cost of service by customer characteristics and class shown in Table 19 below.

Table 19 Water Fund Water Cost of Service by Customer Class (2018 Projected)						
Customer Class	**Base**	**Max Day**	**Max Hour**	**Customer**	**Meter**	**Total**
Residential	$3,388,820	$4,294,305	$966,442	$1,880,008	$807,040	**$11,336,614**
Multifamily w/ Irrigation	$184,895	$156,737	$42,237	$10,827	$39,601	**$434,297**
Commercial w/ Irrigation	$284,250	$248,414	$66,175	$27,551	$65,341	**$691,730**
Bulk	$134,857	$141,426	$45,131	$10,150	$4,343	**$335,906**
Irrigation	$75,452	$174,740	$31,947	$51,524	$132,993	**$466,657**
Multifamily Indoor Use Only	$208,910	$56,598	$31,917	$36,734	$76,681	**$410,840**
Commercial Indoor Use Only	$285,657	$112,340	$47,798	$35,767	$86,909	**$568,472**
Total	**$4,562,841**	**$5,184,560**	**$1,231,647**	**$2,052,561**	**$1,212,907**	**$14,244,516**

Wastewater Cost-of-Service Analysis Results

This section represents the cost of service by customer class for the wastewater system.

Estimated Wastewater System Revenue Requirements

Test year revenue requirements and service charge revenue requirements, or revenues to be recovered from the calculated wastewater rates, are presented in Table 20. The study projects that the wastewater system needs to recover approximately $10.4 million from wastewater customers in 2018.

Table 20
Wastewater Fund
2018 Revenue Requirements

Description	2018
O&M Expenses	
Admin	$970,953
Customer Billing	$226,985
Engineering	$244,323
Mapping	$78,196
Field Services	$713,479
Facility Maintenance	$437,607
Plant Operations	$2,775,825
SCADA	$210,099
CIP Related O&M	$28,690
PCWRA Capital buy-In	$2,500,167
Subtotal O&M	**$8,186,324**
Less :Transfers	($72,243)
Less: Minor Capital	($94,750)
Total O&M	**$8,019,331**
Capital Expenses	
Transfer to Capital Fund	$72,243
Debt Service	$333,546
Cash Funded Capital	$0
Minor Capital Outlay	$94,750
Subtotal Capital	**$500,539**
Total Revenue Requirements	**$8,519,870**
Less: O&M Related Non-Rate Revenue	($52,292)
Less: Capital Related Non-Rate Revenue	$1,883,334
Service charge Revenue Requirement	**$10,350,912**

Customer characteristics are estimated for 2018 based on January 2016 to December 2016 data from CRW's billing records and assumed residential strength factors plus the projected minimum additional flow by customer class for wastewater customers. The 2017 cost of service model does not currently incorporate differences between waste strength (i.e. BOD and TSS); therefore, no differences in concentrations are used. Minimum additional flow per class is calculated based on a representative customer's annualized AWMC and projected growth. Table 21 summarizes the projected customer characteristics that calculate the equivalent meters used for the study as well as the consumption patterns used. Table 22 shows the percentages allocated to each customer characteristic from the COS model that is projected for 2018 for each customer class.

Table 21
Wastewater Fund
Customer Characteristics by Customer Class (2018 Projected)

Customer Class	Flow (kgal)	BOD (Pounds)	TSS (Pounds)	# of Customers	Equivalent Meter
Residential	743,056	2,133,076	2,678,747	19,292	19,350
Commercial w/ Irrigation	76,900	220,755	277,228	278	1,484
Commercial Indoor Use Only	108,538	311,579	391,285	355	1,896
Multifamily w/ Irrigation	62,300	178,843	224,594	112	939
Multifamily Indoor Use Only	92,098	264,383	332,016	380	1,800
Total	**1,082,892**	**3,108,637**	**3,903,870**	**20,417**	**25,470**

Table 22
Wastewater Fund
Customer Characteristics (2018 Projected)

Customer Class	Flow (kgal)	BOD (Pounds)	TSS (Pounds)	Customers	Equivalent Meter
Residential	68.62%	68.62%	68.62%	94.49%	75.97%
Commercial w/ Irrigation	7.10%	7.10%	7.10%	1.36%	5.83%
Commercial Indoor Use Only	10.02%	10.02%	10.02%	1.74%	7.44%
Multifamily w/ Irrigation	5.75%	5.75%	5.75%	0.55%	3.69%
Multifamily Indoor Use Only	8.50%	8.50%	8.50%	1.86%	7.07%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

The service charge revenue requirements reported in Table 20 of $10.4 million are allocated first among functions, then to customer characteristics and finally to each customer class based on the percentages presented in Table 22 above. These results are the cost of service by customer characteristics and class shown in Table 23 below.

Table 23
Wastewater Fund
Cost of Service by Customer Class (2018 Projected)

Customer Class	Flow (kgal)	BOD (Pounds)	TSS (Pounds)	Customers	Total
Residential	$4,990,455	$832,903	$463,074	$1,123,846	**$7,410,279**
Commercial w/ Irrigation	$516,470	$86,198	$47,924	$16,195	**$666,787**
Commercial Indoor Use Only	$728,957	$121,662	$67,641	$20,680	**$938,941**
Multifamily w/ Irrigation	$418,414	$69,833	$38,826	$6,525	**$533,598**
Multifamily Indoor Use Only	$618,540	$103,234	$57,396	$22,137	**$801,306**
Total	**$7,272,837**	**$1,213,831**	**$674,861**	**$1,189,383**	**$10,350,912**

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. By doing this, revenue stability is increased and all customers are required 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. This also reduces the volumetric rate and recovers a portion of the PCWRA debt service costs from users who require more capacity in the wastewater system. The demand charge component on the monthly service charge recovers the 20 percent of annual wastewater system capital costs not including the capital costs needed to serve new growth.

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

Rate Design

Introduction

Once the cost of service by class was determined, the water and wastewater COS based rates were developed based on the existing rate structure. 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 enterprise funds.

Water System Rates

Water Budget Based Rate Structure

A water budget based rate structure identifies a monthly budgeted amount of water by individual account that varies for each customer by AWMC for indoor use and 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 is defined as the months of March 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. This value is adequate because ET demands are based on the maximum requirements for bluegrass and creates the irrigation allowance.

For non-irrigation or winter months, an irrigation allowance is not included in an account's water budget. Instead, an account's historical average winter monthly 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 February will be equal to the account's AWMC for the year.

Water Usage Thresholds

The water budget based rate structure consists of three consumption tiers. Table 24 represents the tier threshold by customer class for the irrigation and winter season.

Table 24 Water Fund Water Usage Thresholds			
Irrigation Season (April 1 through October 31 Consumption)			
Customer Class	**Tier 1**	**Tier 2**	**Tier 3**
Residential	AWMC	Budget	Excess
Multifamily Indoor Use Only	AWMC	N/A	Excess
Multifamily	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)			
Customer Class	**Tier 1**	**Tier 2**	**Tier 3**
Residential	AWMC	N/A	Excess
Multifamily Indoor Use Only	AWMC	N/A	Excess
Multifamily	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 tiered rates follow. Bulk water accounts are not subject to a water budget based rate structure and are not discussed in this section.

Description of Thresholds

For residential, multifamily and commercial accounts with meters providing both indoor and outdoor irrigation water, the rate structure includes three usage tiers with increasing rates per tier billed in thousand gallons (Kgal).

Tier 1 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 representative residential customer is 5,000 gallons per month. AWMC for multifamily and commercial accounts varies according to meter size and type of commercial account.

Tier 2, or irrigation budget, includes usage above an account's AWMC and includes its monthly irrigation allowance. The threshold will vary by month during the irrigation months. An account's landscaped area in square feet (up to a maximum of 7,000 square feet) and the weekly irrigation requirements (ET) 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.

Tiered 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 Water customers, pays a fixed monthly service charge consisting of a customer charge and a meter charge. A monthly water resources charge per single family equivalent (SFEs, varying by meter) is added to an account's bill. The water resources charge is discussed below.

The water rate structure consists of three increasing tiered rates:

- Tier 1 – Base COS Rate
- Tier 2 – Base plus Extra Capacity Rates by Customer Class
- Tier 3 – Excess Use Rate to Recover CRW's Remaining Revenue Requirements

The rate per 1,000 gallons for Tier 1 equals the cost to CRW of providing one unit of water to its customers on an average use basis. It differs from the average COS rate 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 use.

The rate for Tier 2 was intended to represent the cost of providing base and peaking related water demands to CRW'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 revenues for usage above each customer's Tier 2 budget. The rate is higher than Tier 2 to encourage customers to stay within their Tier 2 budgets.

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.

Wastewater Monthly Service Charges

CRW currently charges wastewater customers a fixed monthly service charge that consists of a customer charge and a demand charge, plus a uniform volumetric rate for wastewater flow. An account's flow is estimated using its AWMC. The proposed 2018 wastewater rates consist of a monthly charge that includes the demand charge by meter size, plus a uniform volumetric rate for all customers as shown in Table 28 below.

Water Resources Monthly Service Charge

CRW currently assesses all water resources customers a fixed monthly service charge per SFE. The charge calculated per SFE for 2018 is presented in Table 27 below.

Stormwater Monthly Service Charge

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

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

Using these assumptions and data 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.

The Town's Geographical Information System (GIS) data indicates 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.

The service charge is also calculated based on a percent imperviousness for non-residential accounts during this 2017 study update. The average percent imperviousness for multifamily and other non-residential properties was assumed to be 80 percent, unless otherwise indicated in CRW's billing system data based on an actual survey of the property. SFEs were calculated based on the percent imperviousness of each property multiplied by its parcel size.

Summary

CRW has completed the 2017 Rates and Fees Study update, including financial planning, COS rate studies and rate design. The purpose of the study is to provide an update for water, water resources, wastewater and stormwater fund rates designed to meet CRW policies and objectives during the years 2018 through 2022. The findings are based on a thorough review of the information provided.

Proposed Rates for 2018 by Enterprise Fund

Rates for the five-year study period (2018-2022) were projected using the percentage rate revenue increases projected by the financial plan. The 2018 proposed rates are shown in the following tables by enterprise fund.

Table 25
Water Fund
Proposed 2018 Monthly Service Charges

Meter Size	Monthly Charges
5/8" x ¾"	$9.54
¾"	$9.54
1"	$13.72
1.5"	$18.78
2"	$26.00
3"	$41.78
4"	$94.12
6"	$147.26
Bulk Water Customers	$9.54

Table 26 Water Fund Proposed 2018 Volumetric Rates by Tier				
Irrigation Season (April 1 through October 31 Consumption)				
Customer Class	**Tier 1 (AWMC)**	**Tier 2 (Irrigation)**	**Tier 3 (Excess)**	**Tier 4 (Over 40 kgal)**
Residential	$2.82	$5.53	$8.29	$8.29
Multifamily Indoor Use Only	$2.82	N/A	$3.57	N/A
Multifamily	$2.82	$4.70	$7.04	N/A
Commercial Indoor Use Only	$2.82	N/A	$3.80	N/A
Commercial	$2.82	$4.75	$7.13	N/A
Irrigation	N/A	$7.58	$11.36	N/A
Bulk Water	$5.07	N/A	N/A	N/A
Winter Season (November 1 through March 31 Consumption)				
Customer Class	**Tier 1 (AWMC)**	**Tier 2 (Irrigation)**	**Tier 3 (Excess)**	**Tier 4 (Over 40 kgal)**
Residential	$2.82	N/A	$5.53	$8.29
Multifamily Indoor Use Only	$2.82	N/A	$3.57	N/A
Multifamily	$2.82	N/A	$4.70	N/A
Commercial Indoor Use Only	$2.82	N/A	$3.80	N/A
Commercial	$2.82	N/A	$4.75	N/A
Irrigation	N/A	N/A	$11.36	N/A
Bulk Water	$5.07	N/A	N/A	N/A

Table 27 Water Resources Fund Proposed 2018 Monthly Service Charges	
Meter Size	**Monthly Charges**
5/8" x ¾"	$17.52
¾"	$26.15
1"	$99.11
1.5"	$187.50
2"	$313.54
3"	$588.90
4"	$1,502.32
6"	$2,429.34
Bulk Water Customers	$0.24

Table 28 Wastewater Fund Proposed 2018 Monthly Service Charges and Volumetric Rate	
Meter Size	**Monthly Charges**
5/8" x ¾"	$9.30
¾"	$9.30
1"	$14.80
1.5"	$21.46
2"	$30.96
3"	$51.72
4"	$120.58
6"	$190.48
Volumetric Rate - All Customers, Per Kgal	$6.59

Table 29 Stormwater Fund Proposed 2018 Monthly Service Charge		
Monthly Stormwater Fee		
All Customers, per SFE		$7.12
SFE Assignment		
Customer Class	**Impervious Sq. Ft.**	**SFE**
Single Family Attached & Detached	3,255	1
Non-Single Family (Multifamily & Commercial)	Parcel size time 80% imperviousness divided by 3,255 impervious sq. ft. per SFE = # of SFEs	

Recommendations

As part of the 2017 Rates and Fees Study, Stantec Consulting Services, Inc. recommends CRW do the following:

- Financial Planning Recommendations
  - Consider reviewing and revising debt service coverage targets. Current models set target of 1.2 times annual debt service as required by bond covenant. This could be increased gradually over time to reach a management target greater than the minimum level required by bond covenant. Positive benefits of this approach include improved bond ratings if needed in the future as well as mitigated risk of falling below required debt service coverage levels.
  - The new FAMS model used by CRW allows for forecasting of account growth, changes in usage, escalation, and other inputs to project future revenues and expenses. Additionally, the FAMs allows for tracking of historical budget and actual O&M expenses and revenue. Stantec recommends utilizing these FAMS features to maintain forecasting and assumptions and historical records in a single location for evaluation and updates with each update to the FAMS model.
  - Conduct a detailed review of CIPs to ensure growth-related projects are funded using SDF or FID revenues. This will promote consistency across FAMS and fee models and will ensure projects are funded using the appropriate sources of fund balances and revenues, thereby minimizing needed rate increases.
- Cost of Service and Rate Recommendations
  - The COS models, financial plans and SDF/DIF models are all related, therefore Stantec recommends linking these models and reviewing together on a regular basis. This practice will minimize risk of inconsistencies

between models, particularly when handling large numbers of assets for CIP projects.

- Periodically review the actual revenues collected by customer class compared to customer class costs of service. If there are differences and it is desired to move toward revenue recovery based on customer class costs of service, adjust volume rates for all classes over a series of years to achieve the appropriate balance.
- Consider consolidating the water and water resources fund expenditures, revenues and fund balances for a single water fund and rate model. The two funds share PCWPF treatment expenses and assets for one water system. Monthly water resources fees are recovered on a per SFE basis rather than a volume/use basis. Combining water resource fund expenses with the water fund expenses could alleviate pressure on fixed charges while recovering volume related costs through volumetric rates. Separate water resources SDFs could still be charged to recover capacity costs of CRW's long term water resources plan.
- CRW's water budget based rate structure has been in place since 2009/2010. The conservation impact model (CIM) used to set up the structure needs to be updated with current information. The CIM model should be updated to optimize its usefulness as a tool to evaluate future scenarios such as the effect of changing ET requirements for types of landscapes versus grass, rate changes to achieve additional water use reductions, impact on revenues of overall reductions in use and even effects of changes to the water resources fee on usage.

Please see Appendix D for study review letter from Stantec Consulting Services, Inc.

For a copy of the supporting data analysis, please contact Castle Rock Water at 720-733-6000.

Appendix A

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
- 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

Appendix B

Definitions

The following are definitions used in this study:

- 2013 Hybrid Model – The water resources strategic plan set in 2013 as to how rates would be projected in order to achieve the long term water goals for CRW.
- System Growth – The projected growth within the Town that is used to project the increased number of SFEs per year for each fund.
- Escalation Factors – As part of the projections of O&M costs for the study period, CRW has provided a 5 year O&M budget. CRW's budget planning documents are used for the O&M projections within the 5 year budget period. After this period, costs were escalated at 3.5 percent, which is the best estimate based on the average Engineering News Record (ENR) index increase for 1st quarter 2017 for the Denver area.
- Rate Revenue Increases – System revenues are derived primarily from service charges or rates. Revenue is a function of price and the current financial plans calculate the increases needed.
- System Development Fee (SDF) Revenues – SDFs are one time charges to new connections to the system that are intended to recover 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 and are presented in Volume 2.
- Revenue Bonds – Current and projected debt for the funds.
- Inter-Fund Loans – Loans borrowed between funds and paid back with interest.
- Other Revenues – This source of funds includes non-rate related revenues, miscellaneous revenues, fines, leases, intergovernmental agreements and interest earning. Interest earning are calculated based on the average operating fund balance with an assumed interest rate of approximately 0.40 percent.
- Fund Balances – The balances needed to be kept in different reserves for each fund. There are minimums per fund. These can include the operating fund, the capital reserve fund, the catastrophic failure reserve fund, and the rate revenue stabilization reserve fund.
- 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 are fixed and do not escalate with increased demand on the system. Meanwhile, variable costs escalate both with increased system use and the expected inflation rate. CRW staff have made a reasonable effort to separate the two for projection purposes. O&M expenses during the rate period were provided by CRW. The 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 – These are one of the most important cost drivers in operating expenses. Additional staff needed over the next five years are included in the 5 year financial planning document.

- Energy Costs – These are a major component in plant operations and an important cost driver in variable operating expenses. Over the next 5 years, energy costs are expected to increase at a rate higher than inflation at approximately 7%.
- Capital Improvements – Capital improvement projections are provided by year for the study. Capital improvement costs were provided by CRW for years 2018-2055. These are reviewed and updated annually.
- Debt Service – The debt service sub-fund currently carries debt service obligations of each fund. As stated in the FMP, CRW aims to minimize debt carrying costs at or below industry standards.
- Debt Service Coverage – Outstanding revenue bonds require operating revenues to be 1.2 times the total annual debt service amount.
- Base Water Demand - the average annual water consumption in thousand gallons for each customer class. This was obtained from the 2017 Customer Characteristics Analysis using the billing data for twelve months ending December 2016.
- Maximum Day and Maximum Hours Extra Capacity Demands - Water demands that exceed average levels of water usage by system customers. Maximum day and hour extra capacity demands are calculated by applying the class peaking factors to the base demand, which average 2.3 for peak day and 4.15 for peak hour.
- Meters and Services – the total number of equivalent meters. These 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 customer class.
- Flow Demand represents the quantity discharged from customers directly to the wastewater system. Since, wastewater discharge is not metered, wastewater flows are measured by the average winter monthly consumption (AWMC) of each customer. AWMC was provided by the 2017 Customer Characteristics Analysis, which summarized the billing data for January 2016 to December 2016.
- 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.
- Base Costs – These 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 Hours Extra Capacity Costs (Extra Capacity Demands) – The 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 – Those costs incurred to serve customers, regardless of water demands or wastewater flows. Customer costs vary with the number of customers. Examples of these costs include administration and billing costs.
- Meter and Services Costs – These vary with the size of the meter and/or service used to serve the customer. Examples of meter and service costs include meter replacement and maintenance costs.
- Flow Costs – These 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 – Include BOD and TSS, represent costs incurred to treat wastewater of various qualities. As the 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.
- Demand Related Costs – 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.

Appendix C

Customer Characteristics Analysis

CUSTOMER CHARACTERISTICS ANALYSIS

2017 RATES AND FEES STUDY

PREPARED BY:

CASTLE ROCK WATER
BUSINESS SOLUTIONS TEAM

September 13, 2017

TABLE OF CONTENTS

EXECUTIVE SUMMARY

As a part of the annual Rates and Fees Study, Castle Rock Water conducts an in-depth analysis of accounts in service to determine customer characteristics and consumption patterns. We start off looking at the most current billing data for FY2016. From there, we break down the number of accounts by meter size and customer class. The Town's Development Services Department provides the number of accounts by customer class that are forecasted for FY2017 and FY2018.

Consumption data by customer class and meter size is then analyzed over a 3 year period to obtain an average, taking into consideration weather patterns and rainfall variances by year. The most current 3 year average (2014-2016) is then compared to the 3 year averages calculated in past years, going back as far as 2011. Average consumption is also analyzed down to the level of consumption in the winter months (without irrigation) and summer months (with irrigation).

This 3 year average consumption is then used to calculate a meter equivalency factor. 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 are calculated by establishing the average use for all ¾" meters as the base unit and then dividing the average use for larger meter sizes by the average use for the ¾" meters.

Customer data for the last three years (2014-2016) is then analyzed to determine an average representative customer by customer class. One customer per class from the data sample that best represents the customers in that customer class is then selected. This data is then used to represent the comparison of adopted rates versus proposed rates on a typical customer's annual bill.

Billed usage by tier from 2011-2016 by customer class is analyzed to see if customers are staying within their budgeted tiers. The purpose of this data analysis is also to see if customers are conserving water and avoiding Tier 3 – excessive and Tier 4 – surcharge (over 40,000 gallons per month).

As part of this study, we also took a closer look at the customers with a .67 SFE to see if their consumption patterns were meeting the intent of the program, to use a 3rd less water than an average ¾" residential customer. Additional information such as .67 SFE accounts by irrigated area also help to understand the larger irrigated accounts that typically consume larger amounts of water and may not be meeting the intent of the program.

This year's study includes three new analysis sections for consumption by subdivision, consumption for accounts designated as HOA's and what the impact would be to customers if the 40,000 gallon surcharge was reduced to a lower level.

Like the water fund, we also chart the number of accounts from the latest 2016 billing data plus growth projections for customers who are being provided water resources and wastewater services. Stormwater Single Family Equivalents (SFE's) are also calculated using the latest 2016 billing data plus growth projections.

Much of the information contained in this analysis is used in the rate making process. Key inputs and how they are used in the financial rate making model will be identified in the individual sections of this report.

WATER ENTERPRISE FUND

NUMBER OF ACCOUNTS BY METER SIZE & CUSTOMER CLASS

Table 1 below shows the number of accounts by meter size and customer class using 12 months of billing data (Jan16-Dec16). This shows that 19,593 customers were receiving water service during this capture period. The FY2015 accounts based on 12 months of billing data (Jan15-Dec15) showed 18,832 customers were receiving water service. There are 761 more accounts in FY2016 than FY2015. The number of accounts by meter size are key inputs into the system development fees model. These are then converted into Single Family Equivalents (SFE's) which are used to determine existing versus new system capacities and are used in the calculations within the cost of service models.

TABLE 1: ACCOUNTS BY METER SIZE & CUSTOMER CLASS (FY2016)

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	MultiFamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	643	-	5	-	21	-	-	669
3/4"	17,386	14	128	95	127	100	113	17,963
1"	19	25	70	-	91	64	73	342
1.5"	-	55	50	-	120	90	62	377
2"	-	15	25	-	84	40	42	206
3"	-	2	5	-	8	-	14	29
4"	-	1	-	-	2	-	2	5
6"	-	-	2	-	-	-	-	2
Total	18,048	112	285	95	453	294	306	19,593

Chart 1 below shows the growth in residential accounts from 2011-2016 and the projected growth for 2017-2018. The projected growth for FY2017 and FY2018 remains strong at 700 permits forecasted for both 2017 and 2018. The growth projections are provided by the Town's Development Services Department. Since 2011, the average number of accounts that have been added per year is approximately 700.

CHART 1: RESIDENTIAL ACCOUNTS 2011-PROJECTED 2018

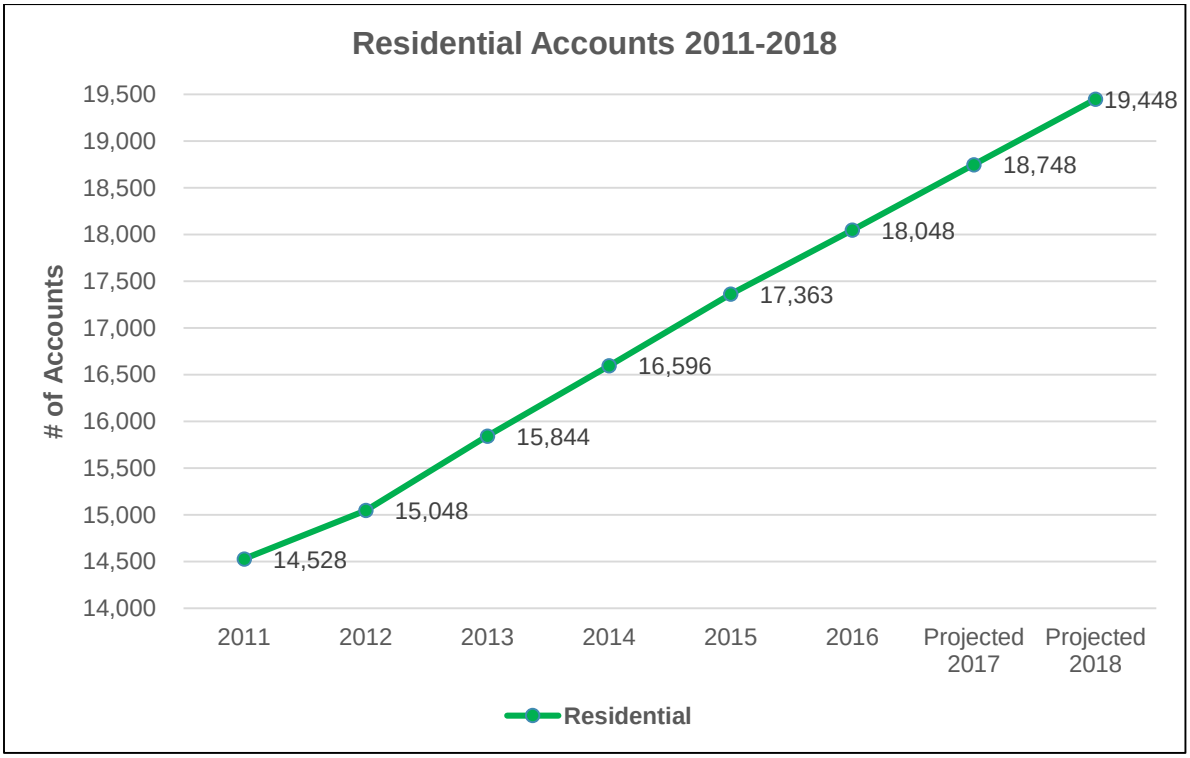


Chart 2 shows the number of non-residential accounts from 2011-2016. Although multi-family indoor use only has remained flat over the last several years, growth projections for this type of account indicate a significant increase in FY2017 and FY2018. A significant increase in irrigation and commercial indoor use only is also projected for FY2017 and FY2018.

CHART 2: NON-RESIDENTIAL ACCOUNTS 2011-PROJECTED 2018

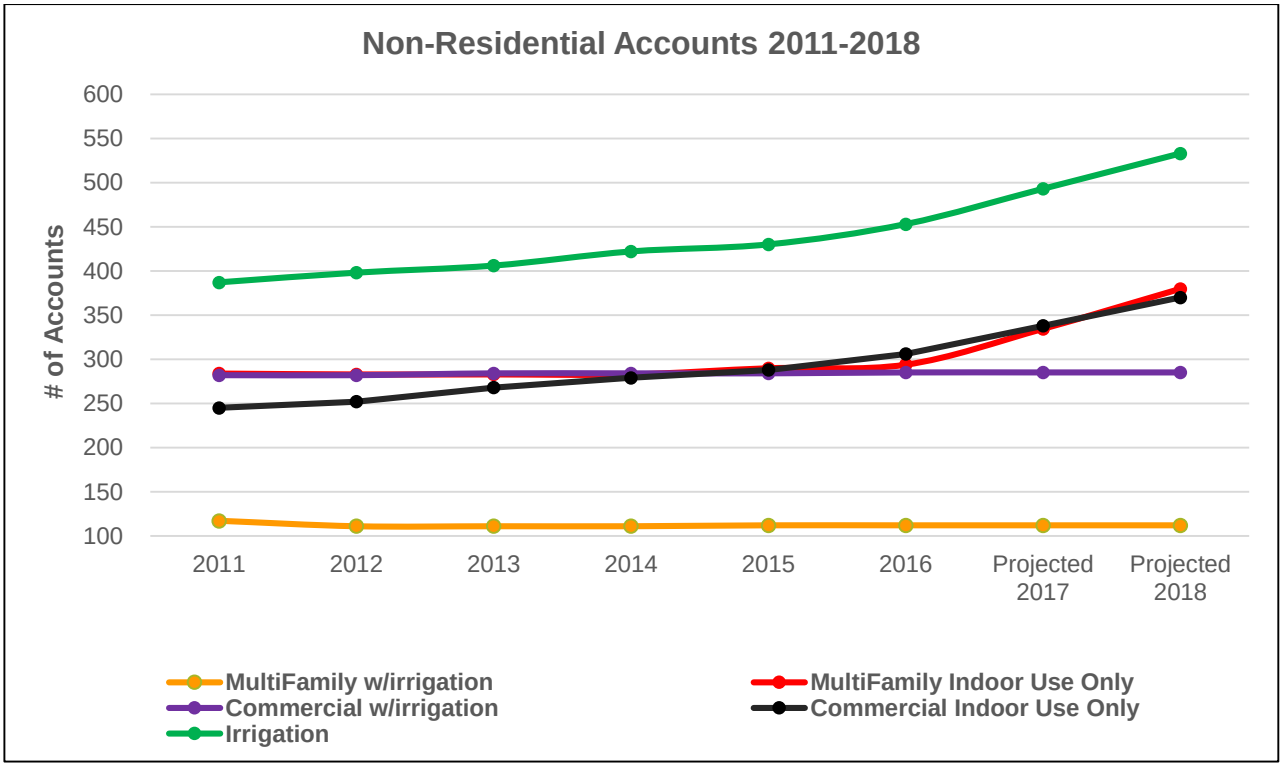
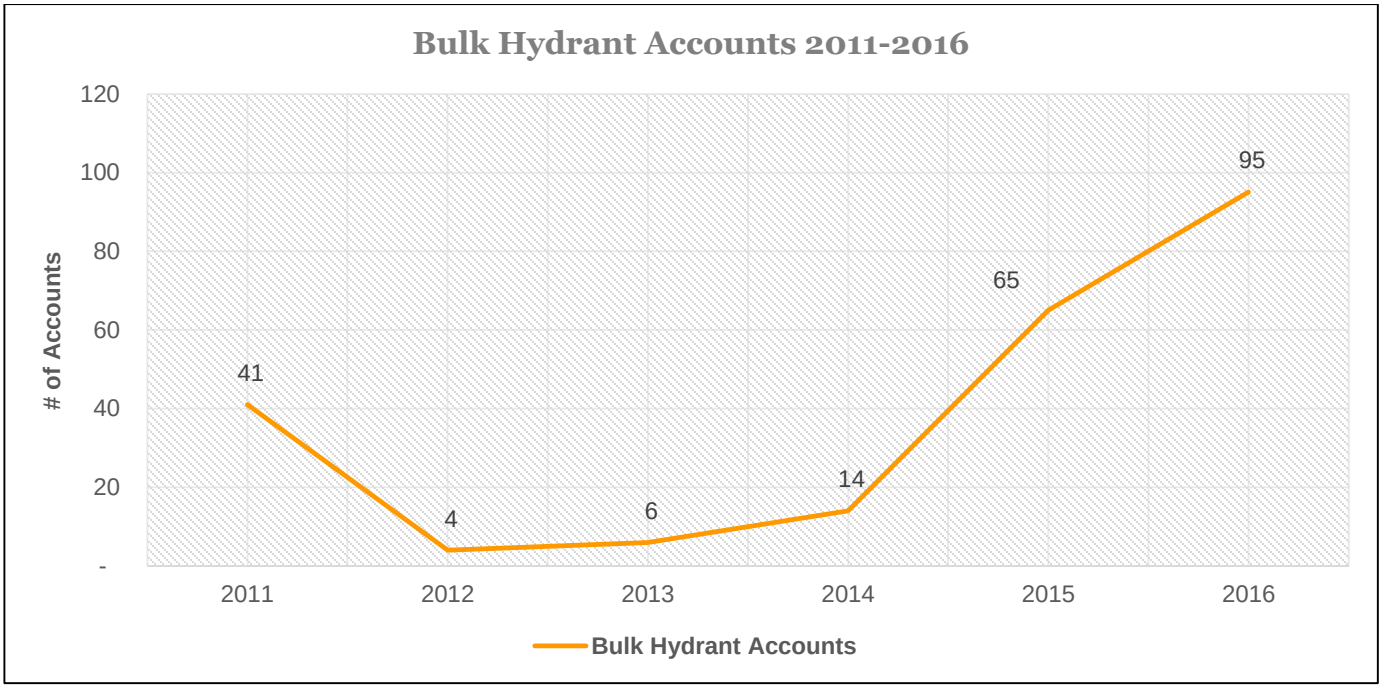


Chart 3 shows the increase in bulk hydrant accounts over the last two years due to new development and construction. In 2015, as growth picked up so did the need for bulk water hydrants. Projections indicate that the need for bulk hydrant accounts will remain strong in FY2017 and FY2018.

CHART 3: BULK HYDRANT ACCOUNTS 2011-2016



Castle Rock Water projects FY2018 water accounts by using FY2016 billing data plus the projected growth for FY2017 and FY2018. The FY2018 water accounts are projected to equal 21,128. Growth is projected for the following customer classes:

2017 Projected Accounts by Customer Class:

84	Residential (.67 SFE)
616	Residential (1 SFE)
41	Multi-Family
32	Commercial
40	Irrigation
813	Total

2018 Projected Accounts by Customer Class:

84	Residential (.67 SFE)
616	Residential (1 SFE)
45	Multi-Family
32	Commercial
40	Irrigation
817	Total

Total growth of 813 accounts is projected for FY2017 and 817 accounts for FY2018 for a total of 1,630 projected for the water fund thru FY2018.

3 YEAR AVERAGE CONSUMPTION DATA BY CUSTOMER CLASS

Table 2 shows the 3 year average monthly consumption by meter size and customer class for 2014-2016 billing data. Table 2A shows the breakdown of the residential meter sizes shown in Table 2 and their individual applicable 3 year averages. Chart 4 shows the 3 year average monthly consumption for all residential meter sizes, including 5/8" through 1". Although the number of 1" residential meters is very small at 19 accounts, the impact to the overall average is significant. However, the trend shows that the average monthly consumption for ¾" accounts, which is 96% of the residential accounts are trending downward year over year.

TABLE 2: 3 YEAR AVG MONTHLY CONSUMPTION BY CUSTOMER CLASS & METER SIZE (2014-2016)

Meter Size	Residential	Multifamily	Commercial	Irrigation	MultiFamily Indoor Use Only	Commercial Indoor Use Only
5/8"	4.66	-	-	32.20	-	2.09
3/4"	6.52	19.64	7.55	25.69	3.76	7.22
1"	12.59	31.88	29.32	49.73	13.40	38.51
1.5"	-	70.63	56.89	109.39	40.92	38.70
2"	-	81.65	54.84	175.35	78.62	73.56
3"	-	360.00	134.48	336.08	-	69.52
4"	-	423.62	-	-	-	1,227.83
6"	-	-	687.20	-	-	-

TABLE 2A: 3 YEAR AVG MONTHLY CONSUMPTION RESIDENTIAL ONLY METER SIZES (2014-2016)

	Residential Accounts			
Meter Size	**2011-2013**	**2012-2014**	**2013-2015**	**2014-2016**
5/8"	5.35	5.11	4.73	4.66
3/4"	7.21	6.97	6.55	6.52
1"	11.42	10.19	12.41	12.59
Average	7.99	7.42	7.90	7.92
Weighted Average	7.20	6.95	6.51	6.47

CHART 4: 3 YEAR AVG MONTHLY CONSUMPTION
ALL RESIDENTIAL ACCOUNTS

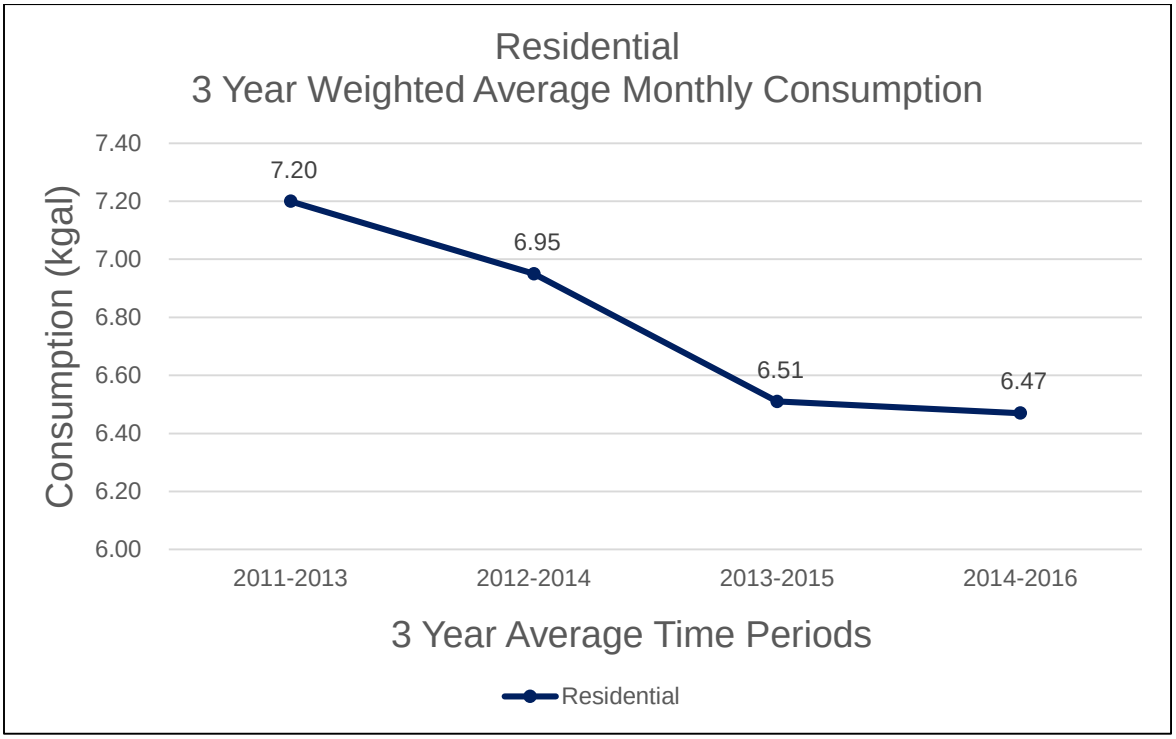
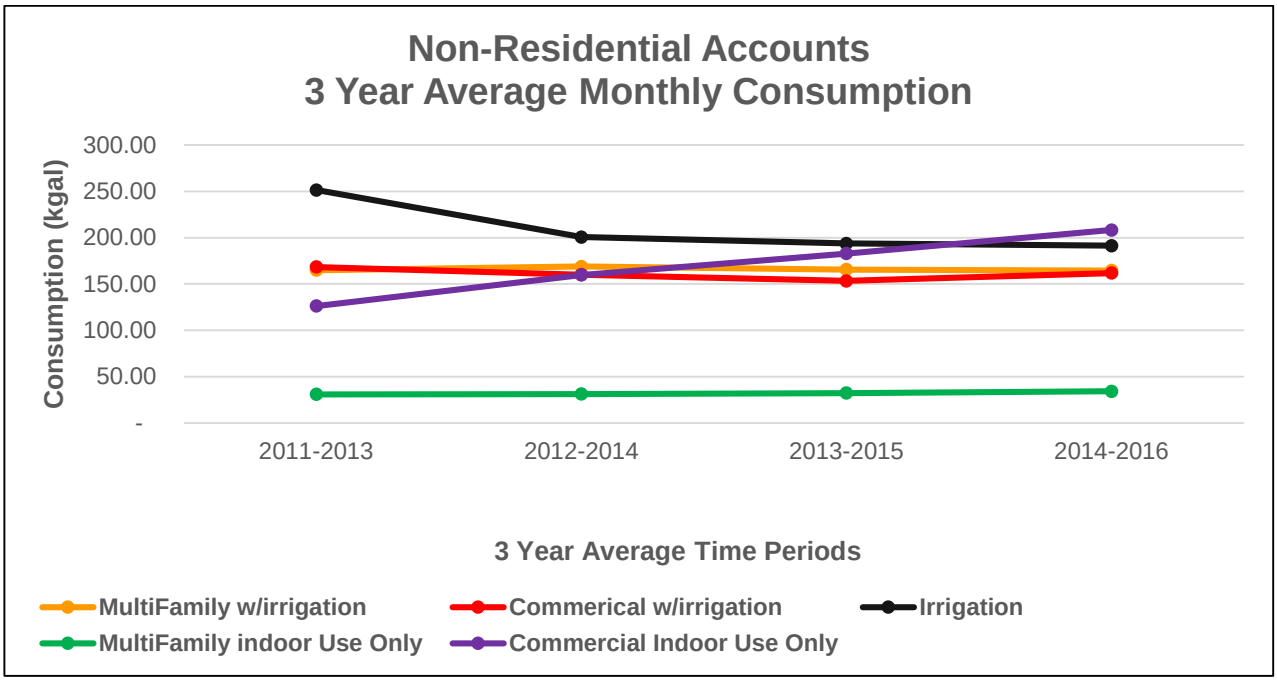


CHART 5: 3 YEAR AVG MONTHLY CONSUMPTION FOR ALL NON-RESIDENTIAL ACCOUNTS



The 3 year average monthly consumption shown above in Chart 5 is for all non-residential meter sizes combined. While multifamily and commercial with irrigation accounts are fairly steady, irrigation usage is slightly trending down, which is a good sign. Commercial indoor use is increasing primarily as a result of the increase in commercial indoor accounts with meters in the 1" to 3" range. Commercial indoor accounts increased by 30 from FY2014 to FY2016 due to the development within Castle Rock.

Chart 6 shows that the 3 year average intervals for comparison have stayed flat for the ¾" and 1" meters. The 1.5" and 2" meters have shown a slight increase from the 2013-2015 three year average to the 2014-2016 three year average.

CHART 6: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE – ¾″-3″ – ALL CUSTOMER CLASSES

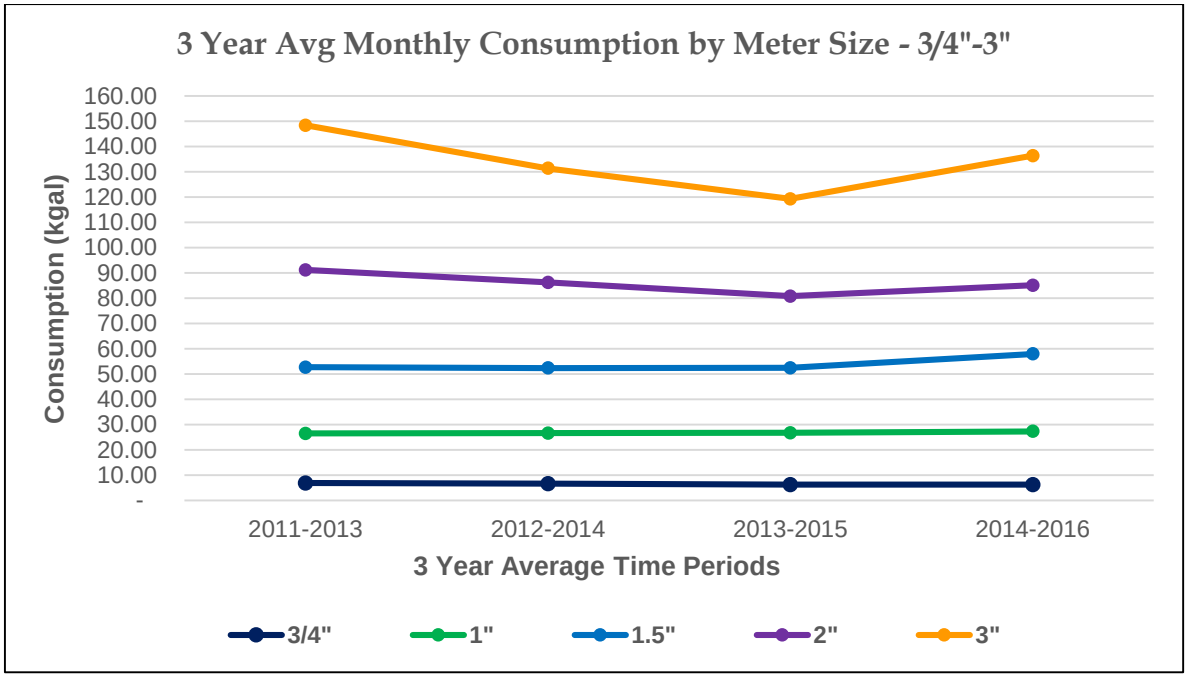
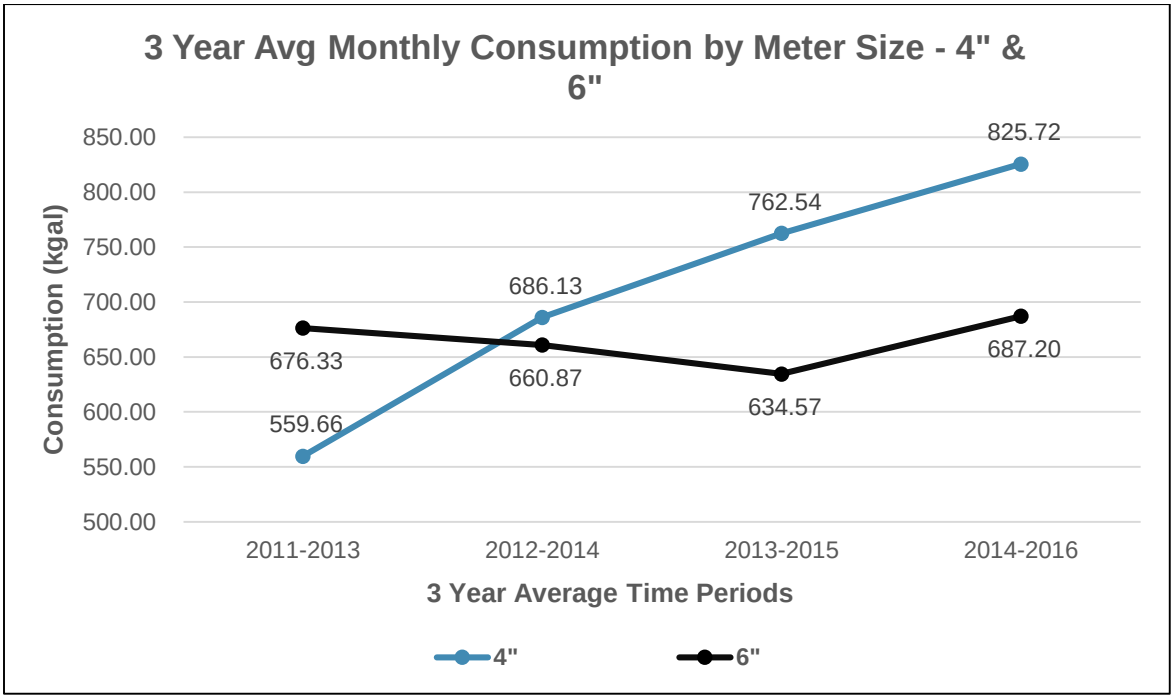


Chart 7 below indicates that the average consumption for the two 6″ meters in service is trending upwards after a downward spike in the prior three year average (2013-2015). We currently have five 4″ meters in service, four active meters and one redundant meter for medical purposes. The increase in the 2013 and forward consumption pattern is a result of the 4″ medical facility meter that was installed in 2013.

CHART 7: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE – 4″ & 6″



3 YEAR AVERAGE CONSUMPTION WITH & WITHOUT IRRIGATION

The data in Table 3 shows the average monthly consumption by meter size for all customer classes combined. This shows that the monthly consumption in many cases almost doubles between the summer "With Irrigation" and the winter "Without Irrigation" seasons.

TABLE 3: 3 YEAR AVERAGE MONTHLY CONSUMPTION BY METER SIZE - ALL CUSTOMER CLASSES - (2014-2016)

Meter Size	With Irrigation	Without Irrigation
5/8"	6.92	3.22
3/4"	8.96	4.21
1"	39.62	20.95
1.5"	86.12	39.57
2"	133.79	60.32
3"	189.25	95.04
4"	800.38	851.07
6"	851.07	523.33

CHART 8: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE – ¾" ALL CUSTOMER CLASSES

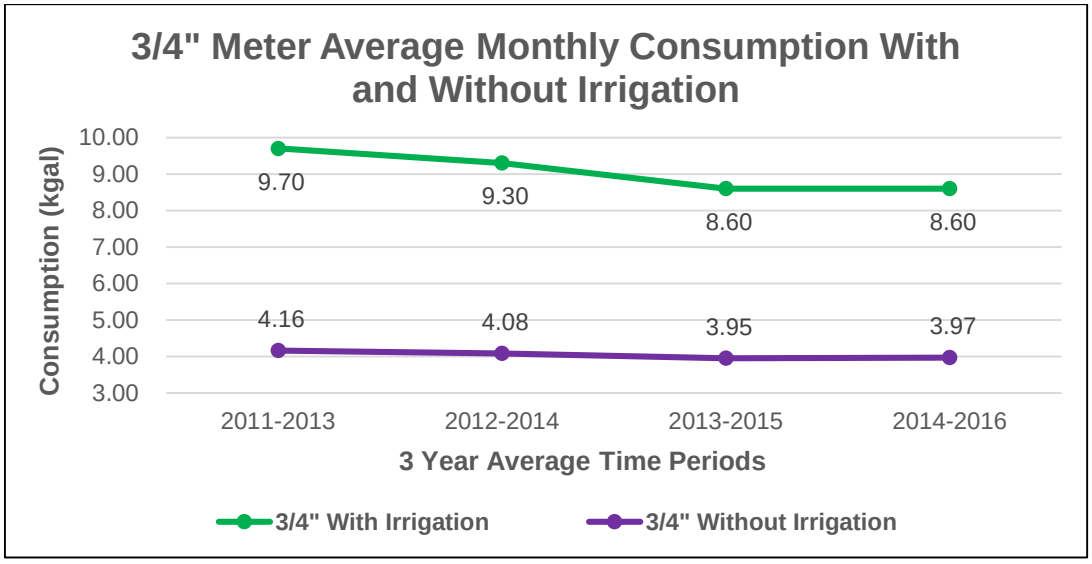


CHART 9: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE – 1″ ALL CUSTOMER CLASSES

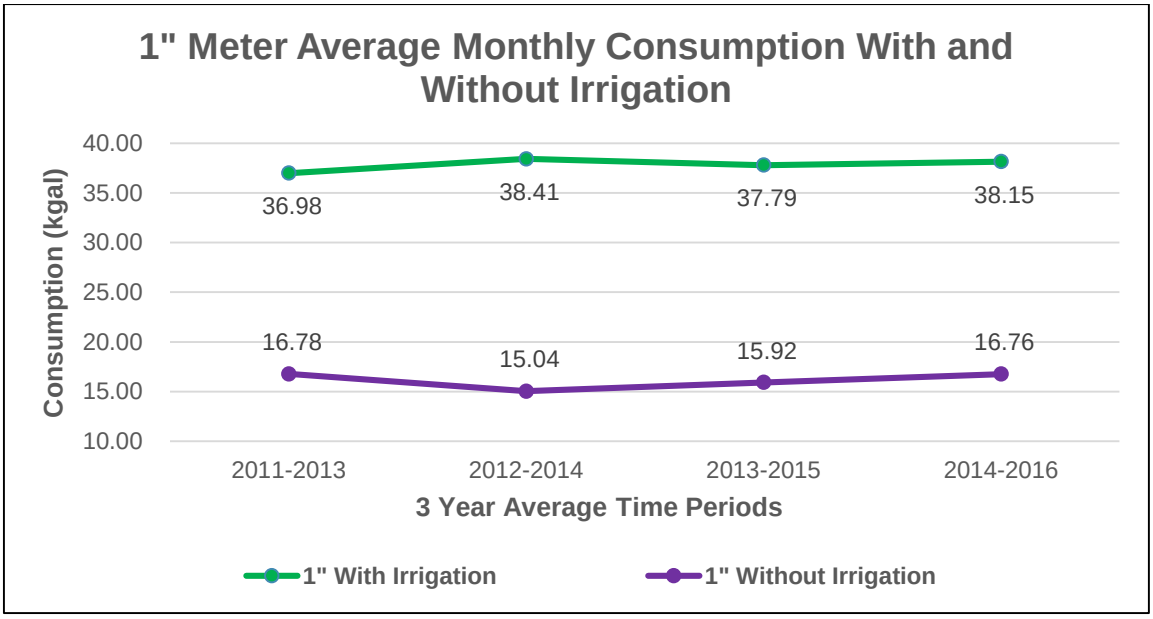


CHART 10: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE – 1.5″ ALL CUSTOMER CLASSES

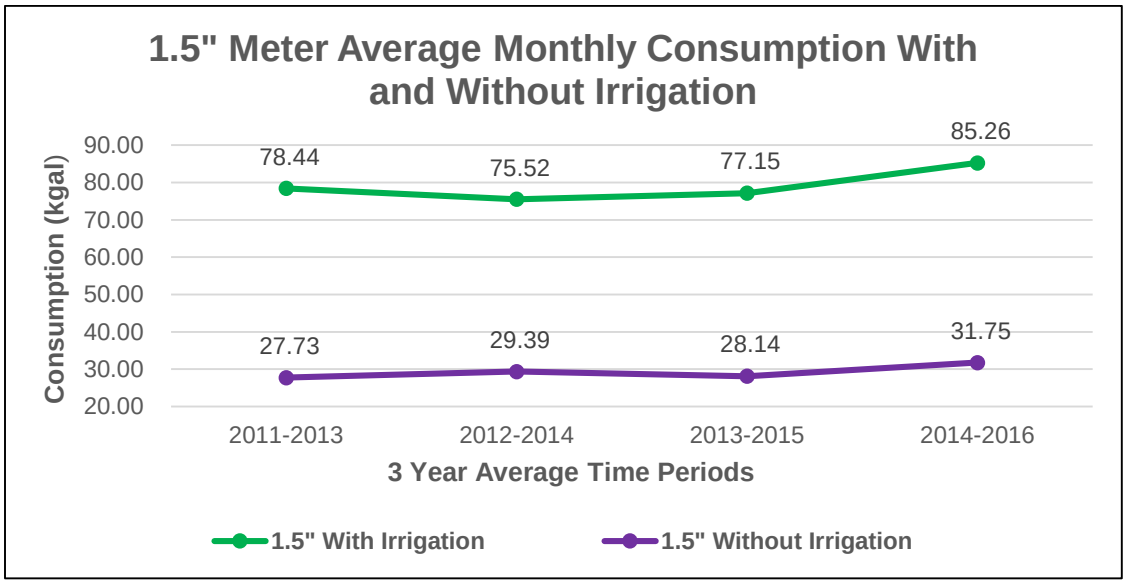


CHART 11: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE – 2″ ALL CUSTOMER CLASSES

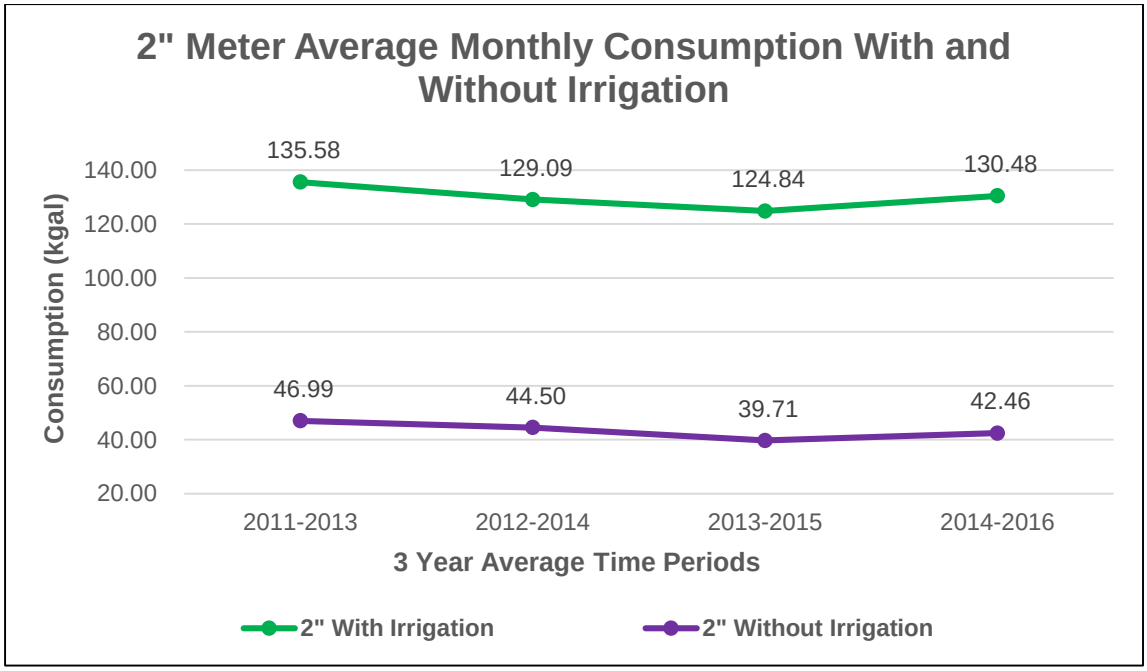


CHART 12: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE – 3″ ALL CUSTOMER CLASSES

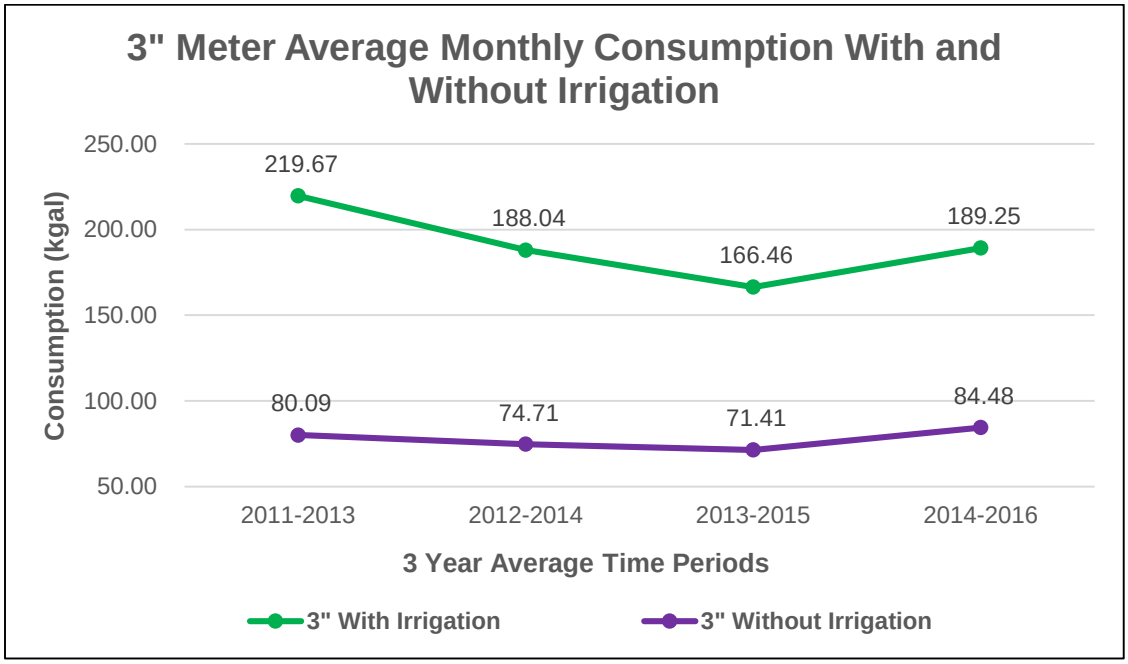


CHART 13: 3 YEAR AVG MONTHLY CONSUMPTION BY METER SIZE – 4″ ALL CUSTOMER CLASSES

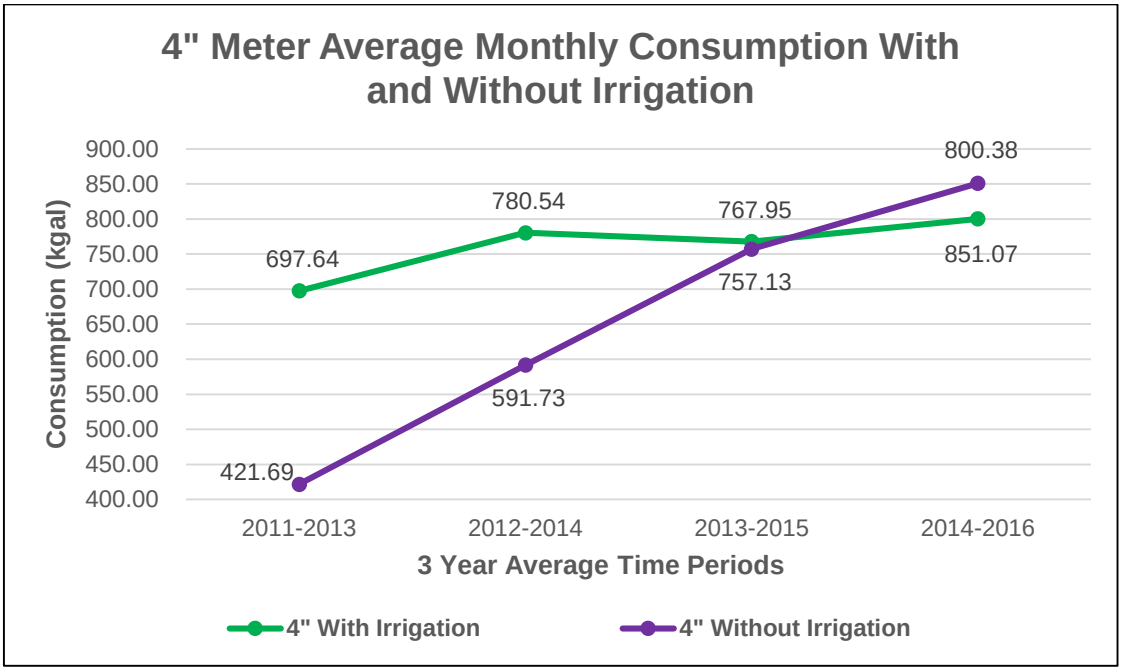
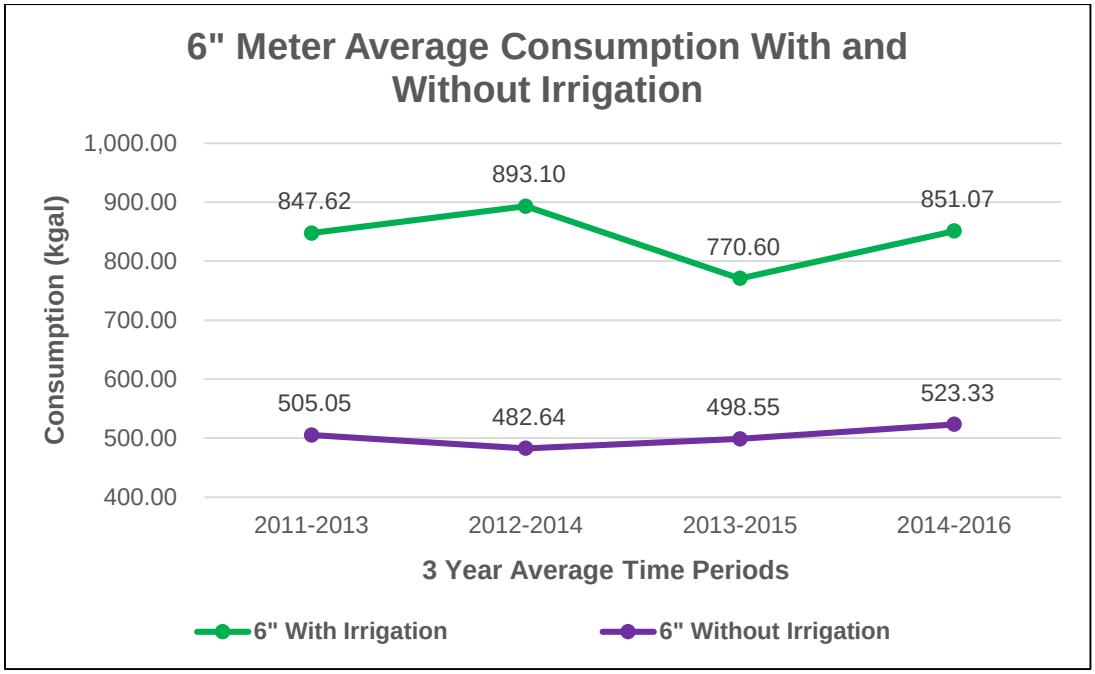


CHART 14: 3 YEAR AVG MONTHLY CONSUMPTION
BY METER SIZE – 6" ALL CUSTOMER CLASSES



EQUIVALENCY FACTORS

There are two different types of equivalency factors. The first is the hydraulic capacity method which is based on the relative capacity of different meter sizes and meter types utilized to deliver water. These can also be based on the relative potential demands of different customers. Based on the characteristic hydraulic demands, a single family meter size of ¾" is designated as the base for one SFE. The maximum flow rate or water through the meter in gallons per minute (gpm) becomes the unit of comparison. The maximum flow rate demanded by new customers is compared to the base demand in order to determine the equivalency ratio. For example, if the base single family residential customer requires 30 gpm and a commercial customer requires 200 gpm, the equivalency ratio equals 6.67. The second method is the actual use equivalency factor, which is based on the relative average monthly water usage of CRW's customers. CRW uses the second method using actual use equivalency factors.

Table 4 calculates equivalency factors by customer class and meter size based on a ¾" single family residential customer. This is what is used to calculate Single Family Equivalents (SFE) in the system development fees model and are used to allocate the meter related costs recovered in the cost of service model by meter size. It takes the number of accounts times the actual use equivalency factors to come up with the existing SFE's.

Chart 16 indicates that the equivalency factors for the 4″ and 6″ meter sizes needed to be adjusted for the 2017 Rates and Fees Study.

TABLE 4: ACTUAL USE EQUIVALENCY FACTORS
(Based on 3 Year Avg. 2014-2016)

Meter Size	Residential	Multifamily	Commercial	Irrigation	MultiFamily Indoor Use Only	Commercial Indoor Use Only	Equivalency Factor
5/8"	0.61	-	-	3.26	-	0.34	0.67
3/4"	1.00	2.98	1.16	2.38	0.59	1.10	1.00
1"	1.75	5.13	4.71	4.99	2.15	5.91	4.40
1.5"	-	11.36	8.88	11.96	6.58	5.99	9.32
2" C2	-	13.13	8.82	13.82	12.08	9.86	11.20
2" T2	-	-	-	17.59	-	69.98	18.31
3" C2	-	58.56	21.62	11.74	-	11.56	18.28
3" T2	-	56.53	-	36.80	-	6.05	34.96
4" C2	-	68.11	-	-	-	197.41	76.19
4" T2	-	-	-	98.20	-	-	98.20
6" C2	-	-	110.49	-	-	-	110.49

CHART 15: EQUIVALENCY FACTORS USED IN THE 2016 RATES AND FEES STUDY

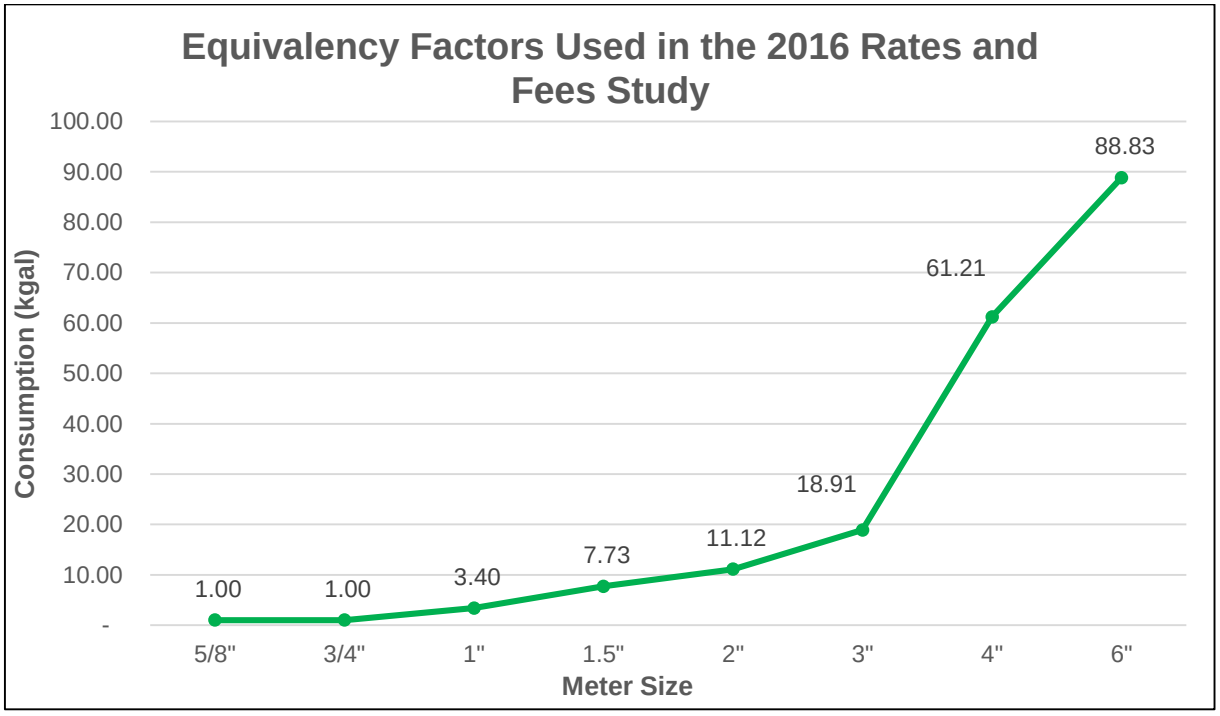


CHART 16: EQUIVALENCY FACTORS 2016 STUDY USED VS 2017 STUDY CALCULATED

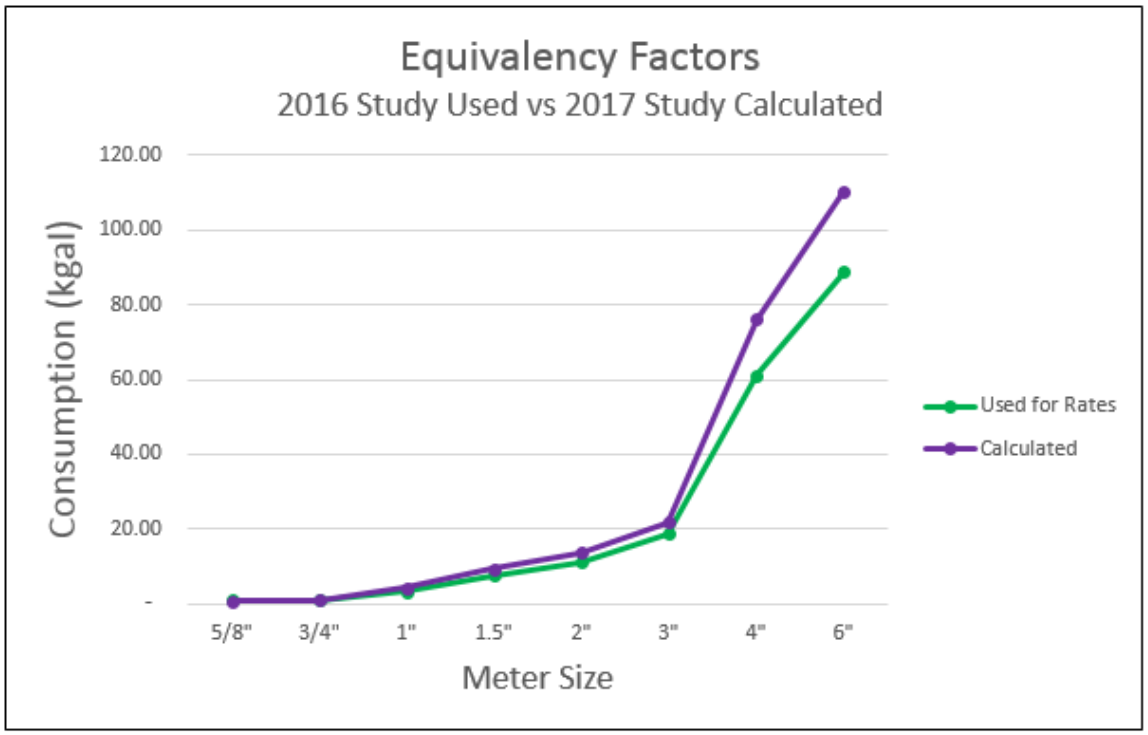
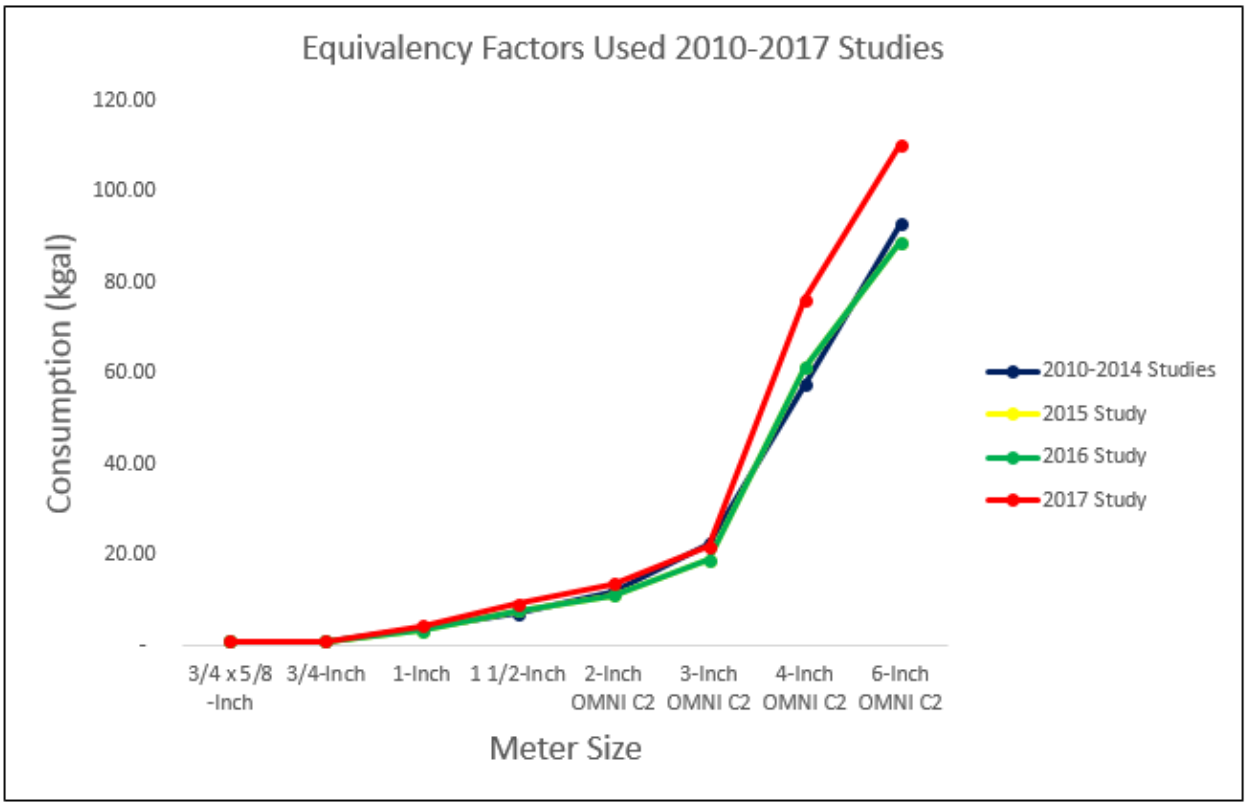


Chart 16A shows the equivalency factors that have been used over time from the 2010 to the 2017 rate and fees studies.

CHART 16A: EQUIVALENCY FACTORS USED
2010-2017 RATES AND FEES STUDIES



REPRESENTATIVE CUSTOMER BY CUSTOMER CLASS

Customer data for the last three years 2014-2016 was analyzed to determine an average representative customer by customer class that is used to represent the comparison of adopted rates versus proposed rates on a customers' typical annual bill. The process included the following steps:

- Calculate and report the average consumption, total consumption, and consumption for irrigation season and winter season based on most recent billing data (Jan16-Dec16).
- 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 each customer class.
- Customers with atypical consumption have been removed from the calculation as they skew the average calculation for a representative customer by class.

Results of the representative customer analysis are shown in Table 5. Average Winter Monthly Consumption (AWMC) is calculated for each customer by dividing the total water consumption 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. Irrigation does not typically have winter consumption, however as shown below there is a small amount that is consumed due to leaks, winterization late or early in the season.

TABLE 5: REPRESENTATIVE CUSTOMER BY CLASS BASED ON 2016 BILLING DATA

Customer Class	Meter Size	Total Consumption (kgal)	Average Monthly Consumption (Jan-Dec 2016) (kgal)	Average Winter Monthly Consumption (kgal)	Average Irrigation Monthly Consumption (kgal)
Residential	3/4"	75.24	6.56	4.09	9.14
Multifamily (with irrigation)	1.5"	851.30	65.11	50.15	81.09
Commercial (with irrigation)	3/4"	111.17	8.07	5.51	10.66
Irrigation	3/4"	179.73	14.82	1.18	28.73
Multifamily Indoor Use Only	3/4"	39.39	3.87	4.07	3.66
Commercial Indoor Use Only	3/4"	86.22	7.13	6.35	7.98

CONSUMPTION BY TIERED STRUCTURE

To compare the total water usage by tier over time, the following tables were prepared from data captured for the years 2014-2016. The comparison shows overall changes in customers' consumption patterns and will be used to evaluate the composition of rate revenue by tier for current and 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 6: BILLED USAGE BY CUSTOMER BY CLASS BY TIER JANUARY 2016-DECEMBER 2016

Class	Tier 1	Tier 2	Tier 3	Total	Tier 4
Commercial	98,189	33,970	-	132,159	-
Commercial w/ Irrig	74,469	38,253	20,947	133,669	-
Irrigation	-	298,608	51,119	349,727	-
MultiFamily	84,752	11,531	-	96,283	-
MultiFamily w/ Irrig	58,184	21,078	7,685	86,947	-
Residential	845,880	624,217	83,505	1,553,602	9,397
Total Kgals	**1,161,474**	**1,027,657**	**163,256**	**2,352,387**	**9,397**
Block % of Total	49%	44%	7%	100%	

CHART 17: ALL COMMERCIAL ANNUAL BILLED USAGE BY TIER 2011-2016

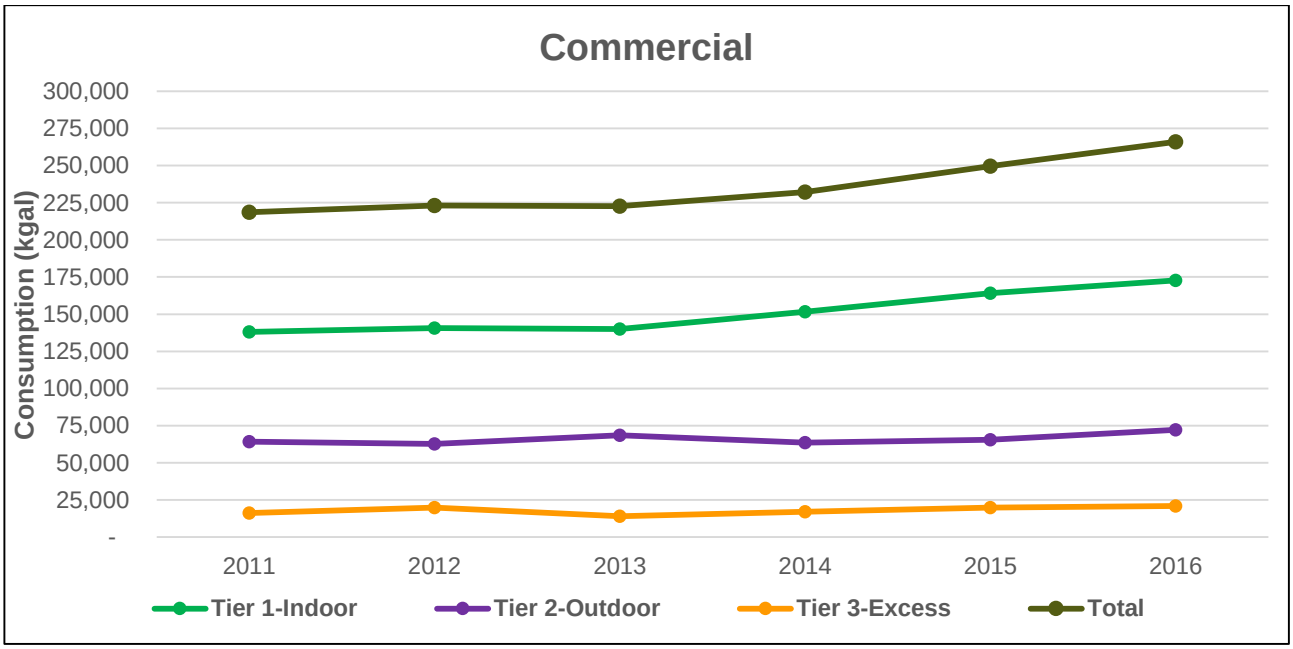


CHART 18: ALL MULTIFAMILY ANNUAL BILLED USAGE BY TIER 2011-2016

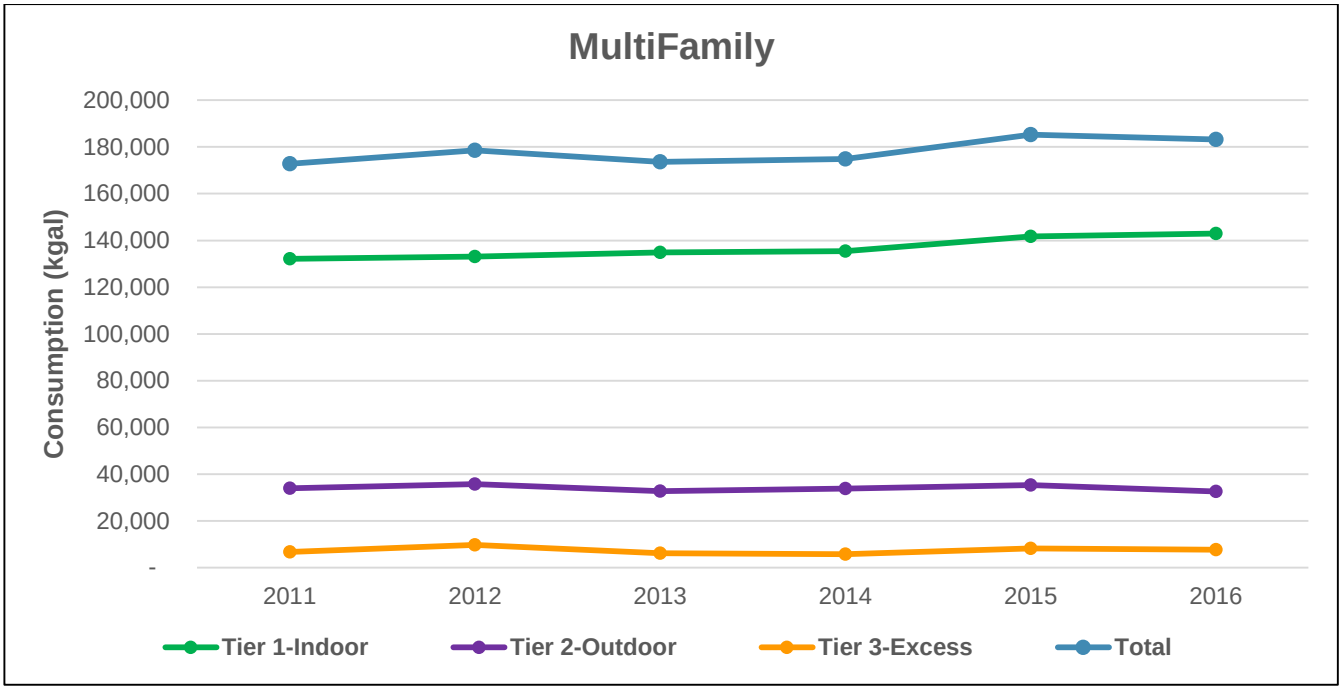


CHART 19: IRRIGATION ANNUAL BILLED USAGE BY TIER 2011-2016

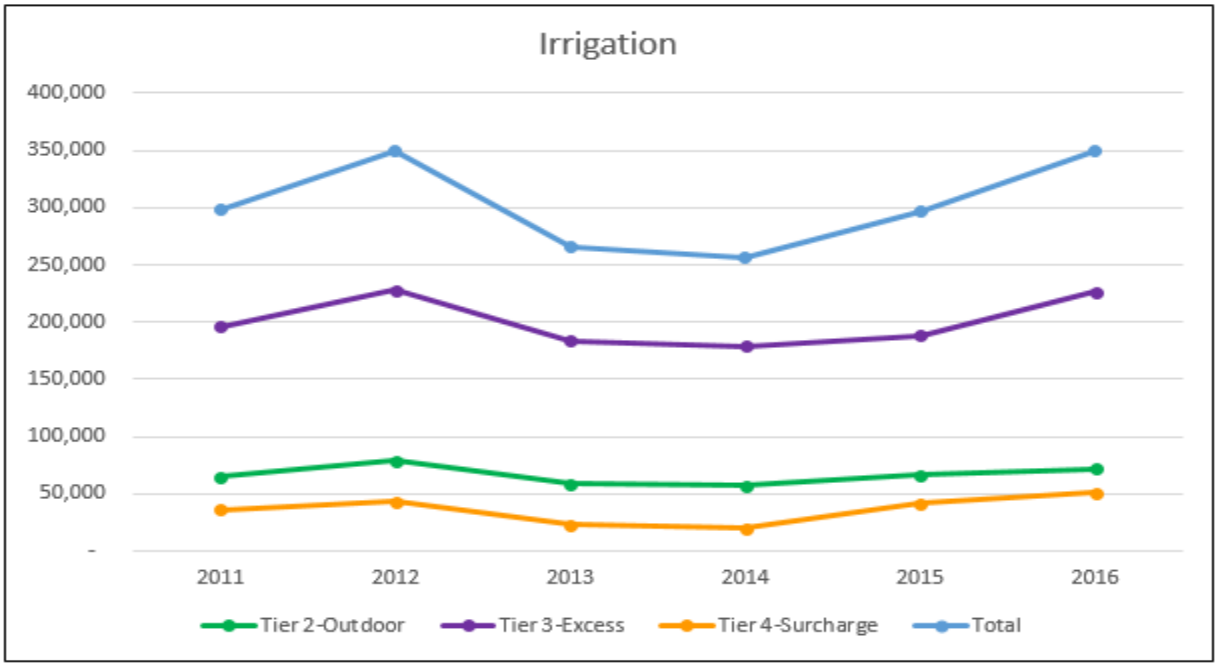


CHART 20: RESIDENTIAL ANNUAL BILLED USAGE BY TIERS (1-3) 2011-2016

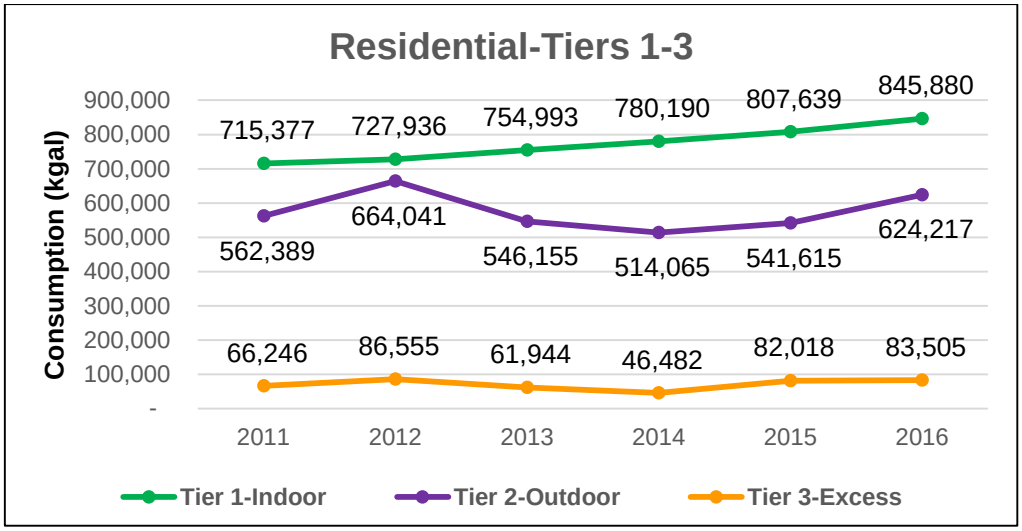
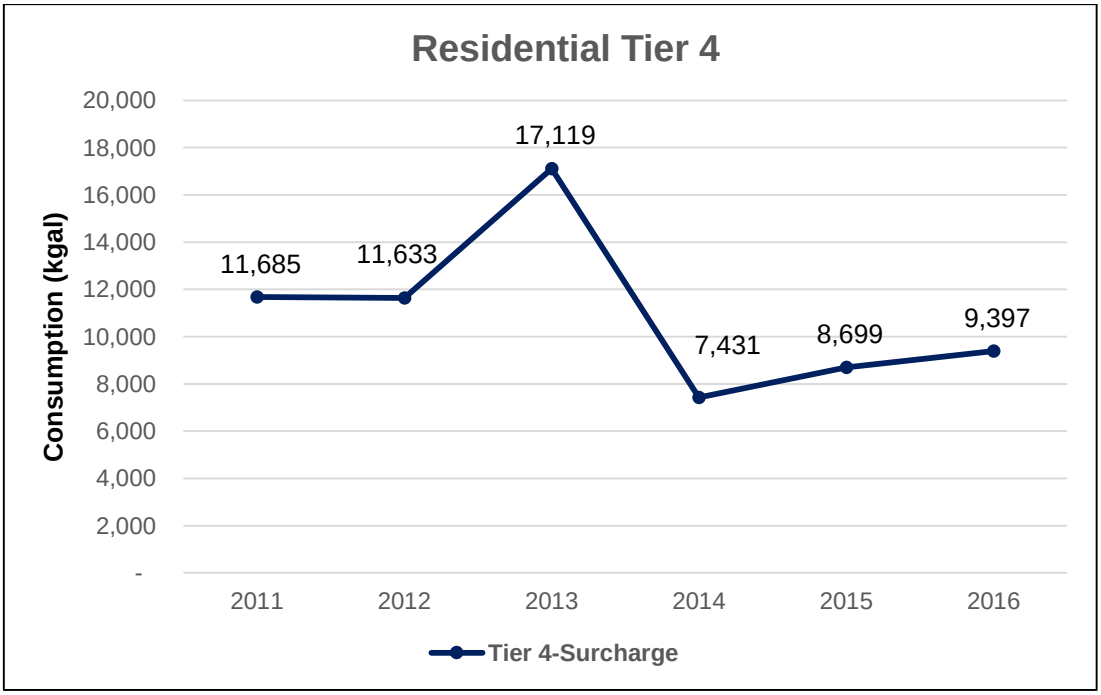


CHART 20A: RESIDENTIAL ANNUAL BILLED USAGE IN TIER 4 (2011-2016)



Charts 17-20A show that growth is resulting in consistent annual increases in total indoor use for commercial, multi-family and residential. The good news is that irrigation and Tier 2 and Tier 3 water use are staying level across all customer classes. Tier 4 usage is almost non-existent

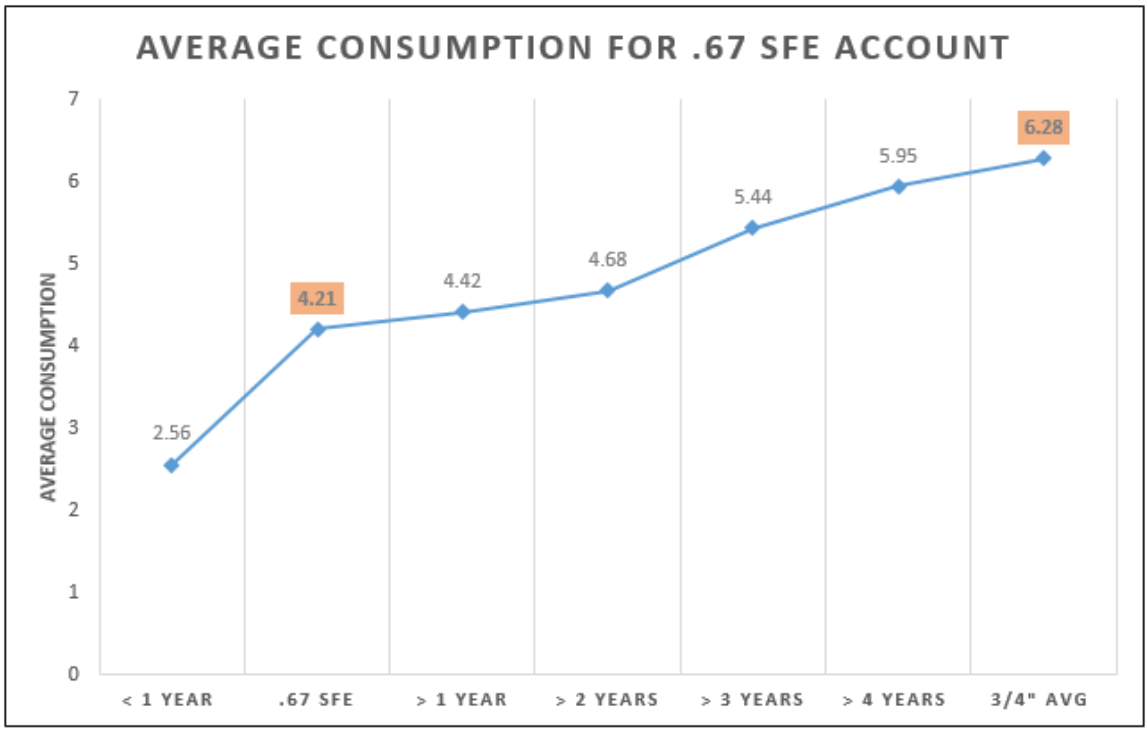
at this point. Castle Rock Water analyzed the impact on accounts if the Tier 4 was reduced to a cap of 30,000 gallons or 35,000 gallons rather than 40,000 gallons that is currently in place.

The analysis showed that in 2016 there were 485 residential customers who were at or over the 40,000 gallons per month threshold at least once during the January 2016-December 2016 capture period. We then took the same data and lowered the threshold to 35,000 gallons which then impacted 777 residential customers. The same data was then used to lower the threshold to 30,000 gallons, which impacted approximately 1,294 customers. In conclusion, the reduction of the 40k gallon surcharge threshold to 30k only impacted approximately 7% of the residential customers and accounted for 1.6% of the total residential consumption. Most of the consumption that is charged in Tier 4 surcharge is the result of a leak, which then based upon Castle Rock Water's leak policy, if the leak is found and repaired is credited to the customer's account.

5/8" ACCOUNTS - .67 SFE

Castle Rock Water evaluated these accounts to determine performance relative to the goal of 67% of average residential use. Chart 21 shows mixed results. More detailed evaluation showed that certain homebuilders were not meeting the intent, while others were. Administrative changes were made to the approval process which should increase performance of these accounts. The 6.28 is the average monthly consumption for a ¾" residential account or 1 SFE, whereas the 4.21 is the monthly consumption that a .67 SFE account should be using.

CHART 21: .67 SFE ACCOUNTS CONSUMPTION BY YEAR



IMPACT OF IRRIGATED AREAS

Chart 22 shows the number of residential accounts by irrigated area. Chart22A shows the average monthly consumption by irrigated area. As you would expect the more irrigated area the more the average consumption is used per month. Chart 23 shows total usage by irrigated area for commercial accounts. Chart 23A shows average monthly consumption for commercial accounts by irrigated area.

CHART 22: RESIDENTIAL ACCOUNTS BY IRRIGATED AREA

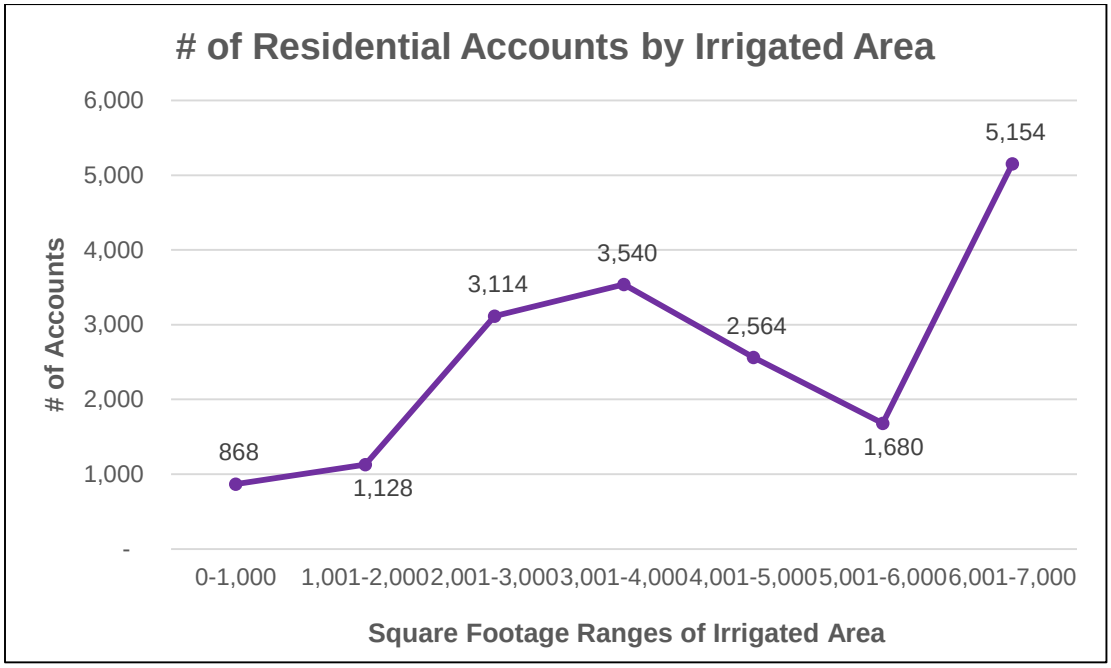


CHART 22A: RESIDENTIAL AVERAGE MONTHLY CONSUMPTION BY IRRIGATED AREA

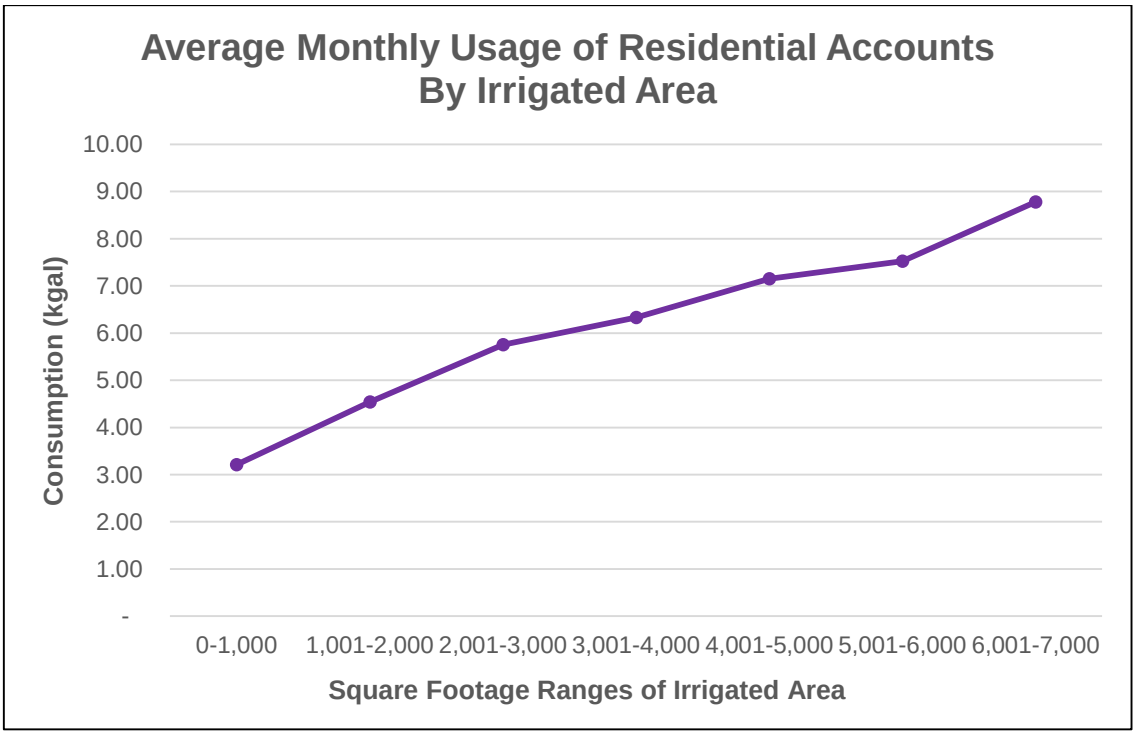


CHART 23: COMMERCIAL ACCOUNTS BY IRRIGATED AREA

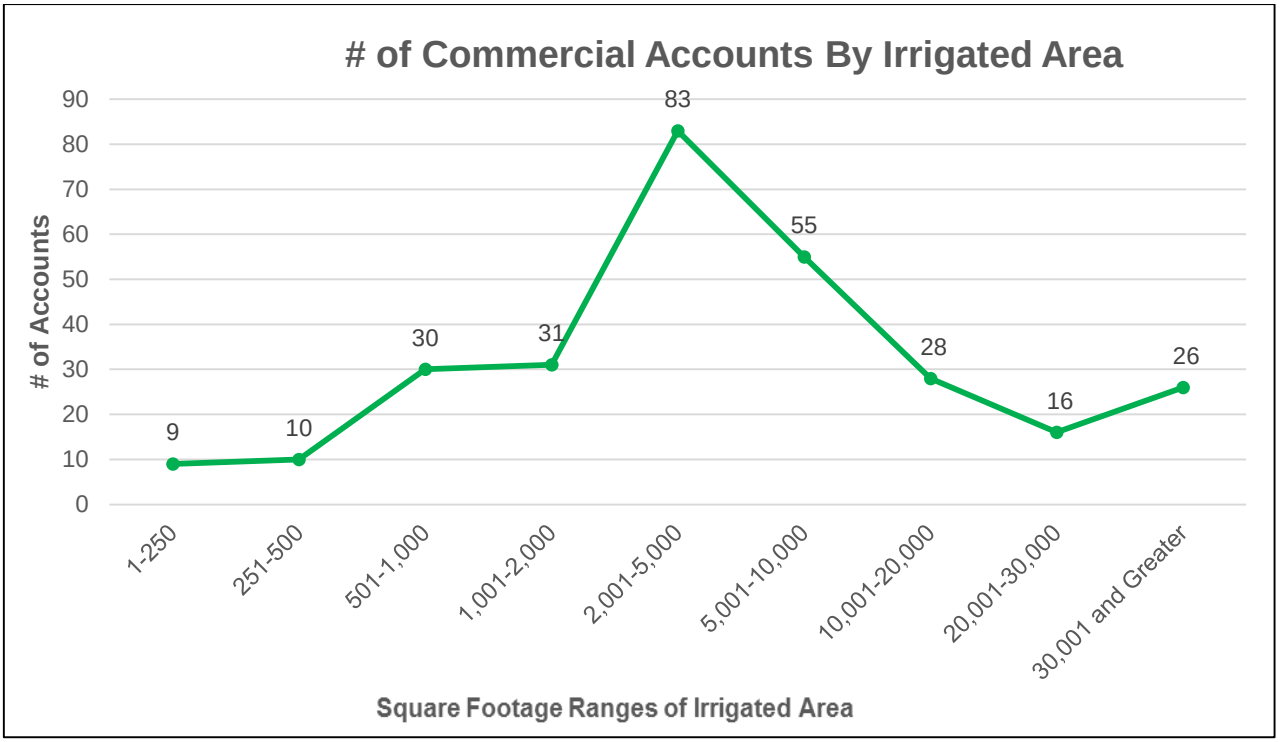


CHART 23A: COMMERCIAL AVERAGE MONTHLY CONSUMPTION BY IRRIGATED AREA

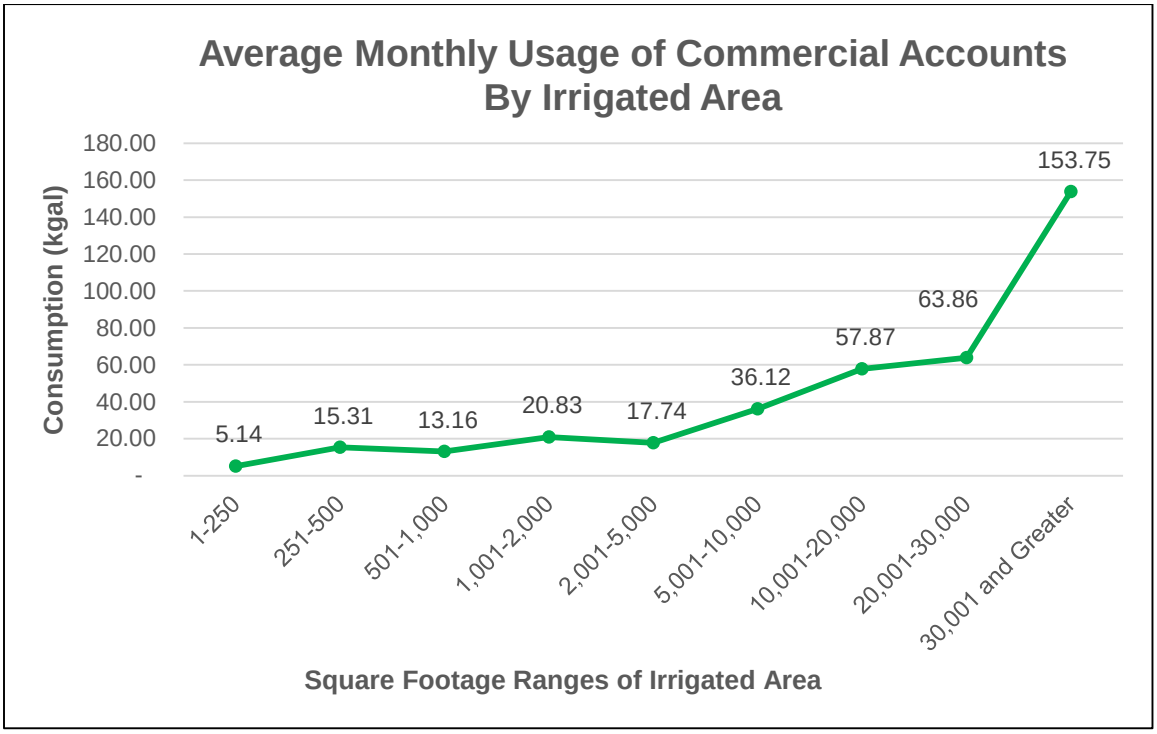


Chart 24 shows the average monthly consumption for all HOA accounts combined.

CHART 24: All HOA's
AVERAGE MONTHLY CONSUMPTION

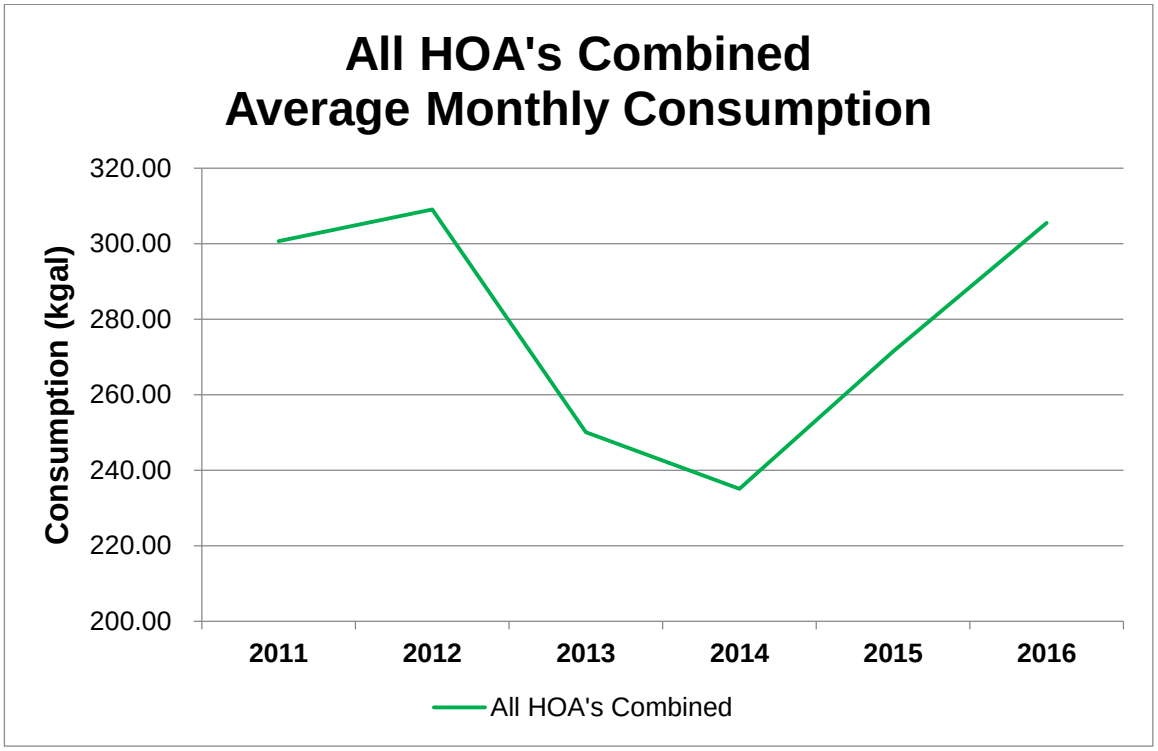
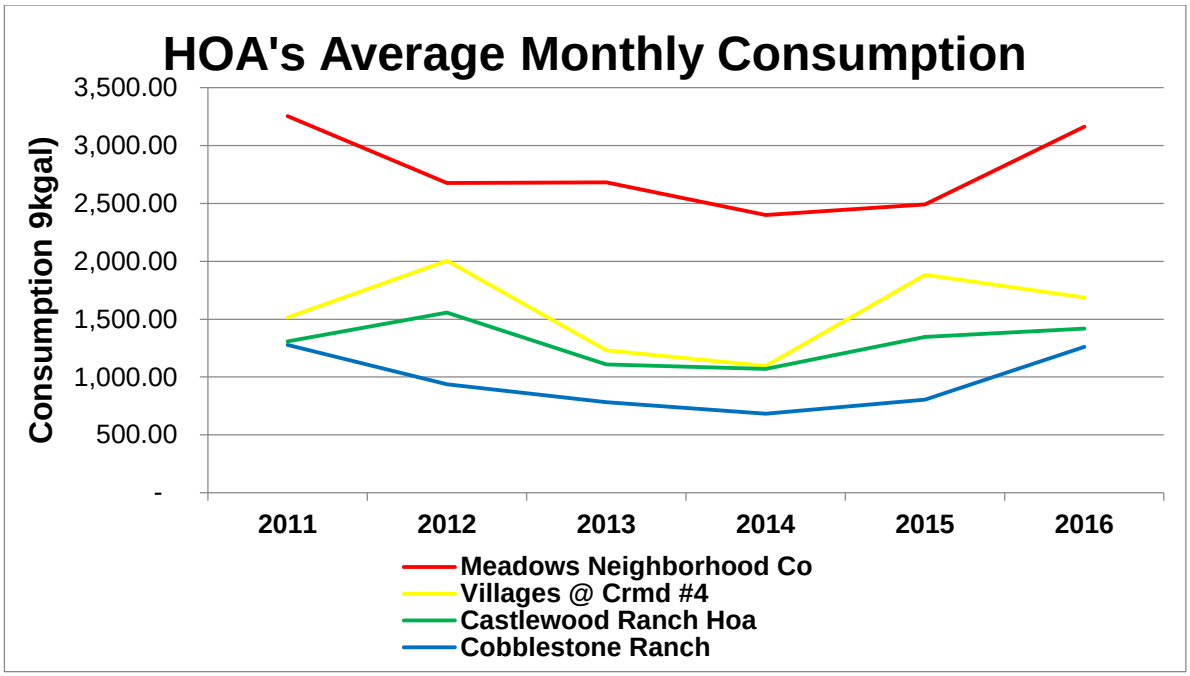


Chart 25 shows four HOA's that were selected at random to show the average monthly consumption patterns for these user types.

CHART 25: SELECT HOA's
AVERAGE MONTHLY CONSUMPTION



MONTHLY CONSUMPTION BY SUBDIVISION

CHART 26: MEADOWS
AVERAGE MONTHLY CONSUMPTION

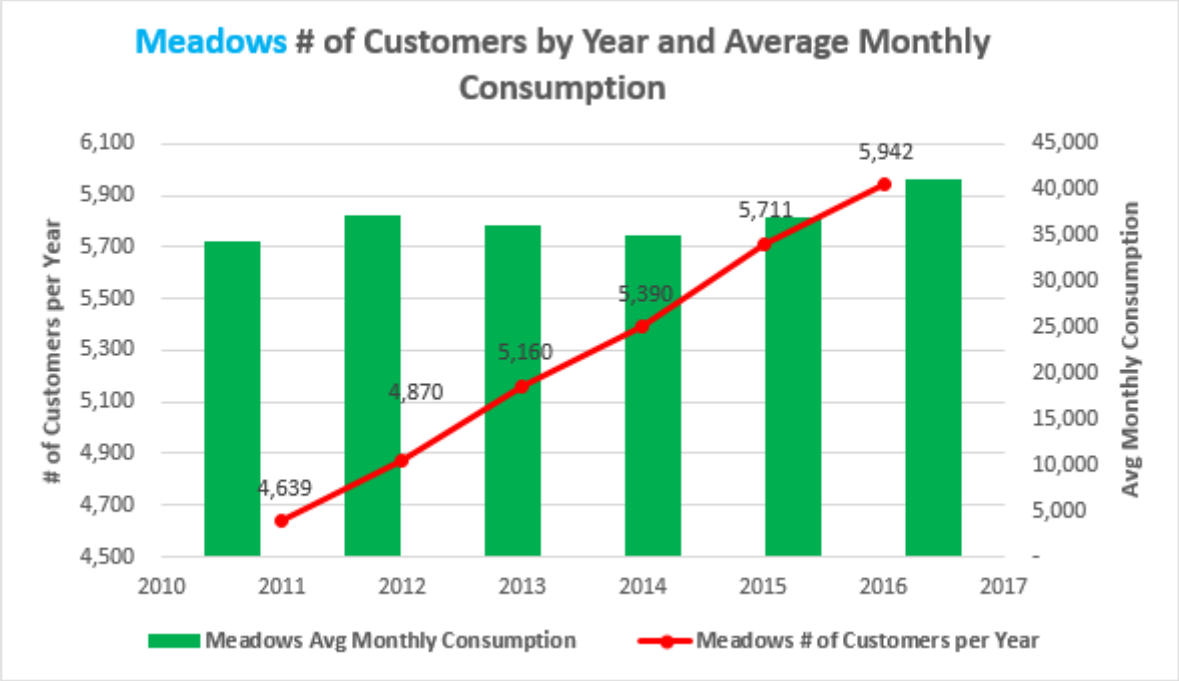


CHART 27: MEADOWS RESIDENTIAL ACCOUNTS BY IRRIGATED AREA

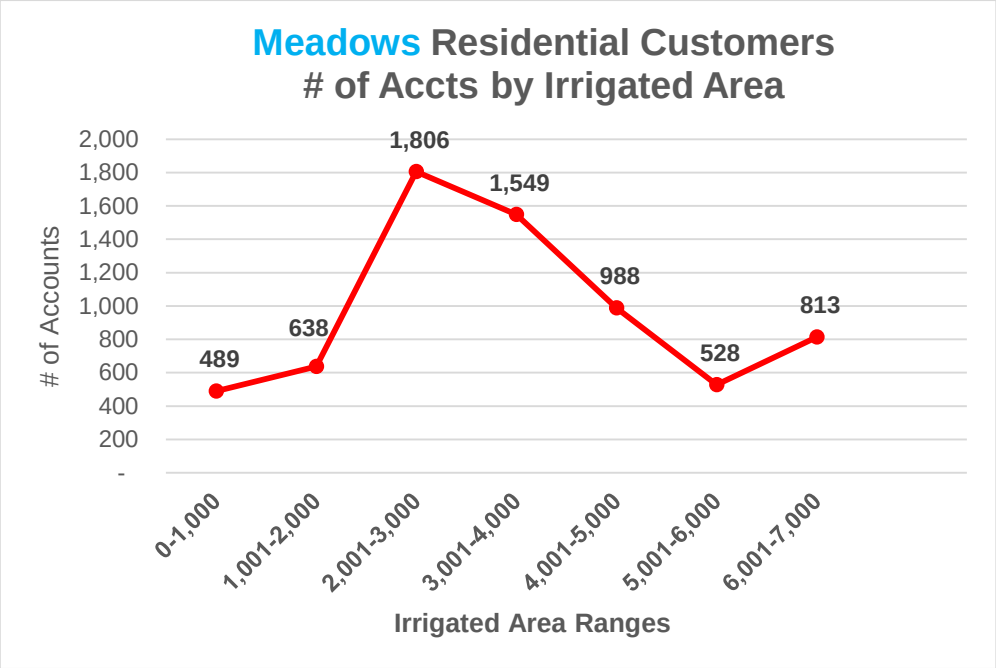


CHART 28: FOUNDERS AVERAGE MONTHLY CONSUMPTION

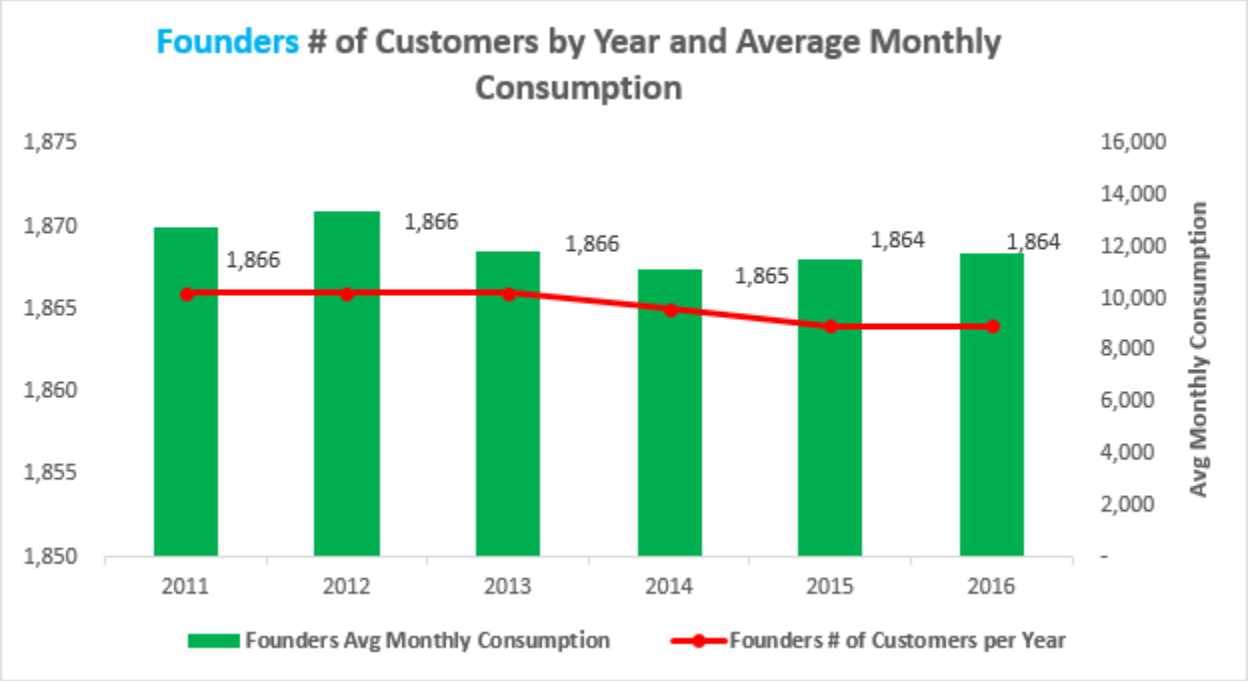


CHART 29: FOUNDERS RESIDENTIAL ACCOUNTS BY IRRIGATED AREA

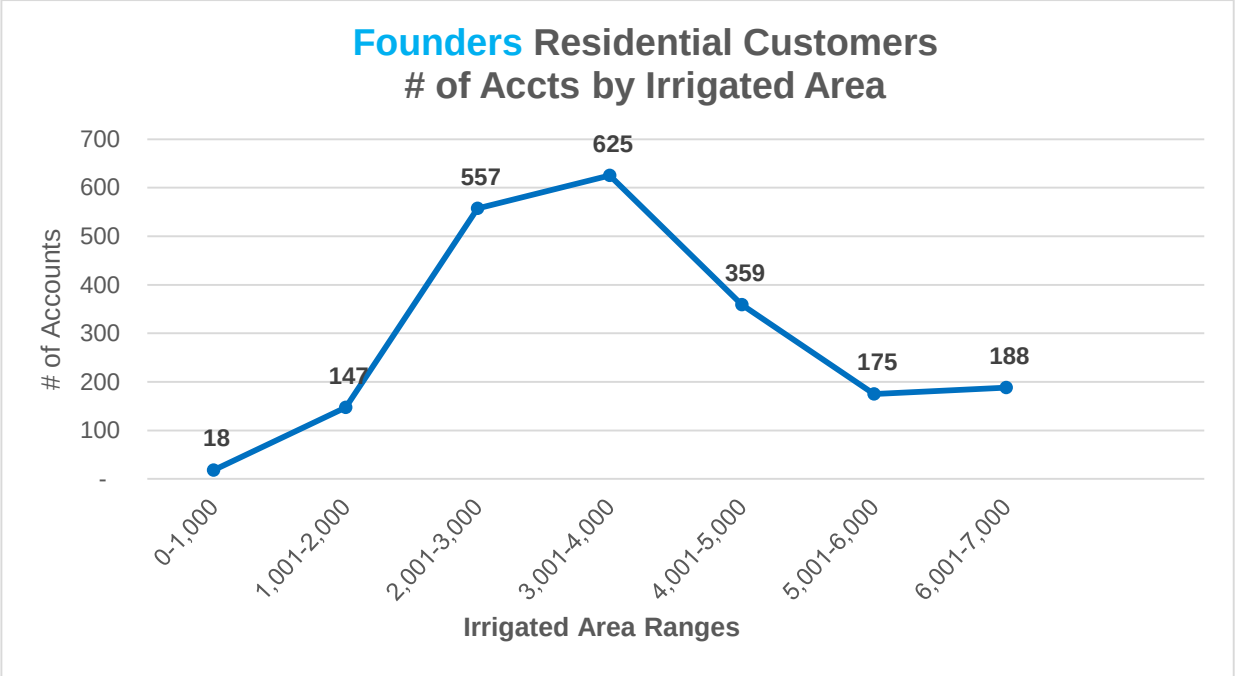


CHART 30: PLUM CREEK AVERAGE MONTHLY CONSUMPTION

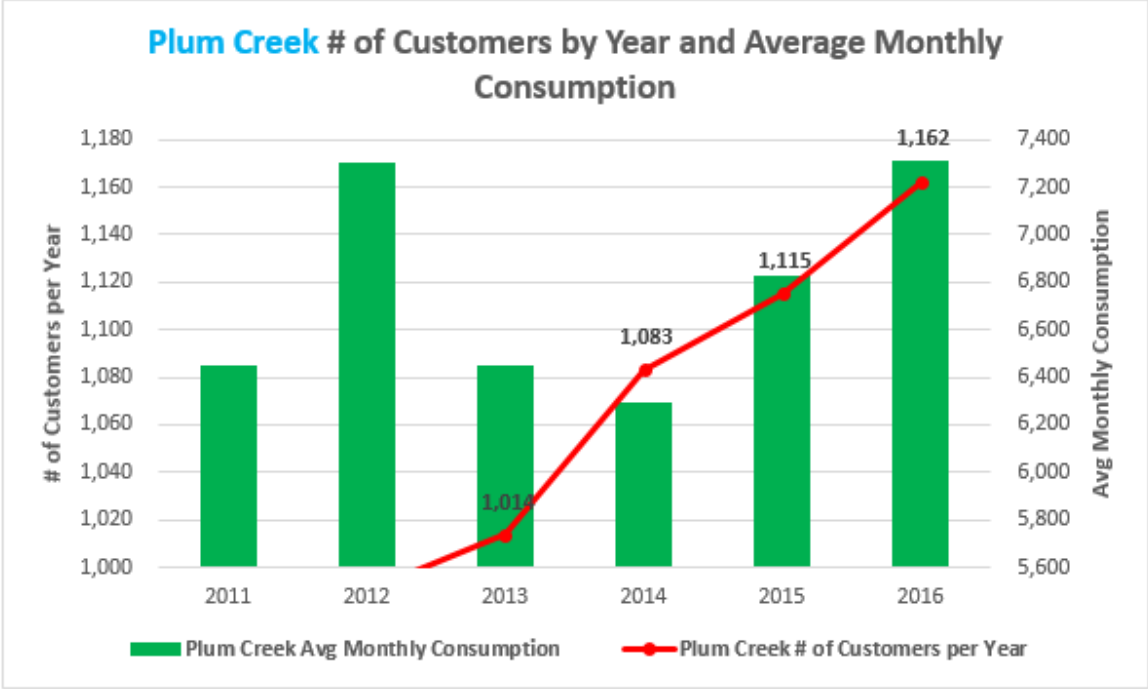


CHART 31: PLUM CREEK RESIDENTIAL ACCOUNTS BY IRRIGATED AREA

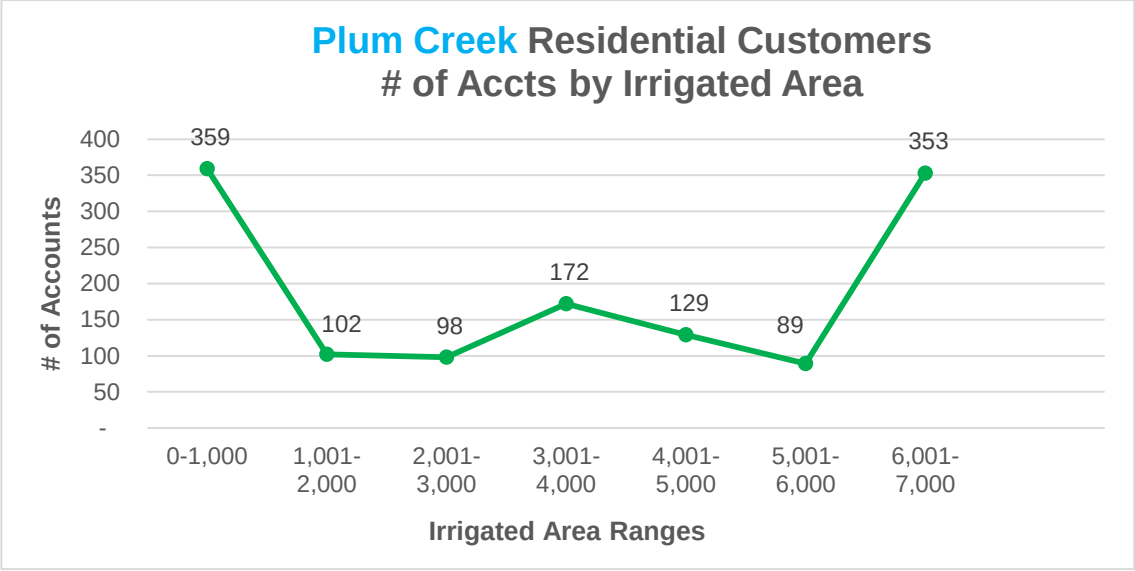
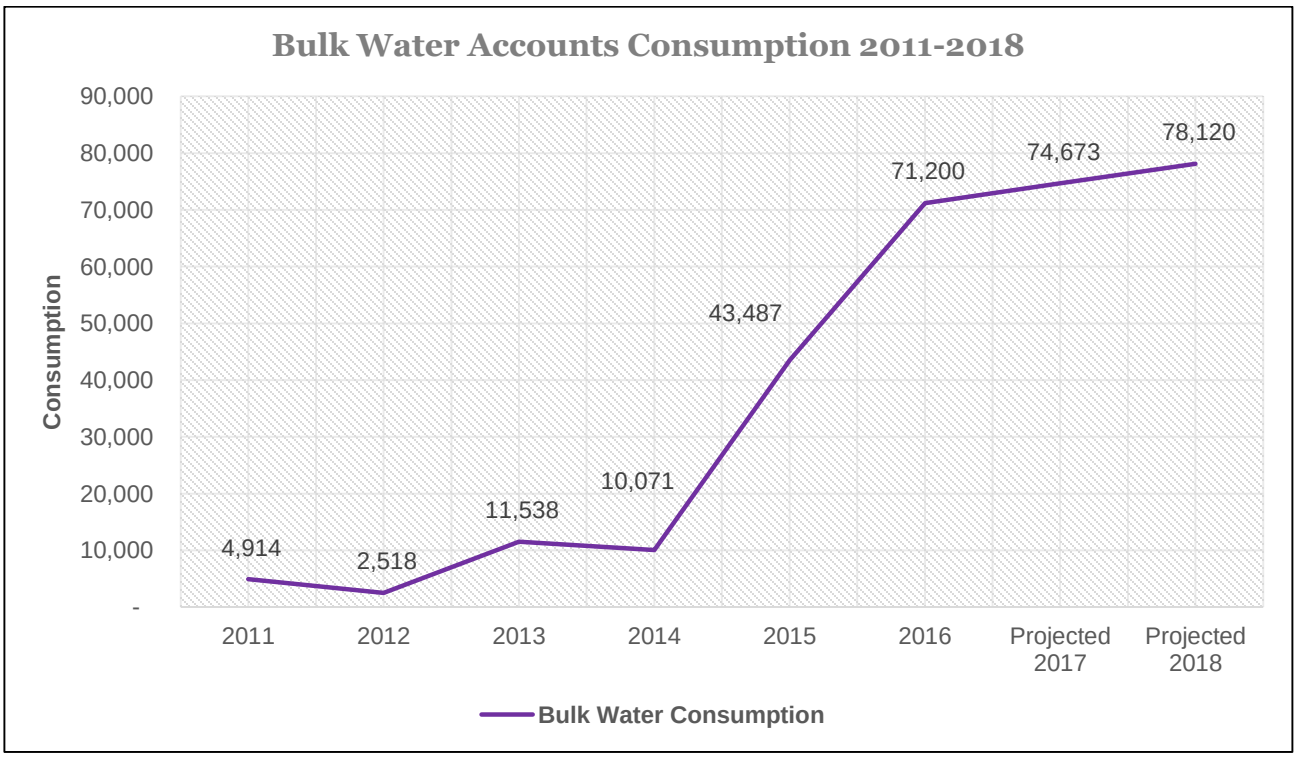


CHART 32: BULK HYDRANT CONSUMPTION DATA 2011-PROJECTED 2018



WASTEWATER ENTERPRISE FUND

NUMBER OF ACCOUNTS BY METER SIZE & CUSTOMER CLASS

Table 7 shows the number of accounts by meter size and customer class using 12 months of billing data (Jan16-Dec16). This shows that 18,866 customers were receiving wastewater service during this capture period. The FY2015 accounts based on 12 months of billing data (Jan15-Dec15) shows that 18,157 accounts were receiving wastewater service. There are 709 more accounts in FY2016 than FY2015.

There are approximately 727 less customers receiving wastewater service than water service due to irrigation customers who don't have wastewater and a few customers who have their own septic thus not utilizing the Town's wastewater services.

TABLE 7: ACCOUNTS BY METER SIZE & CUSTOMER CLASS (FY2016)

Meter Size	Residential	Multifamily	Commercial	MultiFamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	643	-	4	-	-	647
3/4"	17,230	14	125	100	106	17,575
1"	18	25	69	64	68	244
1.5"	-	55	48	90	62	255
2"	-	15	25	40	41	121
3"	-	2	5	-	13	20
4"	-	1	-	-	1	2
6"	-	-	2	-	-	2
Total	17,891	112	278	294	291	18,866

CHART 33: RESIDENTIAL ONLY ACCOUNTS 2011-PROJECTED 2018

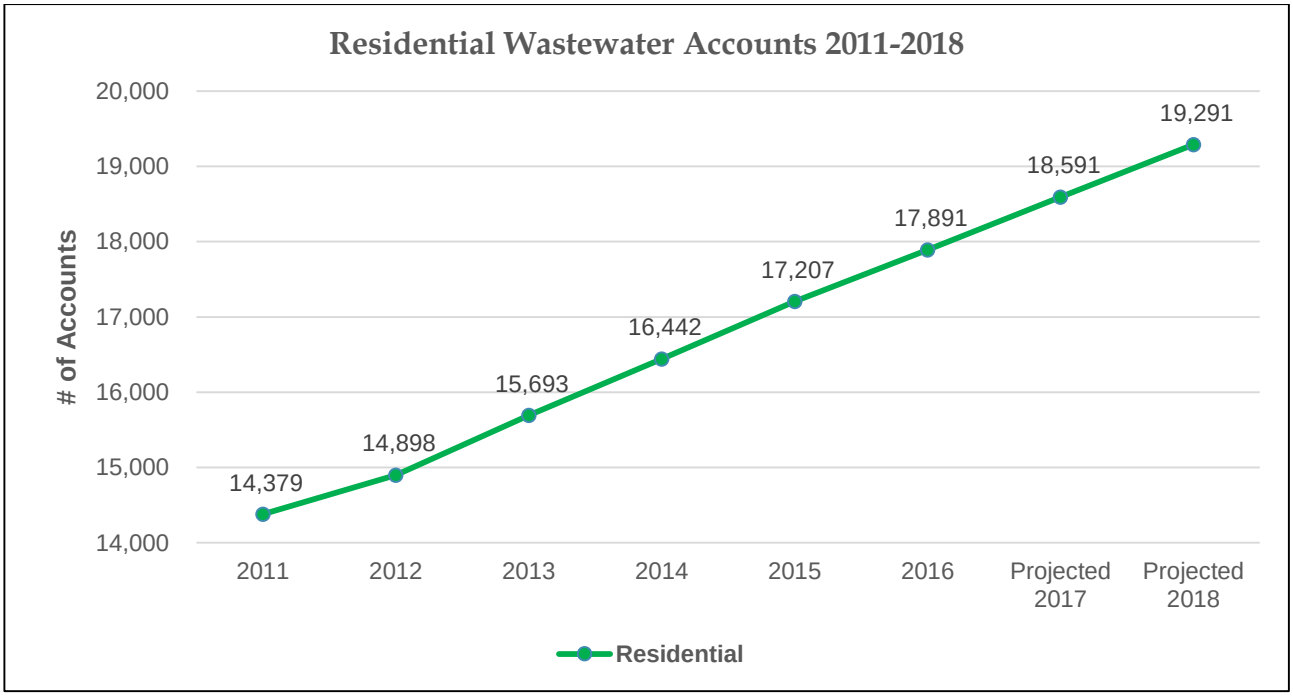
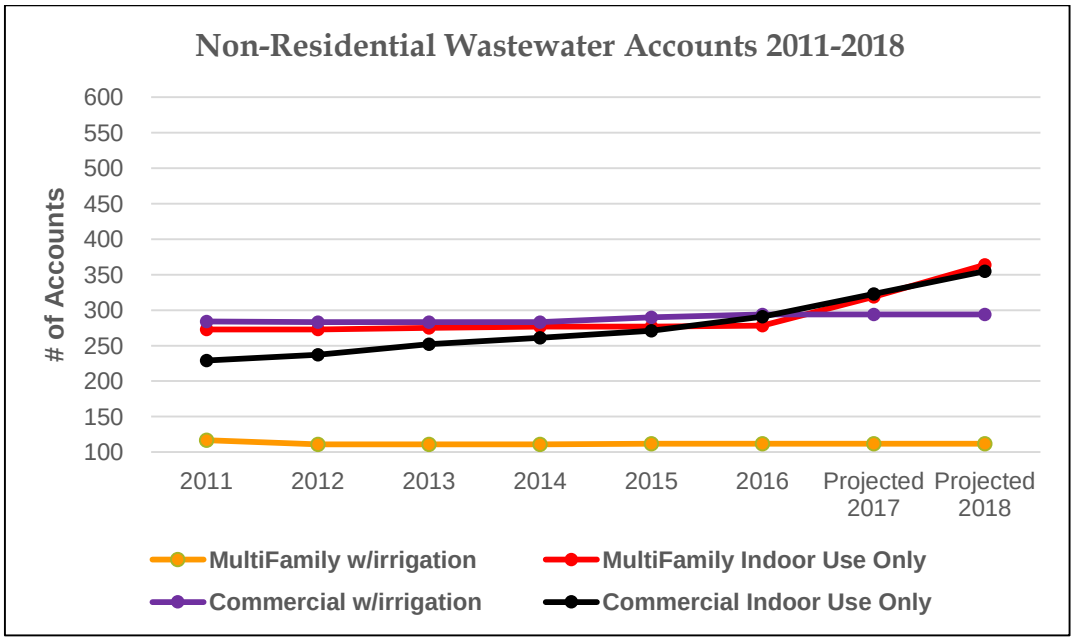


CHART 34: NON-RESIDENTIAL ACCOUNTS 2011-PROJECTED 2018



Castle Rock Water projects FY2018 wastewater accounts by using 2016 billing data plus projected growth for FY2017 and FY2018. The FY2018 wastewater accounts are projected to equal 20,416. Growth is projected for the following classes:

2017 Projected Accounts by Customer Class:

84	Residential (.67 SFE)
616	Residential (1 SFE)
41	Multi-Family
32	Commercial
773	Total

2018 Projected Accounts by Customer Class:

84	Residential (.67 SFE)
616	Residential (1 SFE)
45	Multi-Family
32	Commercial
777	Total

Total growth of 773 accounts is projected for FY2017 and 777 for FY2018 for a total of 1,550 projected for the wastewater fund thru FY2018.

WATER RESOURCES ENTERPRISE FUND

NUMBER OF ACCOUNTS BY METER SIZE & CUSTOMER CLASS

Table 8 shows the number of accounts by meter size and customer class using 12 months of billing data (Jan16-Dec16). This shows 19,579 accounts being served by the water resources enterprise fund. The FY2015 accounts based on 12 months of billing data (Jan15-Dec15) showed 18,818 water resources accounts. There are 761 more accounts in FY2016 than in FY2015.

TABLE 8: ACCOUNTS BY METER SIZE AND CUSTOMER CLASS (FY2016)

Meter Size	Residential	Multifamily	Commercial	Bulk	Irrigation	MultiFamily Indoor Use Only	Commercial Indoor Use Only	Total
5/8"	643	-	5	-	21	-	-	669
3/4"	17,385	14	128	95	127	100	113	17,962
1"	19	25	70	-	88	64	72	338
1.5"	-	55	50	-	118	90	62	375
2"	-	15	25	-	79	40	42	201
3"	-	2	5	-	7	-	14	28
4"	-	1	-	-	2	-	1	4
6"	-	-	2	-	-	-	-	2
Total	18,047	112	285	95	442	294	304	19,579

CHART 35: RESIDENTIAL ACCOUNTS 2011-PROJECTED 2018

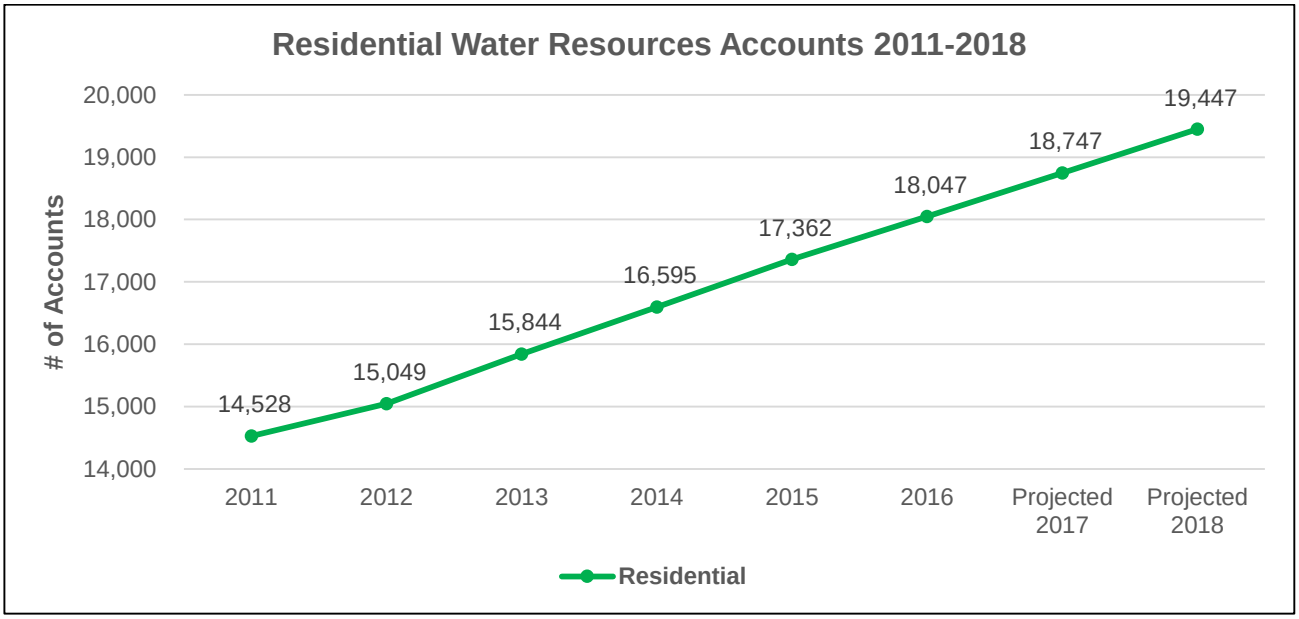
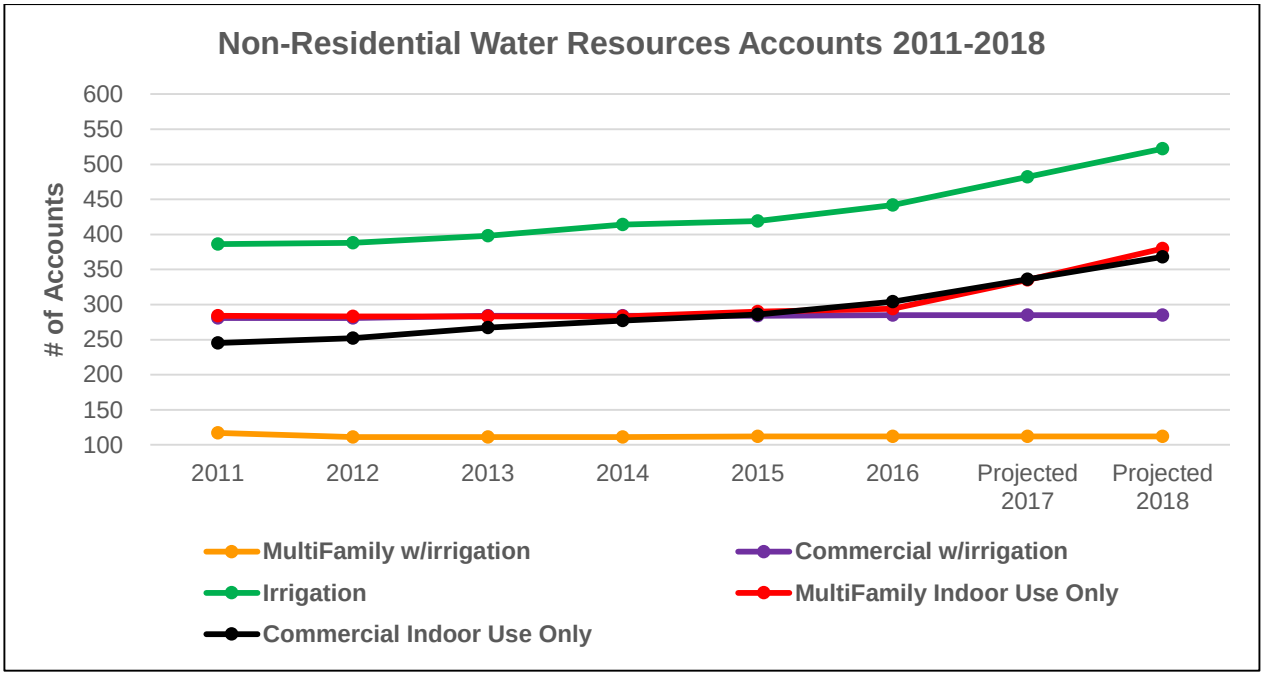


CHART 36: NON-RESIDENTIAL 2011-PROJECTED 2018



Castle Rock Water projects FY2018 water resources accounts by using 2016 billing data plus projected growth for FY2017 and FY2018. The FY2018 water resources accounts are projected to equal 21,219. Growth is projected for the following classes:

2017 Projected Accounts by Customer Class:

84 Residential (.67 SFE)
616 Residential (1 SFE)
41 Multi-Family
32 Commercial
40 Irrigation
813 Total

2018 Projected Accounts by Customer Class:

84 Residential (.67 SFE)
616 Residential (1 SFE)
45 Multi-Family
32 Commercial
40 Irrigation
817 Total

Total growth of 813 accounts is projected for FY2017 and 817 for FY2018 for a total of 1,630 projected for the water resources fund thru FY2018.

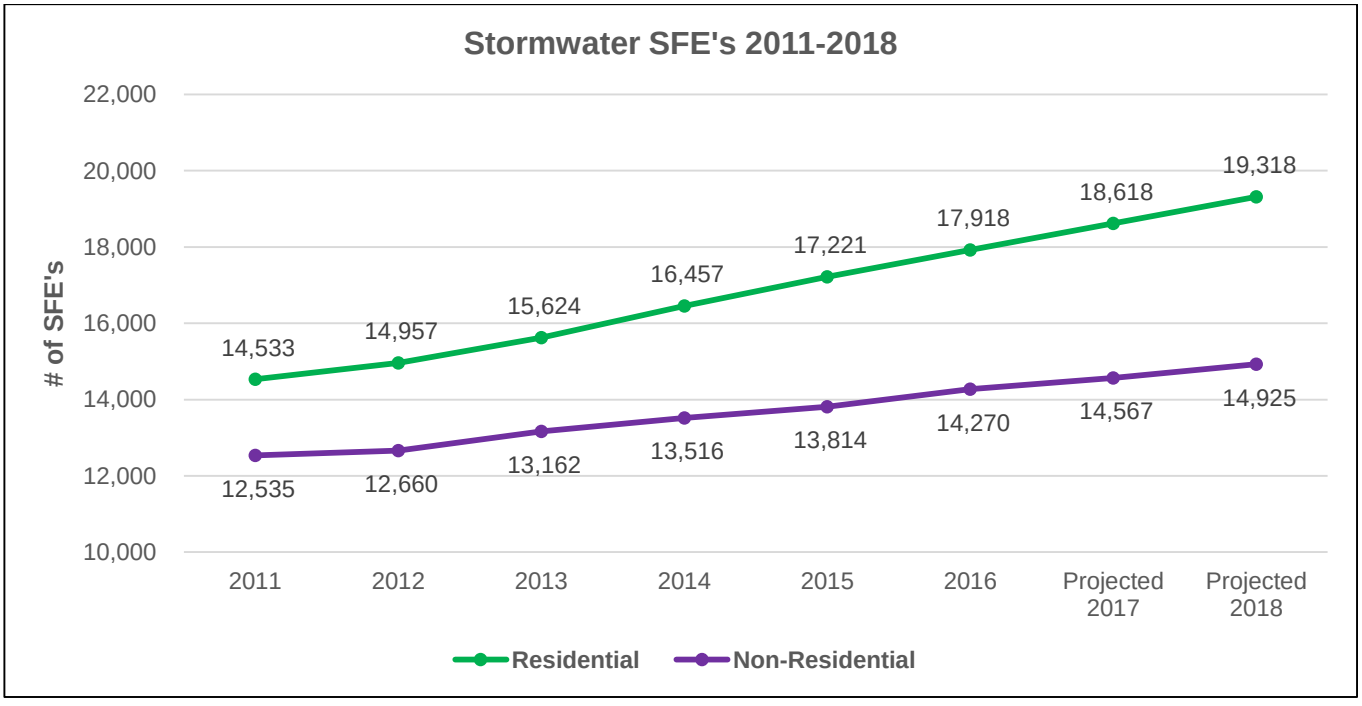
STORMWATER ENTERPRISE FUND

Table 9 shows stormwater average monthly SFEs accounts based on 12 months of billing data (Jan16-Dec16). This shows that 32,188 SFE's were receiving stormwater services during this capture period. The FY2015 billing data (Jan15-Dec15) showed 31,035 SFE's receiving stormwater services. There are 1,153 more SFE's in FY2016 than FY2015.

TABLE 9: STORMWATER SFE'S (JAN 16-DEC 16)

	Total Monthly SFE's
Residential	17,918
Non-Residential	14,270
Stormwater SFE's	32,188

CHART 37: SFE'S 2011-PROJECTED 2018



Castle Rock Water shows FY2018 projected stormwater SFE's based on 12 months of billing data (Jan16-Dec16) plus projected growth for FY2017 and FY2018. The FY2018 stormwater SFE's are projected to equal 34,243. Growth is projected for the following classes:

2017 Projected Accounts (SFE's)

700	Residential
98	Detached in Cherry Creek Basin
602	Detached in Plum Creek Basin
297	Commercial in the Plum Creek Basin

2018 Projected Accounts (SFE's)

700	Residential
203	Detached in Cherry Creek Basin
497	Detached in Plum Creek Basin
358	Commercial in the Plum Creek Basin

Total growth of 997 SFEs are projected for the stormwater fund in FY2017 and 1,058 SFEs are projected for FY2018. The 2018 increase is largely due to an increase in commercial SFEs in the Plum Creek Basin.

Appendix D

Stantec Consulting Services, Inc. Study Review Letter

Stantec Consulting Services Inc.
370 Interlocken Boulevard Suite 300, Broomfield CO 80021-8012

September 12, 2017

Anne Glassman, Business Solutions Manager
Castle Rock Water
175 Kellogg Ct.
Castle Rock, CO 80109

Reference: Stantec Review Services for Castle Rock Water's 2017 Rates and Fees Study Volume 1 of 2, 2018 – 2022 Rates

Dear Anne,

As part of the 2017 Rates and Fees Study, Stantec Consulting Services Inc. (Stantec) was engaged by Castle Rock Water (CRW) as a third-party reviewer of CRW's methodology and findings. In preparing review comments and recommendations, Stantec has relied on the information and data presented by CRW without independent verification. The intent of our review was to provide an outside perspective of CRW's work products and models, as well as financial policies, based on our experience and best practices in the industry.

CRW's efforts to optimize capital project funding while maintaining reserves, meeting targets, and minimizing rate increases are in line with industry best practices. Additionally, by funding growth-related capital projects with impact and development fee revenue, CRW is making efforts to ensure "growth pays for growth," and is adhering to the industry standard of allocating costs to beneficiary parties.

For further insight into CRW's financial standing relative to industry standards, the water and wastewater financial planning models contain a Key Performance Indicators (KPI) worksheet. The KPI worksheet forecasts and compares financial performance against ratings agency standards, internal targets, or industry benchmarks. Metrics evaluated include but are not limited to: outstanding debt to operating revenues, total debt service coverage, service affordability, and days cash on hand. For each metric, with the exception of days cash on hand, CRW is performing at or above levels recommended by ratings agencies for highly rated utilities.

Days cash on hand is identified by Fitch Ratings as an indicator of financial flexibility to pay near-term obligations. For several years of the five-year rate period (2018-2022), CRW's fund balances in total are projected to be lower than the 365 days recommended by the ratings agencies. While this is not an issue in itself, it indicates a target for CRW should revenue bonds be required in the near future.

Following a cost-of-service based approach to establishing rates is recommended by the American Water Works Association (AWWA) and Water Environment Federation (WEF). While CRW updates the cost-of-service models for water and wastewater annually, Stantec recommends periodic review of actual revenues collected by customer class compared to class-specific costs

of service. These comparisons will indicate whether adjustments to rates for certain customer classes may be needed to better align rates with costs of service by class.

In reviewing annual revenue requirements for CRW's water and water resources funds, it may be more equitable for CRW's customers' monthly rates to be based on a single water fund. The two funds share PCWPF treatment expenses and assets for one water system. Consolidating funds could better align monthly rates and charges with the appropriate costs and alleviate pressure on fixed charges while recovering volume-related costs through volumetric rates. Separate water resources SDFs could still be charged to recover capacity costs of CRW's long-term water resources plan. This consolidated approach is practiced by several utilities in the South Metro Water Supply District.

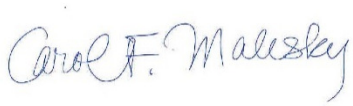
Finally, CRW's water budget-based rate structure, while in place since 2009/2010, is still considered an innovative approach in the industry for addressing water conservation. CRW remains one of the few utilities in Colorado to have successfully implemented such a structure. Stantec recommends revisiting the primary assumptions of evapotranspiration (ET) requirements and water budget allocations to address possible refinements to its water conservation goals.

Stantec's specific recommendations for CRW's rates are found in the Summary of the Volume 1 of 2 2018 – 2022 Rates Report.

We enjoyed the opportunity to work with you and your staff on this study. Please contact me at (330) 271-9125 if you have any questions.

Regards,

STANTEC CONSULTING SERVICES INC.



Carol Malesky
Principal
Phone: (303) 410-4077
carol.malesky@stantec.com