Draft Report

City of Bozeman

Comprehensive Water Rate Study

April 2007

Prepared by:

HDR Engineering, Inc.

ONE COMPANY | *Many Solutions*℠

April 10, 2007

Ms. Anna Rosenberry, CPA
Finance Director
City of Bozeman
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Bozeman, Montana 59771-1230

Dear Ms. Rosenberry:

Please find attached the draft final report on the comprehensive water rate study prepared by HDR Engineering, Inc. (HDR) for the City of Bozeman (City). The conclusions and recommendations contained within this report are intended to enable the City's water utility to operate on a prudent and financially sound basis.

This report has been developed from the City's data and information utilizing generally accepted rate-setting techniques. The findings, conclusions and recommendations of this report provide the basis for the development of fair and equitable water rates for the City.

We appreciate your assistance, along with that of the City's management team and staff in the development of this report. We look forward to the opportunity to provide other technical assistance in the future.

Sincerely yours,
HDR Engineering, Inc.

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Vice President

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Executive Summary

Introduction

HDR Engineering (HDR) was retained by the City of Bozeman (City) to conduct a comprehensive water rate study. The objective of the comprehensive rate study was to develop a financial plan and cost-based water rates necessary to meet the City's operation and maintenance (O&M) needs and the capital improvement program for the water utility. This study determined the adequacy of the existing water rates and provides the framework for any needed future rate adjustments.

> ***"The objective of the comprehensive rate study was to develop a financial plan and cost-based rates necessary to meet the City's operation and maintenance needs and the capital improvement program for the water utility."***

In developing this study the capital improvement plan projects were major cost drivers for the study. The amount and timing of these projects were key in establishing the financial revenue requirements for the water utility.

Key Water Rate Study Results

Based upon the technical analysis undertaken as a part of this study, the following findings, conclusions and recommendations were noted.

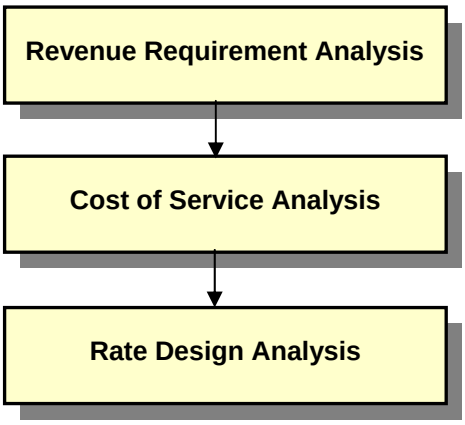
- Minimum water reserve levels are recommended to increase financial stability.
- Maintain water capital funding from rates equal to or greater than depreciation to ensure adequate funding for replacement of existing infrastructure.
- Revenue requirements were developed for a six-year period of fiscal year 2007 through 2012. The City's overall revenue levels for 2007, 2008 and 2009 appear adequate. However, rate adjustments of 2.6%/year are recommended for 2010, 2011 and 2012.
- Based upon the findings of the water cost-of-service analyses conducted, it appears that there are some interclass differences (customers slightly under or over-paying). A slow ramping-in of interclass changes or cost of service adjustments is recommended.
- At this time, no major change in the water rate structure is recommended, except to add a tiered rate structure for residential customers to encourage efficient outdoor water use.

Provided below is the executive summary of the analyses undertaken for the City and the findings, conclusions and recommendations reached as a result of this study.

Overview of the Rate Study Process

A comprehensive rate study consists of three interrelated analyses. Table ES-1 provides an overview of these analyses.

Table ES-1
Overview of the Comprehensive Rate Analyses



Compares the revenue of the utility to the expenses to determine the overall rate adjustment required

Allocates the revenue requirements to the various customer classes of service in an equitable manner

Considers both the level and structure of the rate design to collect the appropriate and targeted level of revenues

A comprehensive review of the City's water rates was undertaken using each of the analyses shown above. In this process, the water utility was evaluated on a "stand-alone" basis. That is, no subsidies between other utilities should occur. By viewing the water utility on a stand-alone basis, the need to adequately fund both O&M and capital infrastructure must be balanced against the rate impacts to customers.

Prudent Financial Planning

In developing revenue requirements, the City's budget documents are used as the initial starting point. However, within the development of the revenue requirements, the analysis should also consider prudent financial planning criteria. The prudent financial planning criteria considered during the development of this study were as follows:

- **ESTABLISHING A MINIMUM FUNDING LEVEL FOR CAPITAL PROJECTS FUNDED FROM RATES** – Prudent financial planning dictates that a utility should fund a certain portion of capital improvement projects from rates on an on-going basis. The general financial guideline used is that at a minimum, a utility should fund an amount equal to or greater than annual depreciation expense.
- **ESTABLISHING A MINIMUM DEBT SERVICE COVERAGE RATIO** – The debt service coverage ratio is an important financial measure that is reviewed by bond rating agencies and banks to evaluate a utility's ability to make debt service payments. While the City will have a legal obligation to meet a specified minimum DSC, for financial planning purposes it is prudent to plan around meeting a debt service coverage ratio that is above the minimum (e.g. 1.50 – 1.75).
- **ESTABLISHING MINIMUM RESERVE LEVELS** – The City should strive to maintain a cash balance sufficient to meet the total operating expenses for the water utility in order to provide sufficient cash flow to meet daily operating expenses.

These prudent financial planning practices were used within the City's study. In addition to these financial planning criteria, certain financial policies related to rate setting were also examined. These policies closely following the prudent financial planning criteria noted above.

Summary of the Water Rate Study Results

In conducting the water rate study, the three analyses of a comprehensive rate study were conducted; a revenue requirement analysis, a cost of service analysis and the design of rates. Provided below is a summary of each analysis.

Water Revenue Requirement Analysis – The development of the water revenue requirements was the first analysis undertaken. This analysis is used to determine the overall adequacy of the water utility revenues (rates).

For this particular analysis, the revenue requirements were developed for the six-year time period of 2007 – 2012. The City's analysis utilized the "cash-basis" approach to accumulate costs. The cash basis approach sums the water utility's O&M expenses, taxes, debt service and capital improvements from rates to determine the overall funding requirements. This approach is the most commonly used methodology to set revenue requirements.

> ***"An important aspect of the water revenue requirements was the proper and adequate funding of capital improvements."***

An important aspect of the water revenue requirements was the proper and adequate funding of capital improvements. The City's capital improvement plan was used as a starting point. The capital improvement projects were designated by the City as either water fund or impact fee (growth) related projects. The City has planned during the period of 2008 – 2012 approximately $29.7 million in water fund capital improvements and $12.8 million in growth related capital improvements. The funding for the planned water fund capital improvements is from rates, reserves and $8.0 million dollars in State Revolving Fund loans. The funding for the water growth related capital improvements is from water impact fees and reserves.

A general financial guideline that can be used to determine proper funding levels for capital improvements from rates is that, at a minimum, a utility should fund an amount equal to or greater than annual depreciation expenses. The City has historically had a policy of funding at least 100% or more of annual depreciation expense within their rates for renewal and replacement capital projects. This higher level of funding attempts to close the gap between the difference between replacement cost and the level of rate funding based on original cost (depreciation expense).

A summary of the water revenue requirement analysis is provided below in Table ES-2.

Table ES-2 Summary of the Water Revenue Requirement Analysis (000's)						
	2007	**2008**	**2009**	**2010**	**2011**	**2012**
Revenues						
Retail Sales	$5,103	$5,691	$5,975	$6,274	$6,587	$6,916
Other Revenue	367	379	392	403	420	434
Total Revenues	**$5,470**	**$6,070**	**$6,367**	**$6,677**	**$7,007**	**$7,350**
Expenses						
O&M Expenses	$3,053	$3,236	$3,428	$3,631	$3,788	$3,952
Rate Revenues Dedicated to CIP	2,324	2,741	2,877	3,016	3,200	3,300
Current Debt Service	93	93	62	30	15	15
New Debt	0	0	0	0	305	611
Total Revenue Requirement	**$5,470**	**$6,070**	**$6,367**	**$6,677**	**$7,308**	**$7,878**
Balance/(Deficiency) of Funds	($0)	($0)	($0)	($0)	($301)	($528)
Bal./(Def.) as a % of Rates (Cumulative)	0.0%	0.0%	0.0%	0.0%	4.6%	7.6%
Proposed Annual Rate Adjustments	**0.0%**	**0.0%**	**0.0%**	**2.6%**	**2.6%**	**2.6%**
Add'l Revenue From Rate Adj.	$0	$0	$0	$163	$343	$539
Bal./(Def.) of Funds After Rate Adj.	$0	$0	$0	$163	$42	$11

It should be noted that the balance or deficiencies in any single year are cumulative. That is, any adjustments in the initial years will reduce the deficiency in the following years. Over the six-year period, rates need to be adjusted by approximately 7.6% in order to adequately and properly fund the City's water utility O&M and capital infrastructure needs. To implement the needed adjustments, a water transition plan was developed. It has been recommended that rates be adjusted by 2.6% in 2010, 2011 and 2012.

Provided below in Table ES-3 is the relative impacts of the proposed adjustments to an average residential customer.

Table ES-3 Water Utility – Six Year Rate Transition Plan						
	2007	**2008**	**2009**	**2010**	**2011**	**2012**
Present Average Monthly Residential Water Bill [1]	$35.30					
Proposed Water Rate Adjustments		0.0%	0.0%	2.6%	2.6%	2.6%
Projected Average Monthly Residential Water Bill		$35.30	$35.30	$36.22	$37.16	$38.13
$ Change Per Month		$0.00	$0.00	$0.92	$0.94	$0.97
Cumulative $ Change Per Month		$0.00	$0.00	$0.92	$1.86	$2.83

[1] Average bill was assumed a 3/4" meter with 10 CCF

Water Cost of Service Analysis – A water cost of service analysis is concerned with the equitable allocation of the total water revenue requirements to the various customer classes of service of the utility. The objectives of the water cost of service analysis are different from determining revenue requirements. A revenue requirement analysis determines the utility's overall financial needs, while the cost of service study determines the "fair and equitable" manner to collect those revenue requirements. A summary of the water utility cost of service analysis is shown within Table ES-4.

Table ES-4
Summary of the Water Utility Cost of Service Analysis for 2008 ($000's)

Classes of Service	Present Rate Revenues	Allocated Costs	$ Difference	% Difference
Residential	$2,837	$2,533	($304)	-10.7%
Low-Income	5	9	4	74.4%
Multi-Family	1,171	1,176	5	0.4%
Commercial	1,043	1,314	271	26.0%
Government	99	136	37	38.1%
Montana State University	531	518	(13)	-2.4%
Unmetered	5	5	(1)	-11.3%
Total	$5,691	$5,691	$0	0.0%

The cost of service results indicate that some cost differences do exist between the major customer classes of service. A general rule is that a customer class is paying their fair allocation of costs if the costs of service results are within +/- 5.0% of the overall adjustment. It is recommended that a slow ramping in of interclass cost of service adjustments should be made over time. As a result of this decision, each class of service will be adjusted in the design of the proposed rates not more than +/-10.0%. Residential will be adjusted -5.0%, Commercial/Government +10.0%, Multi-Family/MSU/Unmetered 0.0%. By definition, low-income should be below cost, and show the need for a large adjustment. For that reason, no cost of service adjustment is made to the low-income customer class of service.

Water Rate Design – The revenue requirement and cost of service results indicate that a priority of the City should be to generate an adequate level of funding for the water utility. Therefore, the revenue requirement results were the basis for establishing cost-based rates for the utility. At the present time, the City has seven water classes of service. The current customer classes of service for rate purposes are residential, low-income, multi-family, commercial, government, Montana State University, and unmetered. The present rate structure is composed of a base rate (meter) charge and a consumption charge. Presented below in Table ES-5 is a summary of the present (2007) water rate schedules.

Table ES-5 Summary of the 2007 Present Water Rates	
Rate Component	**Present Rate**
Meter Charge (Monthly)	
3/4"	$12.60/Month
1”	16.07
1-1/4”	20.00
1-1/2”	24.00
2”	34.04
3”	57.42
4”	90.95
6”	165.45
8”	260.45
Consumption Charge ($/CCF)	
Residential	$2.27
Low-Income	$2.27
Multi-Family	$1.57
Commercial	$1.29
Government	$1.34
Montana State University	$1.78

[1] – CCF of water = One hundred cubic feet of water. 1 CCF of water = 748 gallons

A high priority of the City is to encourage efficient use of water, particularly as it relates to outdoor water use by residential customers. The City’s current water rate structure does not provide a particularly strong conservation price signal for residential customers and for outdoor use. This study considered other alternative rate structures to further strengthen the conservation price signal. A three-step inverted block rate structure for residential customer is recommended as a starting point for strengthening the City’s efforts in this area. In developing this recommendation, it is important to note there was insufficient bill frequency data to adequately determine the full impact on rate revenues with this tiered rate structure. Tiered rate structures have greater issues with revenue stability then the City’s current rate structure, and for that reason the City should be cautious in the pricing used for the tail or highest use block. Presented below in Table ES-6 is a summary of the proposed water rates.

Table ES-6 Summary of the Proposed Water Rates						
	Present Rate	**2008**	**2009**	**2010**	**2011**	**2012**
Meter Charge (Monthly)						
3/4"	$12.60	$12.60	$12.60	$12.60	$12.60	$12.60
1”	16.07	16.57	16.69	16.90	17.31	18.56
1-1/4”	20.00	20.73	20.92	21.22	21.84	23.67
1-1/2”	24.00	25.80	26.25	26.99	28.49	32.98
2”	34.04	37.35	38.18	39.56	42.32	50.60
3”	57.42	64.28	65.99	68.85	74.57	91.71
4”	90.95	102.86	105.84	110.80	120.72	150.50
6”	165.45	190.90	197.26	207.87	229.08	292.71
8”	260.45	301.60	311.89	329.04	363.33	466.21
Consumption Charge ($/CCF)						
Residential	$2.27					
Low-Income	2.27					
0 – 7 CCF		$2.05	$2.05	$2.10	$2.15	$2.21
8 – 15 CCF		2.20	2.20	2.26	2.32	2.38
Over 15 CCF		2.60	2.60	2.67	2.74	2.81
Multi-Family	1.57	1.57	1.57	1.61	1.65	1.69
Commercial	1.29	1.38	1.38	1.42	1.46	1.50
Government	1.29	1.38	1.38	1.42	1.46	1.50
Montana State University	1.34	1.43	1.43	1.47	1.51	1.55

The inverted or tiered rate structure proposed for the residential class of service has sized the blocks around indoor use (0 – 7 CCF), efficient outdoor use (8 – 15 CCF) and inefficient outdoor use (over 15 CCF). These blocks sizes are based upon an assumed or typical residential customer’s usage characteristics.

It will be noted that the study has not recommended an inverted or tiered block rate structure for the multi-family, commercial, government and university customer classes of service. Conservation and efficient use can be achieved in a number of different ways, and price is one of those methods. However, the adoption of an inverted block rate structure for these customers would be problematic in that for these specific customers, greater consumptive use does not necessarily imply inefficient or wasteful use. To achieve water conservation and efficient use, non-residential customers may best be addressed by individual water audits or technical advice/assistance. Commercial conservation through a more comprehensive conservation program is discussed later in the rate design section of the report.

A full and complete discussion of the development of the comprehensive water rate study and the proposed rate designs can be found in Section 3 of this report.

Summary

The previous discussion has provided an executive summary of the rate analyses undertaken for the City's water utility. In summary, it was concluded that the City's water rates appear to be fair and equitable and set at a level that generally meets the City's current overall costs. The City should consider the establishment of formal written financial/rate setting policies to aid in establishing future rates. Included within this report are Technical Appendices, which documents all the analyses undertaken, along with our findings, conclusions and recommendations.

Section 1
Introduction

1.1 Introduction

HDR Engineering, Inc. (HDR) was retained by the City of Bozeman (City) to conduct a comprehensive water rate study. The objective of the rate study was to develop financial plans and cost-based rates necessary to meet the City's operation and maintenance (O&M) needs and the capital improvement program for the utility. This study determined the adequacy of the existing water rates and provides the framework for any needed future adjustments.

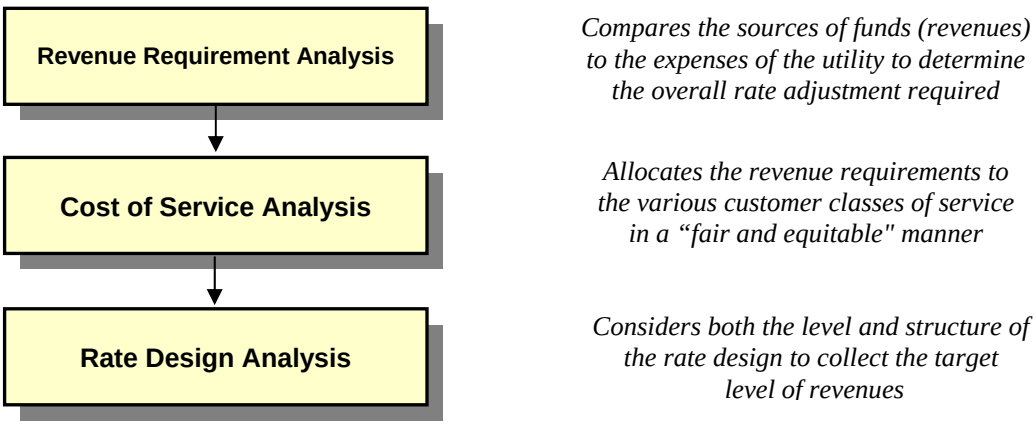
"The objective of the rate study was to develop financial plans and cost-based rates necessary to meet the City's operation and maintenance needs and the capital improvement program for the utility."

In developing this study the City's water capital improvement plan was a major cost driver for the study. The amount and timing of these projects were important to the establishment of the financial revenue requirements.

1.2 Overview of the Rate Study Process

User rates must be set at a level where a utility's operating and capital expenses are met with the revenues received from customers. This is an important point, as failure to achieve this objective may lead to insufficient funds to maintain system integrity. To evaluate the adequacy of the existing rates, a comprehensive water rate study is often performed. A comprehensive water rate study consists of three interrelated analyses. Figure 1-1 provides an overview of these analyses.

Figure 1-1
Overview of the Comprehensive Rate Analyses



1.3 Organization of the Study

This report is organized in a sequential manner that first provides an overview of utility rate setting principles, followed by sections that detail the specific steps used to review the City's water rates. The following sections comprise the City's water rate study report:

- Section 2 – Overview of Utility Rate Setting Principles
- Section 3 – Development of the Water Rate Analyses

A Technical Appendices is attached at the end of this report, which details the various water rate analyses that were used in the preparation of this report.

1.4 Summary

This report will review the comprehensive water rate analyses prepared for the City of Bozeman. This report has been prepared utilizing "generally accepted" water rate setting techniques. The next section of the report will provide a brief overview of the general rate setting process that was used to analyze and establish the proposed water rates for the City.

Section 2
Overview of Utility Rate Setting Principles

2.1 Introduction

A major objective of conducting a comprehensive rate study is to determine the adequacy of the existing water rates and provide the basis for any needed adjustments to meet operating and capital needs of the City. At the same time, the study reviewed the fairness and equity of the current water rates.

In developing and establishing utility rates, there are "generally accepted" principles or guidelines around which rates should be set. This section of the report provides a general overview of the methodology and guidelines used for setting cost-based rates for the utility. This should give the reader a better understanding of the general process that is detailed later in this report. In addition, this section of the report discusses the issues of "prudent" financial planning and the use of established financial policies to aid in establishing the City's rates.

> ***"In developing and establishing utility rates, there are "generally accepted" principles or guidelines around which rates should be set."***

2.2 Global Principles in Which Rates Should Be Set

As a practical matter, there should be a general set of principles around which rates should be set. These guiding principles may be items such as setting rates that are cost-based, equitable, and easy to administer. These types of principles may be referred to as "global principles" since they should be utilized by all utilities in the development of their rates.

Provided below is a brief listing of the global principles around which the City should consider setting its water rates:

- Rates should be cost-based and equitable, and set at a level able to meet the full revenue requirements of the utility.
- Rates should be easy to understand and administer.
- Rates and the process of allocating costs should conform to generally-accepted rate setting techniques.
- Rates should be stable, in their ability to provide adequate revenues to meet the utility's financial, operating, and regulatory requirements.
- Rate levels should be stable from year to year from the customer's perception.

These guiding principles were utilized within this study to help develop water rates that are cost-based and equitable.

2.3 Methods of Accumulating Costs for Water Revenue Requirements

The convention used by most public utilities to establish their revenue requirements is called the "cash basis" approach of setting rates. As the name implies, a public utility aggregates its cash expenditures for a period of time to determine its required revenues from user rates and other forms of income. This methodology conforms nicely to most public utility budgetary requirements, and is a very straightforward and easily understood calculation. Operation and maintenance expenses are added to any applicable taxes or transfer payments to determine total operating expenses. Capital costs are calculated by adding debt service payments (principal and interest) to capital improvements financed with operating rate revenues. Depreciation expense is sometimes included in lieu of this latter item to stabilize annual revenue requirements. Under the "cash basis" of accounting, the sum of the capital and operating expense equals the utility's revenue requirement during any period of time. It should be noted that the two portions of the capital expense component (debt service and capital improvements financed from rates) are necessary under the "cash basis" approach because utilities generally cannot finance all of their capital facilities with long-term debt. Table 2-1 may be helpful in summarizing the "cash basis" methodology.

Table 2-1
Overview of the "Cash Basis" Methodology

+	O&M Expense
+	Taxes/Transfer Payments
+	Capital Additions Financed with Rate Revenues (≥ Depreciation Exp.)
+	Debt Service (P+I)
=	Total Revenue Requirements

2.4 Overview of the Cost Allocation Procedures

After the total revenue requirement has been quantified and determined, it is allocated to the users of the service in a manner that reflects the cost relationships incurred for the production and delivery of the services. This analytical exercise usually takes the form of a "cost of service" study.

A cost of service study is a three-step approach. First, costs must be functionalized or grouped into the various cost categories related to the providing of service (e.g. for a water utility; source of supply, treatment, transmission, distribution, etc.). This step is largely accomplished by the utility's accounting system. The next step is the classification of the functionalized costs. Classification refers to the arrangement of the functionalized data into cost components. For a water utility, these are typically, capacity-related, commodity (flow)-related, public fire protection-related and customer-related component costs. Each of the cost components are allocated to the various customer classes of service based upon each customer class' relative contribution to the specific cost component. For example, customer related costs are allocated proportionally to each class of service based upon the total number of customers in that class of

service. Once the costs are allocated to each class of service, a measure of the required level of rate revenues from each class of service to achieve cost-based rates can be determined.

2.5 Economic Theory and Rate Design

The design of the proposed water rates for adoption by the City concludes the rate study process. The rate design process utilizes the results of both the revenue requirement and cost of service analysis to develop rates that achieve the overall goals and objectives of the City. These goals and objectives may include consideration of cost-based rates, but may also consider items such as ability to pay, continuity of past rate philosophy, conservation, encouragement of economic development, ease of administration, legal requirements, etc. It is important to understand that cost of service is only one goal or objective in designing final water rates, however, it is an important one.

While the general description of the utility rate setting process discussed in this section of the report is greatly simplified and abbreviated, it does however address the basic elements of contemporary regulatory thinking. One of the major justifications for a comprehensive rate study is founded in economic theory. Economic theory suggests that the price of a commodity must roughly equal its cost, if equity among customers is to be maintained. The implications of this statement on utility rate design are significant. For example, capacity-related costs are usually incurred by a water utility to meet peak use requirements. Thus, the customers causing peak demands should properly pay for the demand-related facilities in proportion to their contribution to maximum demands. Recent emphasis on seasonal and marginal cost-based utility rates are movements in a direction that embrace this economic concept. Through refinement of costing and pricing techniques, consumers of a product are given a more accurate price signal of what the commodity costs to produce and deliver. The above basic thoughts have considerable foundation in economic literature. They also serve as primary guidelines for rate design by most utility regulators and administrative agencies. This “price-equals-cost” concept will provide the basis for much of the subsequent analysis and comment.

> ***"Economic theory suggests that the price of a commodity must roughly equal its cost, if equity among customers is to be maintained."***

2.6 Prudent Financial Planning

In developing revenue requirements, the City’s budget documents are used as the initial starting point. However, within the development of the revenue requirements, the analysis should also consider prudent financial planning criteria. There are three key financial indicators that should be considered in the development of all utility financial plans or revenue requirement analyses. These three financial planning criteria are: establishing minimum funding levels for capital projects funded from rates, establishing a minimum target debt service coverage ratio, and establishing minimum reserve levels. The following discussion provides a brief overview of each of these financial planning indicators.

- **ESTABLISHING MINIMUM RESERVE LEVELS**

  Reserve levels are a crucial part of a utility's financial picture. Typically utilities maintain several different types of reserve funds. These may include: an operating reserve, a capital (replacement) reserve, an emergency or contingency reserve, and a rate stabilization reserve. Each of these reserves has its own financial, operating or legal requirements which may set an established minimum reserve level (e.g. a bond reserve). A key aspect of reviewing reserve levels was determining target minimum levels for the City's current reserves. It is important to remember that when reserves fall below the targeted minimum level, management should review the cause of the declining reserves and determine what action, if any, should be taken. Maintenance of minimum reserve levels should not, on its own, trigger the need for a rate adjustment. However, after two consecutive years of diminishing reserves as a result of under-recovery of costs, rates should be reviewed.

- **ESTABLISHING A MINIMUM FUNDING LEVEL FOR CAPITAL PROJECTS FUNDED FROM RATES**

  Prudent financial planning dictates that a utility should fund a certain portion of capital improvement projects from rates on an on-going basis. The general financial guideline used is that at a minimum, a utility should fund an amount equal to or greater than annual depreciation expense. However, there are three reasons for increasing the level of capital funding through rates. The first is that funding levels over and above depreciation expense better reflect actual replacement cost. Second, increasing the level of capital funding from rates will help provide cash flow to fund the capital plan in future years, and minimize any long-term borrowing needs. Finally, an increased level of capital funding will have the added benefit of strengthening the utility's debt service coverage ratio.

- **ESTABLISHING A MINIMUM TARGET DEBT SERVICE COVERAGE RATIO**

  The debt service coverage ratio is an important financial measure that is reviewed by bond rating agencies and banks to evaluate a utility's ability to make debt service payments. For revenue bonds, there is typically a legal requirement (rate covenant) to meet a minimum debt service coverage ratio. The debt service coverage ratio is calculated by subtracting total O&M and taxes from total revenues. The resulting figure is the balance available for debt service payment. The balance available for debt service is then divided by the annual debt service obligations (payments) to determine the debt service coverage ratio. For a revenue bond, most bond covenants require meeting a minimum coverage ratio of 1.25 – 1.30. While the City would have a legal obligation to meet the minimum, for financial planning purposes it is prudent to plan around meeting a debt service coverage ratio that is above the minimum (e.g. 1.50 – 1.75). In that way, if the utility has any negative financial fluctuations (e.g. cool/wet summer, low sales/revenues); they will be much more assured of meeting the required minimum. At the same time, by planning around a higher debt service coverage ratio, the City will appear financially stronger to the bond rating agencies, which may translate into an improved bond rating and lower interest rates on borrowing. Bond rating agencies do not want utilities to financially plan around simply meeting the minimum.

The above key financial planning criteria are main drivers in the City's study. Other prudent financial planning criteria beyond those cited above were used within the City's study. As the

study is discussed in more detail, these other financial planning criteria will be discussed at that time.

2.7 City Financial/Rate Setting Policies

As a part of the comprehensive rate study process, it is important to understand the key objectives the City was striving to achieve and the policy issues that needed to be addressed by the study. By establishing financial/rate setting policies, it provides City management with clear policy direction concerning these key financial measures and parameters. At the same time, it should also lead to more stable rates over time as a consistent set of financial policies are used to establish the City's rates.

> ***"By establishing financial/rate setting policies, it provides City management with clear policy direction concerning these key financial measures and parameters."***

Provided below is a brief discussion of each of the key financial/rate setting policy issues addressed as a part of this study. The key policy issues provided a decision framework for key areas of the study.

- **OPERATING RESERVES – THE CITY SHOULD STRIVE TO MAINTAIN A CASH BALANCE THAT IS SUFFICENT TO MEET DAILY OPERATING EXPENSES.**

  Cash working capital, or operating reserves, is needed to meet daily cash flow needs, and to minimize reliance on short-term borrowing. For the water utility it was determined that minimum operating reserve levels of 45 days of annual operating expenses were needed for that purpose. This financial measure is equivalent to approximately 12% (45 days / 365 days).

- **CAPITAL RESERVE – THE CITY SHOULD STRIVE TO MAINTAIN A CAPITAL RESERVE.**

  The capital reserve should be set at a minimum level equal to the amount of the utilities annual depreciation expense.

- **MINIMUM FUNDING OF CAPITAL OUTLAY PROJECTS FROM RATES– THE CITY SHOULD ANNUALLY BUDGET AND FUND A REASONABLE AMOUNT OF THE COST FOR "DEPRECIATION" OF CAPITAL ASSETS AS AN EXPENSE WITHIN THE UTILITY'S OPERATING BUDGET.**

  One of the major financial challenges in the utility industry is the need to properly maintain utility infrastructure. Across the U.S., the water utility industry is seeing more systems that are deteriorating and are inadequately funded. Therefore, this policy is designed to properly fund a capital program that will help to assure system reliability and efficiency. A well thought out and fully funded replacement program will extend the life of the City's utility system and in turn reduce infrastructure costs over the long-term. A utility should fund a certain portion of capital improvement projects from rates on an on-going basis. A general financial guideline that can be used to determine minimum funding levels

> ***"One of the major financial challenges in the utility industry is the need to properly maintain utility infrastructure. Across the U.S., the water utility industry is seeing more systems that are deteriorating and are inadequately funded."***

for capital improvements funded from rates is an amount equal to or greater than annual depreciation expense.

- **MINIMUM DEBT SERVICE COVERAGE RATIO – THE CITY SHOULD STRIVE FOR A MINIMUM DEBT SERVICE "COVERAGE" RATIO NECESSARY TO SATISFY ITS OUTSTANDING REVENUE BOND COVENANTS**

  The debt service coverage (DSC) ratio is a financial measure of the utility's ability to repay outstanding debt. Typically, a utility must maintain a minimum of a 1.25 DSC on outstanding revenue bond debt. Failure to meet the minimum DSC for an outstanding debt obligation is considered to be technical default, making the bonds callable or payable upon demand. Therefore, it is critical that the utility meet this legal requirement. For the City, the net revenue of the combined utilities (gross revenue of the utilities less operating and maintenance expenses) must currently equal at least 1.25 times the City's annual revenue bond debt service payments. It is recommended that the City target a minimum DSC of 1.50 for financial planning purposes.

- **COMPREHENSIVE UTILITY RATE STUDIES – COMPREHENSIVE UTILITY RATE STUDIES SHOULD BE CONDUCTED AT LEAST EVERY FIVE YEARS TO UPDATE ASSUMPTIONS AND ENSURE LONG-TERM SOLVENCY AND VIABILITY OF THE CITY'S UTILITIES.**

  The City's systems and costs change over time. It is prudent for the City to conduct a comprehensive rate study at least every five (5) years. It should be noted that the use of five years should tie to the comprehensive (master) planning period.

2.8 Summary

This section of the report has provided a brief introduction to the general principles, techniques, and economic theory used to set water rates. These principles, techniques, and economic theory were the basis for the rate study and the foundation used to meet the City's key objectives in establishing their water rates. At the same time, the City reviewed and established a set of financial/rate setting policies to aid in adequately and consistently establishing their water rates.

Section 3
Development of the Water Rate Study

3.1 Introduction

This section of the report will discuss the rate analysis developed for the City's water utility. A key objective or goal of a water rate study is to develop water rates that are "fair and equitable" and adequately fund the operating and capital requirements of the utility. In this process, the water utility should be viewed as a "stand alone" entity capable of financially supporting its own operating and capital needs.

In developing a comprehensive water rate study, three interrelated analyses were conducted for the City. First, a revenue requirement analysis was conducted to determine the overall funding needs of the water utility. Next, the cost of service analysis provided a method to equitably allocate the City's water revenue requirements between the various types of customers (e.g. residential, commercial, etc.). Finally, given a determination of the level of funding required and a method to equitably allocate costs, rates can be designed to collect the appropriate level of revenues, while considering any other City rate design objectives (e.g. conservation, revenue stability, etc.). This section of the report will review each of these analytical steps of the comprehensive water rate study and discuss the key assumptions, findings and conclusions of each. At the end of this section of the report, the proposed water rates are provided.

3.2 Development of the Water Revenue Requirements

The development of revenue requirements is the first step in the rate study process. A revenue requirement analysis determines the adequacy of the overall level of water rates. From this analysis, a determination can be made as to the level of water rate adjustment needed to provide adequate and prudent funding for both operating and capital needs.

"Typically, one of the main objectives of a water rate study is to develop equitable water rates while attempting to minimize the impacts to the utility's customers."

The City's budget documents, consumption data, and capital improvements plan were used to complete the revenue requirements. In this process, a number of items were calculated independently of the City's budget document. Specifically, these items were the projection of rate revenues, excise taxes and reserve levels. Provided below is a detailed discussion of the development of the water utility revenue requirements.

3.2.1 Determination of Time Period and Method of Accumulating Costs

The initial step in calculating the revenue requirement for the water utility was to establish a "test period", or time frame of reference for the revenue requirement analysis. For this particular study, the revenue requirements were developed for a six-year projected time period (2007 –

2012). This time period captured the City's major capital projects over the next few years. Reviewing a multi-year time period is generally recommended in an attempt to identify any major expenses that may be on the horizon. By anticipating future financial requirements the City can begin planning for these changes sooner, thereby, minimizing short-term water rate impacts and water rates over the long-term.

In developing the City's revenue requirements, a "cash basis" approach was utilized. While Section 2 provided a brief overview of the "cash basis" approach, this method of establishing the City's water revenue requirements has been "tailored" to follow the City's system of accounts (budget documents). While it has been "tailored" to follow the City's budgeting approach, it still contains the major cost components of the "cash basis" methodology. Table 3-1 provides a summary of the approach that was used to develop the City's water revenue requirements.

Table 3-1
Overview of the Water Utility Revenue Requirements

+ Operation and Maintenance Expenses
  - ✓ Treatment
  - ✓ Reservoirs
  - ✓ Operations
  - ✓ Utility Locates
  - ✓ Water Service
  - ✓ Meter Reading
  - ✓ Hydrants
  - ✓ Water Valves
  - ✓ Main Repairs
+ Net Capital Improvements Funded From Rates (calculated below) [1]
+ Debt Service (P+I) Existing and Future
= Total Water Revenue Requirements

[1] Net Capital Improvements Funded From Rates
+ Total Water Capital Improvement Projects
– Funding Sources Other Than Rates
  - ✓ Impact Fees
  - ✓ Grants
  - ✓ Low-Interest State Loans
  - ✓ Long Term Debt Issues
= Net Capital Improvements Funded From Rates [1]

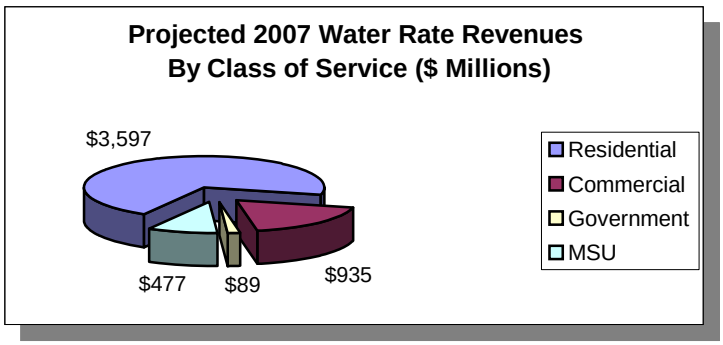
Given a time period around which to develop the revenue requirements, and a method to accumulate the costs, the focus can shift to the projection of revenues and expenses for the City's water utility. The primary financial inputs in this process were the City's historical billing records, the City's capital improvement plan and the City's 2006 budgeted expenses.

3.2.2 Water Rate and Other Miscellaneous Revenues

The revenue requirement calculation begins with a projection of rate revenues at present rate levels. This process involved developing projected billing units for each customer class of service (e.g. residential, commercial, etc.) based on historical usage records and an assumed

annual growth rate. The billing units are then applied (multiplied) against the current rates to calculate the projected rate revenue. This method of independently calculating revenue ensures consistency in the revenue and consumption figures that are used throughout the rate study process.

The revenue at present rates was calculated using historical consumption data. The present rates were then calculated for each year based on the specific rate schedule for that year. The revenues at present rates were calculated separately for historical FY 2006. FY 2007 was estimated based on historical 2006 customer class loads and a 5.0% growth rate. Projected revenues for 2007 thru 2012 were based upon an assumed 5.0% customer growth rate.



The water utility also receives a variety of miscellaneous revenues unrelated to the sale of water. These revenues are received from sources such as inspections, service charges, and interest income. Miscellaneous revenues vary by year, but are fairly level during the planning period. In 2007, the City is projected to receive approximately $5.4 million in total revenues.

3.2.3 Projection of Water Operation and Maintenance Expenses

In general, operation and maintenance expenses are grouped into functional areas or services (e.g. operations, meter reading, etc.). Escalation factors were developed for the various types of expenses that the City incurs: power, labor, materials and supplies, equipment, miscellaneous, and electricity. The escalation factors applied range from 2% to 10% per year. The higher escalation factor reflected the significantly higher costs associated with medical benefits.

The City's 2006 budgeted expenses were used as a starting point to project future O&M expenses. Future year projections were calculated by applying an applicable escalation factor. The current O&M levels are approximately $3.0 million per year. This is expected to escalate over the study's planning horizon to almost $4.0 million.

3.2.4 Projection of Water Capital Improvement Projects and Funding

An important aspect of the water revenue requirements was the funding of capital improvements. The City anticipates approximately $42.5 million in capital expenditures for the water utility over the planning period of 2008 - 2012. There are a number of different methods that may be used for the City's replacement and growth-related capital projects. Among the methods that may be used to finance these capital improvement projects are long-term debt, impact fees, grants, capital reserves and rates. It is through the use of a combination of these financing resources that the City can minimize their rates through time.

"A general financial guideline that can be used to determine proper funding levels for capital improvements from rates is that, at a minimum, a utility should fund an amount equal to or greater than annual depreciation expense."

A general financial guideline that can be used to determine proper funding levels for capital improvements from rates is that, at a minimum, a utility should fund an amount equal to or greater than annual depreciation expenses. Annual depreciation expense reflects the current investment in plant that is being depreciated or "losing" its useful life. Therefore, this portion of plant investment needs to be replaced (funded) to maintain the existing level of infrastructure. It must be kept in mind that, in theory, annual depreciation expense reflects an investment in infrastructure an average of fifteen (15) years ago, assuming a 30-year useful (depreciable) life. Simply funding an amount equal to annual depreciation expense will not be sufficient to replace the existing or depreciated facility. Therefore, consideration should be given to funding within rates some amount greater than annual depreciation expense for renewals and replacements. Whenever possible, the City should be funding capital projects from rates in an amount that is actually greater than annual depreciation expense.

"Historically, the City has funded 100% or more of annual depreciation expense for renewal and replacement funding."

Historically, the City has funded 100% or more of annual depreciation expense for renewal and replacement funding. Failure to fund at least 100% of depreciation will require the use of long-term borrowing to fund the difference between replacement cost and rate funding, or unfortunately, the deferral of maintenance projects due to a lack of adequate funding. The water utility industry currently has billions of dollars of deferred maintenance due to a failure to properly and adequately fund this important component of rates. For purposes of this study, the level of funding has been maintained at the City's current level. Provided below in Table 3-2 is a summary of the water utility capital improvement projects.

Table 3-2 Overview of the Water Capital Improvement Plan (000's)						
Description	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Capital Outlays – Water Fund						
Water Plant Treatment -						
Sourdough Tank Repairs	$0	$200	$0	$0	$0	$0
3/4 Ton 4X4 Pickup	0	35	0	0	0	0
22 MG Water Treatment Plant	902	133	1,000	1,000	10,000	10,000
Sourdough Water Intake/Tank Improv.	0	0	200	0	0	0
Sourdough Creek Dam/Water Rights	0	4	0	0	0	0
Water Operations	1,421	1,736	750	90	797	90
Unidentified CIP	0	810	927	1,926	0	0
Total Capital Outlays for Water Fund	$2,323	$2,918	$2,877	$3,016	$10,797	$10,090
Capital Outlays - Impact Fee						
Shops Complex - Phase I	$0	$990	$0	$0	$0	$0
22 MG Membrane Water Treatment Plant	0	67	500	500	5,000	5,000
Sourdough Creek Dam	0	50	0	0	0	0
Sourdough Creek Drainage Water Rights	0	16	0	0	0	0
5.3 MG Concrete Water Reservoir	0	0	0	0	0	0
Lyman – Exp. Groundwater Collection	0	700	0	0	0	0
New Transmission Main from WTP	0	0	0	0	0	0
Total Capital Outlays for Impact Fee	$0	$1,823	$500	$500	$5,000	$5,000
Total Capital Outlays	**$2,323**	**$4,741**	**$3,377**	**$3,516**	**$15,797**	**$15,090**
Less: Funding Sources						
From Operating Reserve Fund	$0	$0	$0	$0	$0	$1,000
From Capital Reserve Fund	0	177	0	0	3,597	1,790
SRF Loan for WTP	0	0	0	0	4,000	4,000
Impact Fees	0	$1,823	500	500	5,000	5,000
Total Funding Sources Other than Rates	$0	$1,823	$500	$500	$5,000	$5,000
Rate Revenues Dedicated to CIP	**$2,323**	**$2,741**	**$2,877**	**$3,016**	**$3,200**	**$3,300**

[1] – Detail of the water capital improvement projects can be found in the Water Technical Appendices

As noted previously, the City anticipates approximately $42.5 million in capital expenditures for the water utility over the five-year period of 2008 – 2012. This equates to approximately $8.5 million per year in capital improvement projects. Of the $42.5 million in projects, approximately $29.6 million is related to water fund improvements and $12.8 million in impact fee (growth-related) improvements, during 2008 - 2012. The majority of funding for the planned water fund capital improvements is from rates and $8.0 million dollars in State Revolving Fund loans. Approximately $15.1 million of the total water fund projects is funded from rates. The balance of the water fund projects will be funded from existing reserves. In contrast to this, the funding for the water impact fee (growth-related) improvements will come from water impact fees and reserves.

3.2.5 Projection of Debt Service Payments

Debt service relates to the principal and interest obligations of the water utility when financing capital projects with a long-term debt issue. The City currently has two Lyman Creek Water Revenue Bond issues outstanding. The total annual debt service payments for these loans are approximately $92,000 per year. The first bond will be fully paid in 2009, requiring only a $30,000 debt service payment annually thereafter.

3.2.6 Summary of the Water Revenue Requirements

The above components came together to develop the overall water revenue requirements for the City. In developing the final revenue requirements, consideration was given to the financial planning criteria of the City. In particular, emphasis was placed on attempting to minimize rates, yet still providing adequate funds to support the City's O&M activities, along with the planned capital projects throughout the projected time period. A summary of the water revenue requirements is shown below in Table 3-3.

"A very positive aspect of this portion of the study is that it indicates that the City's current rates are actually funding 100%or more of annual depreciation expense in 2007."

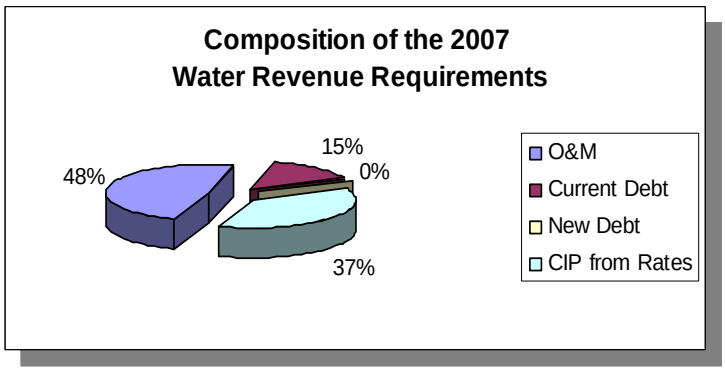
Table 3-3
Summary of the Water Revenue Requirement Analysis (000's)

	2007	2008	2009	2010	2011	2012
Revenues						
Retail Sales	$5,103	$5,691	$5,975	$6,274	$6,587	$6,916
Other Revenue	367	379	392	403	420	434
Total Revenues	**$5,470**	**$6,070**	**$6,367**	**$6,677**	**$7,007**	**$7,350**
Expenses						
O&M Expenses	$3,053	$3,236	$3,428	$3,631	$3,788	$3,952
Rate Revenues Dedicated to CIP	2,324	2,741	2,877	3,016	3,200	3,300
Current Debt Service	93	93	62	30	15	15
New Debt	0	0	0	0	305	611
Total Revenue Requirements	**$5,470**	**$6,070**	**$6,367**	**$6,677**	**$7,308**	**$7,878**
Balance/(Deficiency) of Funds	($0)	($0)	($0)	($0)	($301)	($528)
Bal./(Def.) as a % of Rates (Cumulative)	0.0%	0.0%	0.0%	0.0%	4.6%	7.6%
Proposed Annual Rate Adjustments	**0.0%**	**0.0%**	**0.0%**	**2.6%**	**2.6%**	**2.6%**
Add'l Revenue From Rate Adj.	$0	$0	$0	$163	$343	$539
Bal./(Def.) of Funds After Rate Adj.	$0	$0	$0	$163	$42	$11

In reviewing Table 3-3, it should be noted that the annual deficiencies are cumulative. That is, any adjustments in the initial years will reduce the deficiency in the latter years. The results of the water revenue requirements indicate a small deficiency of funds by the end of the projected six-year time period. Given the assumed inflation of costs over the projected time horizon, this

result would be expected. The increase of rate revenues as a result of customer growth has also helped to minimize the need for any rate adjustments.

A very positive aspect of this portion of the study is that it indicates that the City's current rates are actually funding 100% or more of annual depreciation expense in 2007. However, over the six year period, increasing costs will erode the existing balance of funds and by 2012 the deficiency of funding is approximately $529,000 or 7.6% of rates. This level of deficiency over the time period is very manageable. Detailed exhibits of the water revenue requirement analysis prepared for the City are provided in Technical Appendices at the end of this report.



3.2.7 Debt Service Coverage

A debt service coverage (DSC) ratio is a financial measure of the utility's ability to repay outstanding debt. A debt service coverage ratio of 1.25 is generally considered the legally acceptable minimum for a revenue bond.[1] Therefore, this implies that the City should have a debt service coverage (DSC) ratio that is greater than 1.25 for all outstanding revenue bonds. Failure to meet this DSC requirement would be considered a "technical default" on the part of the City, making the revenue bonds callable or payable upon demand. Therefore, it is critical that the City meet this legal requirement. On this basis, the net revenue of the combined utilities (gross revenue of the utilities less operating and maintenance expenses) must currently equal at least 1.25 times the City's annual revenue bond debt service payments.

Table 3-4 provided a summary of the calculation of debt service coverage ratios. For the water utility, on a stand-alone basis, the utility easily meets its coverage requirements.

Table 3-4
Summary of Revenue Bond Debt Service Coverage Ratios

	2007	2008	2009	2010	2011	2012
Water Revenue Bond DSC Ratios –						
Before Rate Increase	26.00	30.48	47.77	101.33	10.05	5.43
After Proposed Rate Increase	26.00	30.48	47.77	106.75	11.12	6.29

[1] "Legally" as used herein, refers to the contractual agreement between revenue bondholders and the City to assure repayment of the bonds, and to financially operate the utility in such a manner as to maintain the City's debt service coverage ratio above a specified minimum. This minimum debt service coverage ratio is a specified covenant of the bond resolution for the revenue bond.

As can be seen from the above table, the City easily meets the debt service coverage test. This is primarily a function of the low amount of debt service currently carried by the City, along with the strong level of capital improvement funding from rates.

3.2.8 Rate Transition Plan

The purpose of the rate transition plan was to set the size and timing of the water rate adjustments to meet the City's needs, but also to help minimize impacts to customers. The proposed rate transition plan for the water utility is shown in Table 3-5.

Table 3-5
Water Utility – Six Year Rate Transition Plan

	2007	2008	2009	2010	2011	2012
Present Average Monthly Residential Water Bill [1]	$35.30					
Proposed Water Rate Adjustments		0.0%	0.0%	2.6%	2.6%	2.6%
Projected Average Monthly Residential Water Bill		$35.30	$35.30	$36.22	$37.16	$38.13
$ Change Per Month		$0.00	$0.00	$0.92	$0.94	$0.97
Cumulative $ Change Per Month		$0.00	$0.00	$0.92	$1.86	$2.83

[1] Average bill was assumed a ¾" meter with 10 CCF

As Table 3-5 indicates, the current average residential bill for a City customer is $35.30/month. The proposed rate adjustments will change the average residential bill to $38.13 per month by 2012, or a $2.83/month overall change.

3.2.9 Summary and Recommendations of the Revenue Requirements

"In reviewing the results of the water revenue requirement analysis with City management, it was determined that a 2.6% rate adjustment should be proposed for 2010, 2011, and 2012".

Based upon the water revenue requirement analysis developed herein, it is projected that the City's water utility will operate at a slight deficiency during the six-year period of 2007 – 2012. The total level of deficiency is projected to be approximately $539,000 or 7.6% by 2012. In reviewing the results of the water revenue requirement analysis with City management, it was determined that a 2.6% rate adjustment should be proposed for 2010, 2011, and 2012 (Table 3-5).

This concludes the discussion and review of the water revenue requirement analysis. Given the findings and recommendations from this analysis, the focus now shifts to the water cost of service analysis.

3.3 Water Cost of Service Analysis

A water cost of service analysis is concerned with the equitable allocation of the total water revenue requirements to the various customer classes of service of the utility. There are two primary objectives in conducting a cost of service study. They are as follows:

- Allocate the water revenue requirements among the customer classes of service
- Derive average unit costs for subsequent water rate designs

The objectives of the water cost of service analysis are different from determining revenue requirements. A revenue requirement analysis determines the utility's overall financial needs, while the cost of service study determines the equitable manner to collect those revenue requirements. Provided below is a more detailed discussion of the overall approach used, along with the findings and conclusions of the study.

3.3.1 Customer Classes of Service

One of the first tasks that must be accomplished in the cost of service analysis is to determine the customer classes of service to be reviewed. The objective of this task is to group customers together into similar or homogeneous groups based upon facility requirements and/or flow characteristics. For this study, the following customer classes of service were utilized:

- Residential
- Low-Income
- Multi-Family
- Commercial
- Governmental
- Montana State University
- Unmetered

The water cost of service conducted for the City utilized a three-step approach to review costs. These three steps are: functionalization, classification, and allocation. Provided below is a more detailed discussion of each of these analytical steps of the water cost of service study performed for the City.

3.3.2 Functionalization of Costs

The first analytical step in the water cost of service is called functionalization. Functionalization is the arrangement of expenses and asset (plant) data by major operating functions within the utility (e.g. wholesale purchases/supply, pumping, transmission, distribution, etc). Within this study, the functionalization of the water cost data was largely accomplished through the City's system of accounts.

3.3.3 Classification of Costs

The second analytical step in the water cost of service study is the classification of costs. Classification determines why the expenses were incurred or what type of need is being met. The

Terminology of a Water Cost of Service Analysis

FUNCTIONALIZATION – The arrangement of the cost data by functional category (e.g. supply, treatment, etc.).

CLASSIFICATION – The assignment of functionalized costs to cost components (e.g. base, extra-capacity, customer, and fire protection related).

ALLOCATION – Allocating the classified costs to classes of service based upon each class's proportional contribution to that specific cost component.

COMMODITY COSTS – Costs that are classified as commodity related vary with the total flow of water (e.g. chemical use at a treatment plant).

CAPACITY COSTS – Costs classified as capacity related vary with peak usage. Facilities are often designed and sized around meeting peak demands.

FIRE PROTECTION COSTS - Costs that are related to fire protection systems (e.g. hydrants).

CUSTOMER COSTS – Costs classified as customer related vary with the number of customers on the system (e.g. metering costs).

DIRECT ASSIGNMENT – Costs that can be clearly identified as belonging to a specific customer or group of customers.

CUSTOMER CLASSES OF SERVICE – The grouping of customers into similar groups based upon usage characteristics and/or facility requirements.

City's plant accounts and revenue requirements were reviewed and classified according to the following cost classifiers as part of the water utility cost of service study.

- **Commodity-Related Costs.** Commodity-related costs are those costs that tend to vary with the total quantity of water consumed by a customer. The cost of electricity associated with pumping water is an example of a commodity-related cost, since these costs tend to vary based upon the total flow of water.
- **Capacity (Demand) Related Costs.** Capacity costs are those costs incurred to meet peak demand conditions. These costs are a function of meeting maximum demand requirements of the customers. Capacity may be defined by the peak period event, but is typically defined as peak day and/or peak hour requirements. Capacity related costs are important since they are related to the sizing of facilities that meet these peak use requirements. For example, portions of distribution reservoirs and mains (pipes) must be adequately sized to meet peak use demands.
- **Customer Related Costs.** Customer costs are those costs that vary with the number of customers on the water system. They do not vary with system output or consumption levels. These costs are also sometimes referred to as "readiness to serve" or "availability" costs. Customer costs may also sometimes be further classified as either actual or weighted. Actual customer costs vary proportionally, from customer to customer, with the addition or deletion of a customer regardless of the size of customer. In contrast to this, a weighted customer cost reflects a disproportionate cost, from customer to customer, with the addition or deletion of a customer.
- **Public Fire Protection Related Costs.** Public fire protection costs are those costs that are related to the public fire protection function. Usually, such costs are those related to public fire hydrants and the over-sizing of mains and reservoirs for fire protection purposes.
- **Revenue Related Costs.** Certain costs associated with the water utility may vary with the amount of revenue received by the City. An example of a revenue related cost is a tax based upon the gross revenues of the utility.
- **Direct Assignments.** Some costs associated with operating the system may be directly traced to a specific customer or class of service (e.g. bad debt expense). In this case, these costs are then "directly assigned" to that specific class of service. This assures that other classes of service will not be allocated costs for those "significant" facilities that they do not benefit from, or costs that they did not incur.

For each of the classified costs noted above, an allocation factor must be developed to allocate each specific type of cost in an equitable manner to the customer classes of service (e.g. residential, commercial, etc.).

A more detailed discussion of the specific cost of service methodology used for the City is provided below.

3.3.4 Functionalization and Classification of Water Plant in Service

The City's historical plant records were used in performing the functionalization of water plant in service. The classification process included reviewing each group of assets and determining which cost classifiers the assets were related to, or what function the asset (facility) provided.

Source of supply is based on the average day versus peak day use of the City's system to meet volume and capacity needs. The amount of volume required to meet average day demand is considered to be commodity related. The balance of peak use requirements is considered capacity related. This approach resulted in a classification of source of supply that was 42.0% commodity-related and 58.0% capacity-related. This indicates that the City has a fairly high peak day demand in relation to their average day demand.

Storage reservoirs are typically designed to meet two types of basic needs—capacity needs and public fire protection needs. The total storage capacity of the City's water reservoirs was examined and consideration given to the capacity required for fire protection purposes under a "worst case" scenario. This amount of capacity, in relation to the total storage capacity, is considered to be public fire protection related. The balance of storage capacity is considered to be capacity related. This approach resulted in a classification of reservoirs that was 88.0% capacity-related and 12.0% public fire protection related.

Pumping and transmission facilities are typically sized around meeting both average day and peak day capacity requirements. Therefore, pumping and transmission facilities were classified as 58% capacity related and 42% commodity related.

For most utilities, a vast majority of their investment is in water distribution plant. Water distribution lines (mains) are typically assumed to meet three types of needs on the system; customer-related, capacity-related, and public fire protection-related needs. First, a distribution system is a function of the number of customers that it serves, and must also be in place to meet a customer's minimum requirements for water. This portion of the distribution main plant investment is considered customer-related or a function of the number of customers on the system. Next, a portion of the distribution main investment is considered a function of meeting peak flow demand requirements on the system. Distribution mains must be sized to adequately meet the peak flow (capacity) requirements of the customers. This portion of the distribution main plant investment is considered capacity-related. Finally, even during a peak day or peak hour events, distribution mains must also be over-sized for fire flow requirements. This final portion of over-sizing for distribution main investment is classified as public fire protection-related. The analysis for the City's distribution mains resulted in a classification of 65.0% capacity-related, 26.0% customer-related, and 9.0% public fire protection related.

Table 3-6 shows a summary of the basic functionalization and classification of the City's major water plant items.

Table 3-6 Summary of the Classification of Water Utility Plant in Service						
Plant Component	**Commodity**	**Capacity**	**Actual Customer**	**Weighted Customer**	**Fire Protection**	**Direct Assignment**
Source of Supply	42%	58%	–	–	–	–
Storage	–	88%	–	–	12%	–
Pumping	42%	58%	–	–	–	–
Distribution Mains	–	65%	26%	–	9%	–
Meters/Services	–	–	–	100%	–	–
Hydrants	–	–	–	–	100%	–

The above table represents a summary of the classification of major accounts. A more detailed review of the classification of the water plant in service can be found in the Water Technical Appendices.

3.3.5 Functionalization and Classification of Operating Expenses

Operating expenses are generally functionalized and classified in a manner similar to the corresponding plant account. For example, maintenance of distribution mains is typically classified in the same manner (percentages) as the plant account for distribution mains. This approach to classification of operating expenses has been used for this analysis. In particular, source of supply expenses were classified as 42% commodity-related and 58% capacity-related. This classification is related to the average day versus peak day use of the City's system.

For the City's study, the 2008 water revenue requirements were functionalized and classified utilizing the previously discussed methodology. A more detailed review of the functionalization and classification of revenue requirements can be found in the Water Technical Appendices.

3.3.6 Allocation of the Revenue Requirements

Once the classes of service have been defined, and the classification process is complete, the various costs are then allocated to each of the classes of service based on equitable allocation factors. The City's classified water costs were allocated to the various classes of service using the following allocation factors.

- **Commodity-Related Allocation Factor.** Commodity-related costs vary with the flow of water. Therefore, commodity-related costs were allocated to the various customer classes of service using the City's 2006 water sales (consumption). Water sales were projected forward from this historical billed consumption. This information was provided by the City from their billing system.
- **Capacity-Related Allocation Factor.** Capacity-related costs vary with peak use or maximum demands on the system. Accordingly, the capacity allocation factor was developed based upon each classes assumed contribution to the system peak day demand. In developing this allocation factor, the City did not have City-specific measured information on individual customer class contributions to the City's peak day event. Given that, the

peaking factors, by class of service, were used to estimate the contribution of the each class of service to the peak event. The peaking factors for each customer class of service were initially calculated (estimated) by taking the ratio of the average month to peak month consumption. This ratio was assumed to be a reasonable surrogate of peaking factors for each customer class of service. The calculated total system peak demand was compared to the actual (historical) system peak demand to assure reasonableness of the peaking factors for each class of service.

- **Customer Allocation Factors.** Customer costs vary with the number of customers on the system. Two basic types of customer allocation factors were identified - actual and weighted. The allocation factors for actual customers were based upon the projection of the number of customers developed within the revenue requirements. The weighted customer allocation factor is also broken down further into two factors that attempt to reflect the disproportionate costs associated with serving larger water users. The first weighted customer factor is for customer service and accounting. This weighted customer allocation factor takes into account the fact that it may take more time to read a meter and process a bill for larger customers. The second weighted customer allocation factor is for meters and services. This factor attempts to reflect that different costs associated with providing larger sized meters.
- **Public Fire Protection Allocation Factor.** The allocation of public fire protection expenses in the water cost of service analysis involved an analysis of each class of service and their fire flow requirements. The analysis took into account the gallon per minute flow requirements in the event of a fire, along with the required duration of the flow. The fire flow rates used within the allocation factor were based upon the planning guidelines in the City's Water System Plan. For this study, it has been assumed that the minimum fire flow requirement for a residential customer is 1,500 gallons per minute (gpm) and 2,500 gpm for the commercial customer. The minimum fire flow requirements are then multiplied by the number of customers in each class of service, and the assumed duration, in minutes, of the required flow, to determine the class's prorated fire flow requirements.
- **Revenue Related Allocation Factor.** The revenue related allocation factor was developed from each customer class' projected annual rate revenues for 2008. This same amount of revenue was used in the revenue requirement analysis.

The water utility allocation factors noted above can be found in the Water Technical Appendices.

3.3.7 Summary of the Water Cost of Service Results

The summary of the allocated costs determine each class's overall cost responsibility. The allocated costs are then compared to the present revenue received from each customer class to determine the cost difference between current rates and the cost of service for each class. This difference in costs is compared to present rate levels to determine the adjustment needed (increase or decrease) to have cost-based rates. A summary of the water cost of service analysis developed for each class of service is shown within Table 3-7.

Table 3-7 Summary of the Water Utility Cost of Service Analysis for 2008 ($000's)				
Classes of Service	**Present Rate Revenues**	**Allocated Costs**	**$ Difference**	**% Difference**
Residential	$2,837	$2,533	($304)	-10.7%
Low-Income	5	9	4	74.4%
Multi-Family	1,171	1,176	5	0.4%
Commercial	1,043	1,314	271	26.0%
Government	99	136	37	38.1%
Montanan State University	531	518	(13)	-2.4%
Unmetered	5	5	(1)	-11.3%
Total	$5,691	$5,691	$0	0.0%

The allocation of costs attempted to assure that the facilities and costs allocated to each customer class reflected their respective benefit. The cost of service results indicate that cost differences do exist between the major customer classes of service. Generally, plus or minus 5% of the overall system average adjustment is considered to be within the "range of reasonableness" and indicate that a class of service is paying their "cost of service."

3.3.8 Summary Conclusions and Recommendations of the Cost of Service

The cost of service did note some cost differences associated with serving the City's different customer groups. Therefore, it was determined that interclass cost of service adjustments should slowly be ramped in over time. As a result of this decision, each class of service will be adjusted within an overall +/- 10% in the design of the proposed rates. A slow ramping in of interclass cost of service adjustments should be made over time. As a result of this decision, each class of service will be adjusted in the design of the proposed rates not more than +/- 10.0%. Residential will be adjusted -5.0%, Commercial/Government +10.0%, Multi-Family/MSU/Unmetered 0.0%. Low-income will not be adjusted since, by definition, they should show the need for a large rate adjustment. By definition, the low-income customer class of service has a below-cost rate.

"The cost of service did note some cost differences associated with serving the City's different customer groups.

It must be kept in mind that a cost of service analysis reflects costs and usage characteristics of a specific point in time, and as time goes on, customer's consumption patterns and usage requirements change. Given that consumption patterns and costs change over time, only through continual analysis, can one fully understand the true cost of providing service. Given the results of the water cost of service analysis, the focus will now shift to the development of the proposed water rate designs.

3.4 Water Rate Designs

The final step of the comprehensive water rate study process is the design of water rates to collect the desired level of revenue, based upon the findings and recommendations of the water

revenue requirement and cost of service analysis. In reviewing water rate designs, consideration is given to the level of the rates and the structure of the rates. This portion of the report will review the proposed water rate designs for the City.

3.4.1 Overview of Water Rate Structures

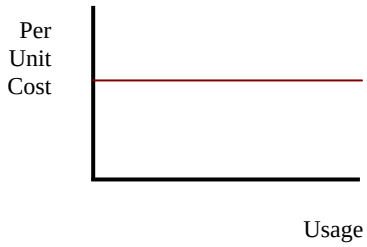
There are various "generally accepted" rate structures that can be used to establish or develop water rates. The initial starting point in considering a water rate structure is the relationship between fixed costs and variable costs. Fixed costs are generally collected as a fixed charge on a monthly basis (e.g. $5.00 per month/meter). This charge may be called by various names (e.g. customer charge, meter charge, readiness to serve charge, etc.), but in all cases, it is intended to collect those fixed costs that the utility incurs, regardless of the customer's level of consumption. The most basic form of a fixed customer charge is a flat monthly fixed cost. While the charge is a fixed cost, it may also vary and increase by meter size. The rate at which the meter charge increases is usually a function of the meter capacity.

> ***"There are various "generally accepted" rate structures that can be used to establish or develop water rates. The initial starting point in considering a water rate structure is the relationship between fixed costs and variable costs."***

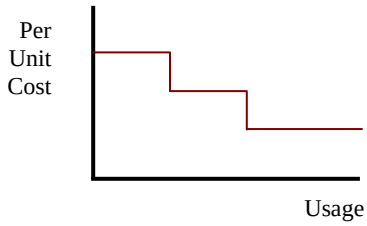
While it was noted that there are different approaches that can be used to collect fixed charges, the same can be said for variable or volumetric charges. Variable charges are generally based upon metered consumption and charged on a $/unit cost. The unit of measurement may vary (e.g. gallons, thousands of gallons, cubic feet, hundreds of cubic feet, etc.), but it is not a critical element in the development of the rates. This is because the charge per unit is simply adjusted to reflect the units of measurement being used. In other words, if you are charging $2.00 per 1,000 gallons, and wanted to charge on a per gallon basis, the rate would be 0.002¢/gallon. It is the structure of the variable charges where numerous options exist.

There are three basic rate structures for variable charges; a uniform charge, a declining block charge and an inverted block charge. Table 3-8 provides an overview of each of these variable charge rate structures.

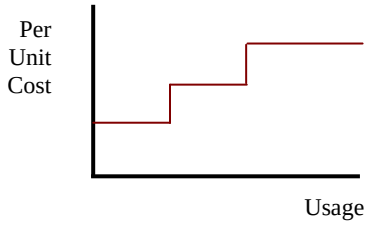
Table 3-8
Overview of the Various Variable Charge Rate Structures



UNIFORM RATE STRUCTURE
The cost per unit of consumption under a uniform rate structure does not increase or decrease with additional units of consumption



DECLINING BLOCK RATE STRUCTURE
The cost per unit of consumption under a declining block rate structure decreases with additional units of consumption



INVERTED BLOCK RATE STRUCTURE
The cost per unit of consumption under an inverted block rate structure increases with additional units of consumption

As can be seen from Table 3-8, the basic philosophy of each of these variable charge rate structures varies significantly. Under a uniform rate structure, the cost per unit does not change with consumption. From the perspective of customer understanding and rate administration/billing, this is a simple and straightforward approach. In contrast, the declining block rate structure is a bit more complex. The number of blocks (e.g. 3 stepped blocks) and size of the blocks (e.g. 0 – 10 CCF) may vary. However, the number of blocks should be reasonable (i.e. 2 – 4 blocks) for reasons of simplicity and administration. Declining block rates may imply that there are certain economies of scale with additional consumption, and not necessarily a "volume discount." Depending upon the utility, this may or may not be a true statement. Finally, an inverted block rate structure attempts to send a price signal to consumers that their consumption costs more, as more water is consumed. This may or may not be the proper price signal regarding the utility's water resource costs. As with the declining block rate structure, the number and size of each block may vary, but should be reasonable for purposes of customer understanding and rate administration.

The rate structure concepts noted above may be combined and used to form various rate design options that meet the City's needs. However, at the same time, the City must understand its overall goals and objectives in designing final water rates.

3.4.2 Rate Design Criteria and Considerations

Prudent rate administration dictates that several criteria must be considered when setting utility rates. Some of these rate design criteria are listed below:

- Rates which are easy to understand, from the customer's perspective
- Rates which are easy for the utility to administer
- Consideration of the customer's ability to pay
- Continuity, over time, of the rate making philosophy
- Policy considerations (encourage conservation, economic development, etc.)
- Provide revenue stability from month to month and year to year
- Promote efficient allocation of the resource
- Equitable and non-discriminating (cost-based)

Many contemporary rate economists and regulatory agencies feel that the last consideration, cost-based rates, should be of paramount importance and provide the primary guidance to utilities on rate structure and policy.

It is important that the City provide its customers with a proper price signal as to what their consumption or usage is costing. This goal may be approached through rate *level* and *structure*. When developing the proposed rate designs, all of the above listed criteria were taken into consideration. However, it should be noted that it is difficult, if not impossible, to design a rate that meets all of the goals and objectives listed above. For example, it may be difficult to design a rate that takes into consideration the customer's ability to pay, and one which is cost-based. In designing rates, there are always trade-offs between the various goals and objectives.

3.4.3 Review of Overall Rate Adjustments

As indicated in the revenue requirement analysis and the cost of service analysis, the priority for the water utility was to adjust and transition the overall level of the water rates to meet the City's financial and rate policies. Therefore, the results of revenue requirement analysis were the primary basis for establishing the proposed rate adjustments for the water utility. Table 3-9 provides a summary of the proposed water utility adjustments shown within the revenue requirement analysis. In addition, since cost of service adjustments were recommended at this time, the proposed 2008 rate adjustment will be applied among each of the customer classes of service (rate schedules) based on cost of service results.

Table 3-9
Summary of the Proposed Water Rate Adjustments

	2007	2008	2009	2010	2011	2012
Proposed Annual Rate Adjustments	0.0%	0.0%	0.0%	2.6%	2.6%	2.6%

3.4.4 Present Water Rates

The City currently has a six water rate schedules. All customers have the same fixed meter charge based on the size of the meter. The consumption charge is a flat charge based on the amount of consumption and varies in rate amongst the classes of service. The City's present water rates are shown below in Table 3-10.

Table 3-10 Summary of the 2007 Present Water Rates	
Rate Component	**Present Rate**
Meter Charge (Monthly)	
3/4"	$12.60/Month
1”	16.07
1-1/4”	20.00
1-1/2”	24.00
2”	34.04
3”	57.42
4”	90.95
6”	165.45
8”	260.45
Consumption Charge ($/CCF)	
Residential	$2.27
Low-Income	$2.27
Multi-Family	$1.57
Commercial	$1.29
Government	$1.34
Montana State University	$1.78

The above summary shows the present water rates. The focus now shifts to the development of the proposed water rates.

3.4.5 Proposed Water Rates

In developing the proposed water rates, consideration was given to reviewing various rate structures that might encourage more efficient water use and conservation. In particular, the City wants to encourage more efficient outdoor watering. This study considered other alternative rate structures to further strengthen the conservation price signal. A three tiered rate for residential is recommended as a starting point for conservation. It is important to note that the City had insufficient bill frequency data to determine the full impact on rate revenues with this tiered rate. A bill frequency analysis provides a better understanding of the amount of consumption at the various levels of usage.

In developing the proposed water rates, three key adjustments were made. First, for the residential and low-income customers their volumetric (consumption) portion of the rate structure was adjusted to an inverted or tiered block rate structure. This is intended to encourage more efficient outdoor use by this customer group. The other major adjustment made is the cost of service adjustments recommended within the water cost of service analysis. These adjustments have also been made within the volumetric portion of the rate structure. For example, it will be noted that the commercial rate has been adjusted from a $1.29/CCF to $1.38/CCF in 2008. This level of adjustment is a movement towards a more cost-based rate for this particular customer class of service. Finally, the City’s monthly base rate is based on service line size. In general, this follows the “generally accepted” approach to establishing meter charges. The difference in costs between the various meter sizes is typically weighted based on meter or service line capacity. Currently the City has rates that vary by service line size, and are

somewhat close to the AWWA meter capacity equivalencies but not in line with them. For example, a 2" meter has capacity that is equal to eight (times) the capacity of a 3/4" meter. That would imply that a 2" meter charge should be eight times the 3/4" charge. Therefore, the proposed rates include phasing-in of the AWWA meter equivalencies, up to 50% of the equivalency, by the end of the 2012 test period.

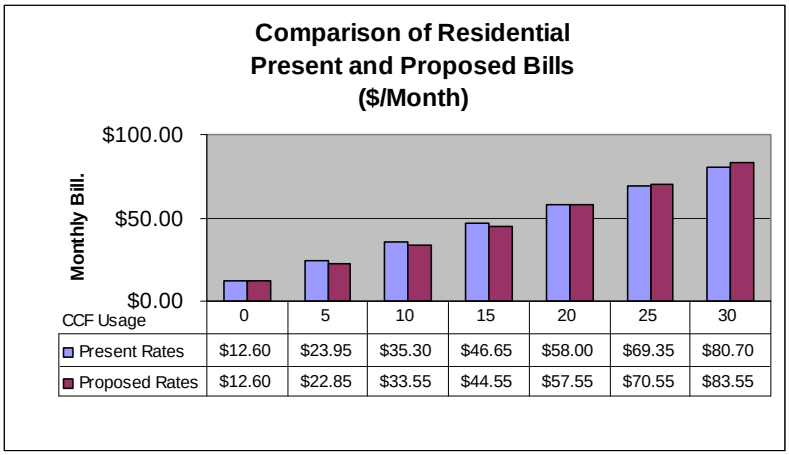
The multi-family class of service shows as lesser consumption charge than residential. This is the result of multi-family using less irrigation resulting in a lower peak capacity factor to the system. Presented below in Table 3-11 is a summary of the recommended water rates.

Table 3-11
Summary of the Proposed Water Rates

	Present Rate	2008	2009	2010	2011	2012
Meter Charge (Monthly)						
3/4"	$12.60	$12.60	$12.60	$12.60	$12.60	$12.60
1"	16.07	16.57	16.69	16.90	17.31	18.56
1-1/4"	20.00	20.73	20.92	21.22	21.84	23.67
1-1/2"	24.00	25.80	26.25	26.99	28.49	32.98
2"	34.04	37.35	38.18	39.56	42.32	50.60
3"	57.42	64.28	65.99	68.85	74.57	91.71
4"	90.95	102.86	105.84	110.80	120.72	150.50
6"	165.45	190.90	197.26	207.87	229.08	292.71
8"	260.45	301.60	311.89	329.04	363.33	466.21
Consumption Charge ($/CCF)						
Residential	$2.27					
Low-Income	2.27					
0 – 7 CCF		$2.05	$2.05	$2.10	$2.15	$2.21
8 – 15 CCF		2.20	2.20	2.26	2.32	2.38
Over 15 CCF		2.60	2.60	2.67	2.74	2.81
Multi-Family	1.57	1.57	1.57	1.61	1.65	1.69
Commercial	1.29	1.38	1.38	1.42	1.46	1.50
Government	1.29	1.38	1.38	1.42	1.46	1.50
Montana State University	1.34	1.43	1.43	1.47	1.51	1.55

Given the proposed rate structures, a bill comparison was developed which compared the residential bill under the present and proposed rates for varying levels of consumption. As can be seen from the graph, users with low usage will actually see small decreases. This is a result of the overall 5% reduction suggested by the cost of service. In contrast to this, large users will actually see an increase in their bills. The increase associated with larger use customers may not be as much or as aggressive as the City would initially believe may be needed. However, tiered rate structures have greater issues with revenue stability then the City's current rate structure, and for that reason the City should be cautious in the pricing used for the tail or highest use block.

In developing the block sizes for the residential rate structure, consideration was given to the amount of water required for indoor and outdoor use. The first block, 7 CCF of water, is an average amount of winter water for a City's residential customers. Usage above this amount is considered to be outdoor use. The second block of 8 CCF to 15 CCF should be adequate for most residential customers for outdoor watering needs. Finally, usage over 15 CCF is considered to be inefficient usage. As noted previously, the City had insufficient bill frequency data to clearly determine the amount of usage and revenues that may be derived in the future from each of these blocks. The approach used by HDR has assumed reasonable estimates of the consumption in each block.



CCF Usage	0	5	10	15	20	25	30
Present Rates	$12.60	$23.95	$35.30	$46.65	$58.00	$69.35	$80.70
Proposed Rates	$12.60	$22.85	$33.55	$44.55	$57.55	$70.55	$83.55

It will be noted that the study has not recommended an inverted or tiered block rate structure for the multi-family, commercial, government and university customer classes of service. Conservation and efficient use can be achieved in a number of different ways, and price is one of those methods. However, the adoption of an inverted block rate structure for these customers would be problematic in that for these specific customers, greater consumptive use does not necessarily imply inefficient or wasteful use. The intent of inverted or tiered block rate structures is to target inefficient discretionary use (i.e. outdoor watering), not particularly large use customers. In fact, large use water customers are often the most water efficient customers, since it may be a large proportion of a company's operating costs. To achieve water conservation and efficient use, non-residential customers may best be addressed by individual water audits or technical advice and assistance. As a business or governmental agency, these customers already have financial incentives to minimize their bills. Should the City find this not to be the case, then other alternative rate structures may be appropriate. However, these alternative rate structures are typically "individualized" to the customer and are much more complex from an administrative and billing system perspective. An example of this type of rate structure is an "individualized" inverted block rate structure for a commercial customer. To implement this type of "individualized" rate structure, the City would need to analysis each individual customer and have a billing system capable of keeping track of these individual blocks sizes for each customer. For the vast majority of municipal utilities, this is often considered too complex or expensive to implement (e.g. billing system modifications). For that reason, it has not been suggested or recommended within this study at this time. A further discussion of the ways of achieving commercial conservation is discussed below.

Based upon the proposed rate structure, the rates are designed to collect the overall target revenue adjustments 2.6% per year for 2010, 2011, and 2012.

3.4.6 Commercial Conservation Best Practices

Conservation is generally not focused on simply saving water, but rather, it is focused on reducing or eliminating inefficient use. For the commercial class of customer, a large volume user does not necessarily imply inefficient use. Given that, punitive pricing practices such as inverted or tiered rates, such as those used for residential customers, may not be the most effective tool to encourage conservation in the commercial sector. The City requested an overview of commercial conservation best practices and examples of utilities that are meeting this challenge.

Commercial conservation can be divided into two categories: domestic (toilets, urinals, sinks, etc.) and all other (irrigation, industrial cooling processes, food service equipment, medical equipment, etc). The following discusses commercial conservation programs in general and then specific utility case examples.

Similar to residential conservation, education and incentives are an important element of commercial conservation. At the same time, a commercial conservation program often reaches out to the commercial sector via audits, newsletters, etc. to achieve target levels of conservation and eliminate inefficient use.

The following discussion outlines conservation programs from the least to most costly. The costs shown are only approximations which the City can use to consider the creation of a rebate program. The easiest and least costly options for commercial conservation are on the domestic conservation side. Rebates for replacing restroom faucet aerators providing 0.5 gpm cost approximately $1.00 per fixture for the utility. Under the plumbing code, 0.5 gpm is the maximum allowed for the Industrial, Commercial and Institutional (ICI) sector. The target customer for this program would be existing customers with pre-code materials currently installed. Older toilets typically use 3.5 gallons per flush (gpf). Replacing older, less efficient toilets with Ultra Low Flow Toilets providing 1.6 gpf typically cost a utility $75 - $100 per toilet for a rebate. The 1.6 gpf is the maximum allowed under current plumbing code. If a business wants to install toilets which are more efficient than code, 1.0 gpf high efficiency toilets are available. Rebates for these toilets typically range between $75 and $110.

The next category of conservation is the “other” and these options cost more than the domestic conservation options. For irrigation systems, the most cost effective option for the utility will be rain sensors installed in an automatic irrigation system to shut off irrigation when it is raining. The approximate cost of rebates for rain sensors to the utility is $100. Target customers for this potential rebate would be those with in-ground irrigation systems with automatic controllers. Another option could be a partial rebate, typically seen at $250, for evapotranspiration-based controllers, which will link the irrigation to weather conditions to shut off if it is raining or the ground is still wet from a rain event. The potential savings for the evapotranspiration-based controller to the customer is 15 percent on irrigation water over automatic controlled irrigation systems saving the customer money and the utility water resources. Rebates can range from no charge to the customer to some percentage of the total cost.

Another option under the “other” category is audits. These are the most costly to the utility to perform as professional auditors perform the audit of the system and use of water. An indoor domestic system audit can cost approximately $300 and cover potential improvements through

hardware improvements or operational changes. Outdoor irrigation audits run approximately $500. These audits can also identify more efficient use of water through hardware improvements or operational changes. These audits are typically performed by professional landscape irrigation auditors. A list of certified professionals by state can be found at www.irrigation.org. These audits and recommended improvements can improve the efficiency of the customers' irrigation systems.

In discussing rebates and audit programs, an important distinction must be made in this discussion. The City should be targeting "beneficial" conservation, not just "conservation." Beneficial conservation is cost-effective conservation in that the benefits to the utility exceed the cost of the conservation measure. HDR, in providing this discussion, is not implying that all of these conservation programs or measures may be "beneficial" conservation. The City, before undertaking any commercial conservation program, should determine the cost and benefit of that program or measure.

Several agencies were contacted to discuss best management practices of their commercial conservation programs. The discussion below is an overview of each utility's best management practices as well as costs of savings to their customers if available.

Seattle Public Utilities – Seattle Public Utilities (SPU) promotes a "Regional 1% Conservation Program". The program includes the City of Seattle and a group of 17 utilities who purchase wholesale water from the City of Seattle. The goal of the program is to keep water demand in the year 2010 at the same level in the year as 2000, despite the anticipated growth expected in the region. In other words, if each person and business becomes ten percent more water efficient over the ten year period of 2000-2010, they anticipate saving approximately 11.0 MGD annually in drinking water.

SPU also conducts workshops and classes in order to educate businesses on the value of conservation. These classes include specific information on how different equipment can provide significant savings in both water use and bills to the business. SPU also has a water supply website which includes a "Supply Indicator" showing the status of the reservoirs and other water supplies as well as tips for residential and business customers.

Rebates are another program in which SPU encourages businesses to participate. According to SPU, in 2005 they spent $512,000 on the commercial irrigation program through rebates while saving an average of 149,482 gallons per day, $3.43 a gallon a day saved.

Other SPU measures and strategies:

- Upgrading domestic water use fixtures, efficiency of industrial use equipment, and irrigation equipment
- Outreach to Chambers of Commerce and other business groups
- Technical assistance, assessments and workshops
- Bonus incentives to increase specific measure participation
- Targeted promotion through vendors, trade groups, agencies, etc.

The above information was provided by Al Dietemann, Water Conservation Team Leader for SPU. For more information on SPU's water conservation programs see www.savingwater.org or commercial conservation information at www.savingwater.org/business.htm.

City of Austin, Texas - The City of Austin is a leader in commercial conservation. Austin Water Utility's commercial program is successful due to the practice of targeting individual businesses. A representative from the utility meets with larger businesses in the Austin area and outlines how the business can improve their water conservation. For smaller business in the area, group meetings are held for the same purpose. The utility representatives have spoken at energy conservation conferences, schools, Earth Day events, church groups, etc. to get the word out about the conservation programs available.

The Austin Water Utility works closely with the city permit department to identify what new buildings are being constructed in the city. The new business or building representative is then contacted to discuss conservation measures and equipment before the building is completed. This way, efficient equipment is installed in the building during construction and conservation is practiced from the beginning.

Rebates are also employed. The utility has several rebate programs for commercial water customers. Examples of the rebates offered are listed below:

- Rainwater harvesting system and rain barrel rebate program: Up to $5,000 per project toward the cost of new and innovative technologies
- Special commercial rebates: Covering the installation of new equipment and re-design of manufacturing equipment up to $40,000. To qualify for this rebate the system must save at least 300 gallons per day and remain in place for five years.
- Free Toilet and Toilet Rebate Program: For hotels, motels, restaurants and office buildings, $110 for purchase and installation of approved toilet.

The utility also distributes a newsletter to participating businesses. The newsletter includes spotlights on specific businesses and their conservation successes as well as tips for improving conservation. The utility focuses on the bottom line type of communication, not only showing the savings to the business, but also showing they are a good steward of the environment.

On the rate side, the utility uses the winter consumption average and then allows businesses up to 25 percent consumption above the winter average for their summer use. Anything above the 25 percent is then charged an additional (higher) rate.

Other programs the utility offers are free irrigation system audits. A city auditor will check underground sprinkler systems for leaks, water application rates, and adequate coverage to help determine an efficient irrigation schedule. Customers can also receive a bill credit of up to $1,000 for upgrading their irrigation system to an underground system with water conservation features.

All above information was provided by Bill Hoffman with the Austin Water Utility. For more information, the utility's website www.waterwiseaustin.org provides information on their commercial programs, their task force and new conservation initiatives the utility is enacting.

Denver Water – Denver Water has an Irrigation Efficiency Program for their large irrigation customers. This program is for those able to save a minimum of one acre-foot of water in a season by irrigating more efficiently by using evapotranspiration controllers, rain sensors or subsurface driplines or if they modify their landscape with Xeriscape, reduced turf area, or soil amendments. If the customer is able to save the acre-foot, they receive incentive payments from Denver Water in the amount of $4,500/acre-foot/year, based on a five-year period to ensure the sustainability of the project. These savings are also adjusted annually for weather variations based on a control group of irrigation accounts. Denver Water also encourages the use of separate irrigation taps where applicable.

The above information was provided by Cindy Moe, Industrial Water Conservation Engineer. For further information on Denver Water's commercial and industrial program and their rebates, please go to http://www.denverwater.org/cons_xeriscape/conservation/Commercial_IndustIncentivePrgm.html. Or you can also view their Best Management Practices at http://www.denverwater.org/cons_xeriscape/conservation/BMPs_Commercial.html.

Other Sources of Information - Other sites providing detailed information on commercial conservation include the California Urban Water Conservation Council www.cuwcc.org. This organization is made up of utilities throughout California and lists best management practices for the conservation of water and control of pollution in the rivers, lakes and bays of California. East Bay Municipal Utility District (EBMUD) has a detailed section on their website www.ebmud.com on the conservation programs they offer to their non-residential customers. These include their WaterSmart Irrigation Controller Program, commercial rebates, and conservation device distribution.

American Water Works Association provides water conservation information through www.awwa.org/waterwiser. Information includes the latest resources on water conservation, a reference section and education programs offered.

In summary, the City has a number of options that it may explore to begin to address the issue of commercial conservation and inefficient use.

3.5 Summary of the Water Rate Study

This section of the report has discussed the development and results of the comprehensive water rate study conducted for the City. The results of the water rate study indicated that water rates are slightly deficient for the projected time period reviewed. The implementation of rate adjustments, as shown in the rate transition plan, should generate the additional revenue needed to meet the City's increased water operating and capital needs, along with the City's financial and rate setting policies.

The water rates, as proposed herein, are cost-based and were developed using "generally accepted" rate making methods and principles. The proposed rates have been adjusted to reflect the results of the cost of service, along with contemporary rate setting principles. This includes an inverted or tiered rate to encourage more efficient outdoor use by residential customers. The proposed rates should enable the City's water utility to operate in a financially sound and prudent manner.

TECHNICAL APPENDIX