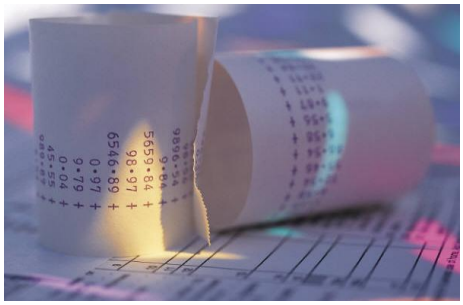
Final Report

City of Lincoln
Public Works and Utilities Department

Review of the Water Shortage Rates

May 2013



Prepared by:

HDR Engineering, Inc.

May 3, 2013

Ms. Fran Mejer
Public Works Utilities Business Manager
555 S. 10th St
Lincoln Nebraska 68502

Subject: Development of Water Shortage Rates

Dear Ms. Mejer:

HDR Engineering, Inc. (HDR) was retained by the City of Lincoln, Public Works & Utilities Department (the "Department") to provide professional and technical services as it relates to the development of water shortage rates. During the prior year, the Midwest and Nebraska, in particular, faced record drought conditions. While the Department successfully addressed the challenges posed by last year's drought, it did highlight the need for a more proactive approach and plan to manage water shortage conditions. As you are aware, water shortage conditions are not simply limited to drought conditions. In addition, a water shortage plan may be applicable during times of emergency or catastrophic conditions (e.g. a natural disaster) or when there may be water system operational issues.

While water shortage conditions, and droughts in particular, create significant water supply issues, it also poses significant financial and revenue issues for the utility. The utility asks customers to conserve water which directly impacts revenues. At the same time, the utility may incur additional and extraordinary costs to manage/supplement the constrained water supply and communicate/educate customers about the drought. Finally, rates and pricing can be used as an incentive to encourage efficient use.

Since last year, the Department has made significant progress in developing a comprehensive water management plan. One possible element of that plan which the Department needs professional and technical assistance with is the establishment of water shortage rates. To that end, HDR has developed a technical analysis to establish water shortage rates for each of the Department's defined "phases" of water shortage. This report documents the professional services undertaken for the Department.

This report was developed based upon information provided by the Department, along with the Department's most recent comprehensive water rate study. In establishing this report and the water shortage rates contained herein, it is important for the Department to understand the complexity of managing consumptive use during a water shortage or droughts. While this report has attempted to create certain financial tools to help shelter the Department from the financial impacts of a water shortage, predicting customer behavior and water usage patterns in a severe shortage is extremely difficult and for that reason, the financial results of the Department during a water shortage should be closely monitored, and as appropriate, adjustments made to the actions being undertaken to achieve the needed water savings.

We appreciate the assistance provided by the City and Department's management and staff in the development of this study. More importantly, we appreciate the opportunity to provide these additional services to the City and the Department.

Sincerely yours,
HDR Engineering, Inc.

Tom Gould
Vice President
National Technical Director
of Finance and Rates

J. Erin Hunt, P.E.
Associate Vice President

500 108th Avenue NE
Suite 1200
Bellevue, WA 98004-5549

Phone: (425) 450-6200
Fax: (425) 453-7107
www.hdrinc.com

Table of Contents

Executive Summary

Introduction 1
Development of a Water Management Plan 1
Need for the Development of Water Shortage Rates 1
Current Industry Practices Related to Water Shortages and Pricing 2
Drought (Water Shortage) Rates 3
Review of the City of Lincoln Water Management Plan 3
Development of the Water Shortage Rates 5
Development of Residential Water Shortage Rate Options 6
Other Non-Residential Water Shortage Rates 9
Summary of the Study 9

1 Introduction

1.1 Introduction 10
1.2 Development of a Water Management Plan 10
1.3 Need for Development of Water Shortage Rates 10
1.4 Potential for Future Water Shortages 11
1.5 Report Organization 12
1.6 Summary 12

2 Current Industry Practices Related to Water Shortages and Pricing

2.1 Introduction 13
2.2 Defining Drought 13
2.3 Price and Non-Price Approaches to Conservation 14
2.4 Price and Water Demand 15
2.5 Mandatory Water Use Restrictions During Water Shortages 16
2.6 Drought Rates 17
2.7 Summary 19

3 Review of the City of Lincoln Water Management Plan

3.1 Introduction 20
3.2 Objectives of the Water Management Plan 20
3.3 Conservation and the Water Management Plan 21
3.4 Triggers for Restrictions 21
3.5 Water Restriction Phases 21
3.6 Voluntary and Mandatory Restrictions 22
3.7 Targeted Level of Overall Savings 22
3.8 Triggers for Declaring a Phase 23
3.9 Summary 25

4 Development of Water Shortage Rates

4.1 Introduction 26
4.2 Customer Responsiveness to Price 26
4.3 Overview of the Current Water Rates 27
4.4 Targeted Water Savings 28
4.5 Development of the Water Shortage Rate Options 29
4.6 Residential Water Shortage Rates 30
4.6.1 Residential Option 1 – Maintain Existing Rate Structure 30
4.6.2 Residential Option 2 – Maintain Existing Rate Structure and Hold Block 1 32
4.6.3 Residential Option 3 – Maintain Existing Rate Structure and Add a 4th Block 34
4.7 Non-Residential Water Shortage Rates 36
4.7.1 Non-Residential Water Shortage Rate – Maintain Existing Structure 36
4.8 High User Water Shortage Rates 37
4.8.1 High User Water Shortage Rate – Maintain Existing Structure 38
4.9 Summary 39

Technical Appendices

Executive Summary

Introduction

The City of Lincoln, Public Works and Utilities Department (Department) retained HDR Engineering Inc. (HDR) to provide professional and technical assistance in the development of water shortage rates. Water shortage rates are designed to achieve two key objectives. First, they are designed to encourage conservation or efficient use in a time period when water supply may be constrained. These constraints may be a function of drought, a natural disaster or an operational issue with the City's water system. The second objective is related to the financial condition of the utility. As customers are asked to use less water, either on a voluntary or restrictive nature, water shortage rates are designed to help keep the utility financially whole.

Development of a Water Management Plan

To address the issues associated with water shortage, the Department has prepared a Water Management Plan (WMP). The plan provides clear guidance and action steps for the Department's management team. More specifically, the WMP discusses the triggers for water restrictions and defines the various water restriction phases (e.g., Phase I: Moderate Shortage, Phase II: Severe Shortage, etc.). For each phase, the WMP provides specific targeted savings and clearly defined action steps.

Need for the Development of Water Shortage Rates

An important element of the WMP is the issue of the financial and revenue impacts from a water shortage event. The Department's adopted water rates are established to collect the Department's overall revenue requirement, while at the same time encouraging efficient use and conservation from their customers. It is well understood that price (rates) can be one tool to encourage conservation and efficient use. From that perspective, during a water shortage, a utility may adjust their water rates to create greater price incentives for customers to reduce their usage, but also to penalize egregious and wasteful users.

At the same time, a utility is encouraging reduced consumption, and simply stated, if a utility maintains their existing rates, the utility will have a significant revenue shortfall during the water shortage period. Even a reduction as small as 10%, can create significant financial (revenue) issues for the utility. The Department has approximately $30 million in annual revenues and a reduction in 10% consumption can potentially translate to a $3 million revenue shortfall. This revenue shortfall simply places a greater strain on the limited financial resources and reserves of the water utility.

To address the issue of encouraging more efficient use through pricing and to attempt to keep the utility financially whole during a water shortage, water shortage rates may be developed. The water shortage rates are directly linked to the WMP and the various drought phases contained within the plan. The water shortage rates are designed to fairly treat both customers that achieve the desired savings and those customers that do not conserve.

Current Industry Practices Related to Water Shortages and Pricing

Drought and water shortages are not new to the water utility industry. What is relatively new is the water utility industry's response and approach to addressing water shortages and drought. Unfortunately, much of what is considered today's "industry best practices" was derived from "lessons learned" in prior water shortages or drought conditions. Each drought or water shortage period has provided an opportunity to learn different practices and approaches to meeting the challenges created by a drought.

Drought events are complex, particularly in trying to make a decision about when an area or utility is in a drought. Unlike other natural hazards, a drought or water shortage "sneaks up on us" disguised as lovely, sunny weather. Technically, a drought may be defined as:

> *"Drought is a shortage of water, usually associated with a deficiency of precipitation. Drought occurs when the demand for water exceeds the supply of water." [emphasis added]*[1]

Drought is also a relative term and must be defined in relation to "normal" for a particular region and time of year.

Conservation and efficient use of water can be achieved through a number of different means. These different means may be described as "price" and "non-price" means. In a drought situation, utilities often turn to price and non-price means to achieve the desired savings. Stated another way, the conservation savings needed in a drought may be achieved in two different ways:

- **Economic Incentives** – Pricing of the water to provide direct economic incentives for efficient use
- **Command and Control** – Direct regulation of an activity by legislation that states what is permitted and what is illegal

Under normal water conditions, command and control approaches are generally discouraged since they are a form of rationing. However, in a water emergency or drought, a command and control approach (e.g. limited outdoor water use, etc.), along with economic incentives would appear to be appropriate. It is important to understand that non-price demand management programs do create certain costs on the system. As a part of developing water shortage rates, consideration must be given to the additional costs that may be incurred in implementing and managing the demand management program.

[1] Thomas B. McKee, et. al., A History of Drought in Colorado, Lessons Learned and What Lies Ahead, Colorado Climate Center, Atmospheric Science Department, Colorado State University, February 2000, p. 5.

It is well understood that as the price of a commodity increases, the demand for that commodity should decrease. This response to price changes is referred to as the price elasticity of demand. Elasticity is also categorized as an "elastic" demand (i.e. highly sensitive to price) and "inelastic" demand (i.e. less sensitive to price). Water is considered to be inelastic, but certain portions of water consumption are more elastic than others. Elasticity varies along the demand curve. Water used for drinking water is highly inelastic, whereas, outdoor watering is more discretionary and elastic. For those reasons, most conservation programs target the elastic portion of water demand which is most sensitive to price and typically focuses on discretionary or outdoor water use.

During water shortages, non-price demand management tools often include implementation of mandatory water use restrictions. These restrictions often center on the total quantity of water that may be used, as well as restrictions on when the usage can occur and on particular types of uses (e.g. no washing of cars, etc.). There has been limited research on the effectiveness of these non-price methods. Interestingly, the research that has been conducted appears to be mixed. Even with somewhat mixed results, the use of water use restrictions is a nearly universal approach for water shortage plans. However, water utilities cannot rely solely on water use restrictions and customer compliance.

As can be seen from the above, non-price means of water demand management is not a perfect or "end-all" solution. While it can be effective, it also has certain drawbacks, particularly to businesses. Businesses that use water within a production process are impacted by water use restrictions. It is often common to apply many of the same drought restrictions for residential customers on the business community. Interestingly, in the case of the California drought, most utilities did not explicitly establish differing reduction goals for residential, commercial and industrial customers.

Drought (Water Shortage) Rates

Drought rates are special surcharges that are implemented during times of severe drought (or water shortage). While many may consider drought rates to be "conservation rates" they do have one distinct difference from a conservation rate --- they are imposed for a temporary time period.

Review of the City of Lincoln Water Management Plan

The cornerstone of Department's proactive efforts to address water shortages is the City of Lincoln Water Management Plan. The Water Management Plan was first adopted in 1994[2] to provide guidance for imposing water restrictions and to supplement the activities of the Mayor's Water Conservation Task Force. From that plan, the City has been in the process of updating their Water Management Plan and the water shortage rates developed as a part of

[2] The Lincoln Water System Water Management Plan was adopted May 1994 through Executive Order 047122. It was subsequently revised in 2000, 2001 and 2003.

this study is based upon the key triggers for restrictions (i.e. water savings) and the targeted levels of savings for each of the phases of water shortage.

There are a number of different objectives of the updated Water Management Plan. In summary form, they are as follows:

- Keep water use within pumping capacity and delivery capability, based on recommendations of the Lincoln Water System
- Define procedures to be used when the above criteria cannot be met, and
- Familiarize citizens, businesses and industry with procedures which may be implemented when voluntary or mandatory water restrictions are required

The plan is designed such that it outlines specific triggers for responding to and management of the City's water supply through various circumstances, particularly drought related. The Director of Public Works and Utilities is responsible for making a recommendation to the Mayor for either enactment of initial restrictions or acceleration to an appropriate phase in the Plan.

In summary form, some of the key elements of the WMP which are important to this study are as follows:

- **Triggers for Restrictions** – the Department's Water Management Plan provides different "triggers" that the Director of Public Works and Utilities may consider before recommending voluntary or mandatory use restrictions. These trigger events are as follows:
  - ✓ Drought (Supply Shortage)
  - ✓ Natural Disaster (e.g. Tornado, Fire, Blizzard, Power Grid Failure)
  - ✓ Failure of Water System Facilities (e.g. major supply/transmission component)

  The Water Management Plan discusses each of these triggers and provides prescribed actions.

- **Water Restriction Phases** – The Water Management Plan defines different phases or stages. These phases are as follows:
  - ✓ Phase 1: Moderate Shortage
  - ✓ Phase 2: Severe Shortage
  - ✓ Phase 3: Critical Shortage
  - ✓ Catastrophic Water Shortage

- **Voluntary and Mandatory Restrictions** – The Water Management Plan specifies for each phase the voluntary and mandatory restrictions.
  - ✓ Phase 1: Voluntary
  - ✓ Phase 2: Required Outdoor
  - ✓ Phase 3: Required Outdoor, Voluntary – Indoor
  - ✓ Catastrophic Water Shortage – Varies based upon specific situation/condition

- **Targeted Level of Overall Savings** – The Water Management Plan does not specify percentage savings, per se, but does specify a targeted level of usage for each phase.

When compared to "normal" water conditions, the following reductions (savings) were determined for purposes of developing the water shortage rates.

- ✓ Phase 1: Up to 10% Savings
- ✓ Phase 2: 10% to 20% Savings
- ✓ Phase 3: 20% to 30% Savings
- ✓ Catastrophic Water Shortage: 30% - 50% Savings

- **Triggers for Declaring a Phase** — The Water Management Plan does not specify percentage savings, per se, but does specify a targeted level of maximum day demand (usage) for each phase. When compared to "normal" water conditions, the following reductions (savings) were determined for purposes of developing the water shortage rates.
  - ✓ Phase 1: Platt River flow less than 3,000 cfs and water usage exceeds 80 MGD
  - ✓ Phase 2: Platt River flow less than 1,000 cfs and water usage exceeds 70 MGD
  - ✓ Phase 3: Platt River flow less than 200 cfs and water usage exceeds 60 MGD
  - ✓ Catastrophic Water Shortage – System usage exceeds the ability to supply, a major transmission/distribution link is disrupted, or a system failure occurs which causes a loss of capability to provide adequate services 30% - 50% Savings

Given these basic parameters from the Department's Water Management Plan, water shortage rates were developed for the City's current water rates.

Development of the Water Shortage Rates

In a water supply shortage or drought, water rates are one mechanism or tool used to encourage or create conservation savings. Economic theory suggests that when the price of a commodity increases the effect on demand for that commodity should decrease. When a utility enters a water shortage or drought stage, it is not uncommon for a utility to have a set of water shortage rates in place to encourage or induce some specified level of conservation savings. More importantly, water shortage rates are also a tool or mechanism to help the utility remain financially sustainable and whole within a shortage event.

At the present time, the Department has three rate schedules in effect: residential, non-residential and high user (major user). The present water rates have been adopted for the time period of November 2012 through October 2013 and November 2013 through October 2014.

The Department's current water rates are composed of two components; a monthly water service charge which varies by the customer's meter size and a usage charge. The usage charges vary by the customer class of service. The residential class of service has a three-block rate structure, non-residential a two-block structure and the high user is a uniform rate structure. In developing the water shortage rates, the focus was on the usage charges and not on the fixed water service charges.

The previously discussed phases of water shortages and the targeted reductions in usage were utilized in the development of the water shortage rates. To achieve these water savings under

each stage, the Department will take a number of different actions. The targeted water savings would be achieved via a combination of voluntary savings, restrictive actions and savings achieved via price signals (i.e. as the price of a commodity increases, consumption will be reduced). A customer's responsiveness to price will vary based upon a number of different factors (e.g., price levels, targeted block of consumption, income level of the customer, perception of the need for conservation savings, etc.). Table ES-1 provides an overview of the assumptions regarding voluntary and price induced (economic) means.

Table ES-1
Summary of the Estimated Voluntary Versus Price Induced Conservation Savings

	Normal Water Conditions	Moderate Shortage	Severe Shortage	Critical Shortage	Catastrophic Water Shortage
Targeted Reduction Goal	**0%**	**10%**	**20%**	**30%**	**50%**
Voluntary Savings	0.0%	7.0%	14.0%	20.0%	35.0%
Price Induced Savings	0.0%	3.0%	6.0%	10.0%	15.0%
Total Targeted Water Savings	0.0%	10.0%	20.0%	30.0%	50.0%

As can be seen, it is assumed that the majority of the anticipated needed savings will be achieved through non-price means.

Development of the Residential Water Shortage Rate Options

Three different options were developed and examined for residential customers. Provided below is an overview of each residential option developed.

- **Option 1** Maintain the existing rate structure and adjust the consumption charges
- **Option 2** Same as Option 1, but leave block 1 "as is" for Phase 1.
- **Option 3** Similar to Option 1, but add a 4th block of consumption for residential customers for Phase 2 and 3.

In developing the various water shortage rate options, the intent is to have the utility essentially remain revenue neutral (i.e. collect approximately the same revenue as would be collected under "normal water" conditions. Each option, while slightly different, is designed to collect approximately the same level of revenue for each phase of the water shortage. Provided below in Table ES-2 is a summary of the three options developed.

Table ES-2 Summary of the Residential Water Shortage Rate Options ($/CCF)					
	Normal Water Conditions	Residential Drought Conditions - $/CCF			Catastrophic Water Shortage
		Moderate Shortage	Severe Shortage	Critical Shortage	
Demand Reduction Goal	**0%**	**Up to 10%**	**10% to 20%**	**20% to 30%**	**30% to 50%**
Rate Structure - Option 1 (Adjust the current block prices)					
Block 1: 0 - 8 CCF	$1.344	$1.478	$1.667	$1.962	$2.937
Block 2: 8 - 23 CCF	$1.911	$2.293	$2.574	$3.344	$4.963
Block 3: Over 23 CCF	$2.961	$3.790	$4.593	$5.833	$8.587
Rate Structure - Option 2 (Only adjust current blocks 2 & 3 prices; block 1 remains the same)					
Block 1: 0 - 8 CCF	$1.344	$1.344	$1.559	$1.855	$2.873
Block 2: 8 - 23 CCF	$1.911	$2.624	$2.771	$3.726	$5.446
Block 3: Over 23 CCF	$2.961	$4.587	$5.635	$7.249	$10.393
Rate Structure - Option 3 (Only adjust blocks 2, 3, & 4 prices; block 1 remains the same)					
Block 1: 0 - 8 CCF	$1.344	$1.344	$1.478	$1.814	$2.829
Block 2: 8 - 23 CCF	$1.911	$2.624	$3.134	$4.099	$6.025
Block 3: 23 - 46 CCF	$2.961	$4.587	$6.109	$7.817	$11.163
Block 4: Over 46 CCF	N/A	N/A	$7.088	$9.078	$12.640

[1] – A CCF of water = one hundred cubic feet of water = 748 gallons

Provided below in Table ES-3 is a summary of the percentage adjustments by phase and by rate structure block

Table ES-3 Summary of the Percentage Adjustments by Phase and Block				
	Drought Conditions - % Change from Normal			Catastrophic Water Shortage
	Moderate Shortage	Severe Shortage	Critical Shortage	
Rate Structure - Option 1 (Adjust the current block prices)				
Block 1: 0 - 8 CCF	10.0%	24.0%	46.0%	118.5%
Block 2: 8 - 23 CCF	20.0%	34.7%	75.0%	159.7%
Block 3: Over 23 CCF	28.0%	55.1%	97.0%	190.0%
Rate Structure - Option 2 (Only adjust current blocks 2 & 3 prices; block 1 remains the same)				
Block 1: 0 - 8 CCF	0.0%	16.0%	38.0%	113.8%
Block 2: 8 - 23 CCF	37.3%	45.0%	95.0%	185.0%
Block 3: Over 23 CCF	54.9%	90.3%	144.8%	251.0%
Rate Structure - Option 3 (Only adjust blocks 2, 3, & 4 prices; block 1 remains the same)				
Block 1: 0 - 8 CCF	0.0%	10.0%	35.0%	110.5%
Block 2: 8 - 23 CCF	37.3%	64.0%	114.5%	215.3%
Block 3: 23 - 46 CCF	54.9%	106.3%	164.0%	277.0%
Block 4: Over 46 CCF	N/A	239.4%	306.6%	426.9%

As can be seen in Table ES-3, greater increases are applied to the more discretionary (outdoor) usage blocks (blocks 2 and 3). This provides a greater price incentive for reductions in outdoor water and inefficient (high) water use. Some of the key differences between the options are easily highlighted in this Table. For example, under Option 2, no adjustment is made to the first block of consumption in a Phase 1 water shortage. It is important to note that 72% of residential consumption occurs in block 1. While block 1 is generally considered to be more non-discretionary, usage in block 1 can certainly be more efficient. For some customers, there can also be some outdoor use in block 1.

To better understand how these water shortage rates work, Table ES-4 shows a comparison of the Option 1 water shortage bill assuming a customer does and does not adjust their consumption in response to the water shortage.

Table ES-4
Residential Water Shortage Rate Option 1
Bill Impacts at Varying Levels of Consumption With and Without Conservation

	Total Monthly Bill				
	Normal Water Conditions	Moderate Shortage Phase 1	Severe Shortage Phase 2	Critical Shortage Phase 3	Catastrophic Water Shortage
Targeted Reduction Goal	**0.0%**	**10.0%**	**20.0%**	**30.0%**	**50.0%**
Tier 1 Customer Using 8 CCF					
Assuming No Change in Use - 8 CCF	$15.30	$16.37	$17.89	$20.25	$28.05
Assuming Reduced Usage -					
Revised CCF Usage	8 CCF	7 CCF	6 CCF	5 CCF	4 CCF
Total Monthly Bill	$15.30	$14.90	$14.55	$14.36	$16.30
Tier 2 Customer Using 23 CCF					
Assuming No Change in Use - 23 CCF	$43.97	$50.77	$56.50	$70.41	$102.49
Assuming Reduced Usage -					
Revised CCF Usage	23 CCF	21 CCF	18 CCF	16 CCF	12 CCF
Total Monthly Bill	$43.97	$46.18	$43.63	$47.00	$47.90
Tier 3 Customer Using 40 CCF					
Assuming No Change in Use - 40 CCF	$94.30	$115.20	$134.58	$169.57	$248.47
Assuming Reduced Usage -					
Revised CCF Usage	40 CCF	36 CCF	32 CCF	28 CCF	20 CCF
Total Monthly Bill	$94.30	$100.04	$97.83	$99.57	$87.60

As can be seen in the above table, three values have been circled. At the present time, a customer using 8 CCF in a month will pay $15.30 (red circle). If the utility declares Phase 2 restrictions (i.e. the need for up to 20% reduction in use) and the customer does not modify their consumption, the customer's utility bill will be greater than their "normal water" bill. In this case, the customer would pay $17.89 (blue circle) for that same 8 CCF of water. However, if the customer does their part to conserve and reduce their consumption by 20%, their usage

will no longer be 8 CCF, but instead 6 CCF[3]. The customer would be charged the Phase 2 rates, but because the customer reduced their consumption, their bill is actually less than the normal water bill. The customer would pay $14.55 (green circle) which is $0.80 less than the normal water bill of $15.30.

For the customer that does not conserve water, price elasticity should then provide a "price signal" to the consumer to reduce their consumption. In contrast to this, a consumer that does reduce their consumption will not see a significant change in their bill and may see a slight reduction in their bill. The bill comparison has also developed bill comparisons for moderate and high volume users of water. High volume residential users will see more significant bill impacts if they do not conserve water, but the bill impacts come from their high outdoor usage, which is the target of water shortage rates (discretionary usage).

Section 4 of this report has all of the detailed bill comparisons for each of the residential bill comparisons.

Other Non-Residential Water Shortage Rates

While the above discussion has focused on the residential water shortage rates, water shortage rates were also developed for non-residential and high use water customers. Given the rate structure of these customers, no alternative or multiple options were developed. A more detailed discussion of the water shortage rates developed for non-residential and high-use water customers can be found in Section 4.

Summary of the Study

This summarizes the technical analyses undertaken for the City. A full and complete discussion of the development of the technical analyses and the proposed water shortage rates can be found in following sections of this report.

[3] In this case, a reduction of 2 CCF is equal to approximately 1,500 gallons. On a daily basis, assuming 30 days in a month, this would be a reduction of 50 gallons per day to achieve the target conservation goal.

Section 1
Introduction

1.1 Introduction

The City of Lincoln, Public Works and Utilities Department (Department) retained HDR Engineering Inc. (HDR) to provide professional and technical assistance in the development of water shortage rates. Water shortage rates are designed to achieve two key objectives. First, they are designed to encourage conservation or efficient use in a time period when water supply may be constrained. These constraints may be a function of drought, a natural disaster or an operational issue with the City's water system. The second objective is related to the financial condition of the utility. As customers are asked to use less water, either on a voluntary or restrictive nature, water shortage rates are designed to help keep the utility financially whole. In fact, during a water shortage, a utility may actually incur additional costs over and above their normal operating costs.

1.2 Development of a Water Management Plan

To address the issues associated with water shortage, the Department has prepared a Water Management Plan (WMP). The plan provides clear guidance and action steps for the Department's management team. More specifically, the WMP discusses the triggers for water restrictions and defines the various water restriction phases (e.g., Phase I: Moderate Shortage, Phase II: Severe Shortage, etc.). For each phase, the WMP provides specific targeted savings and clearly defined action steps. The WMP also discusses enforcement and penalties for violations. In summary, the Department's Water Management Plan is a proactive document to systematically address drought and other water shortage conditions.

> *". . . the Department's Water Management Plan is a proactive document to systematically address drought and other water shortage conditions."*

1.3 Need for the Development of Water Shortage Rates

An important element of the WMP is the issue of the financial and revenue impacts from a water shortage event. The Department's adopted water rates are established to collect the Department's overall revenue requirement, while at the same time encouraging efficient use and conservation from their customers. It is well understood that price (rates) can be one tool to encourage conservation and efficient use. From that perspective, during a water shortage, a utility may adjust their water rates to create greater price incentives for customers to reduce their usage, but also to penalize egregious and wasteful users.

At the same time, a utility is encouraging reduced consumption, and simply stated, if a utility maintains their existing rates, the utility will have a significant revenue shortfall during the

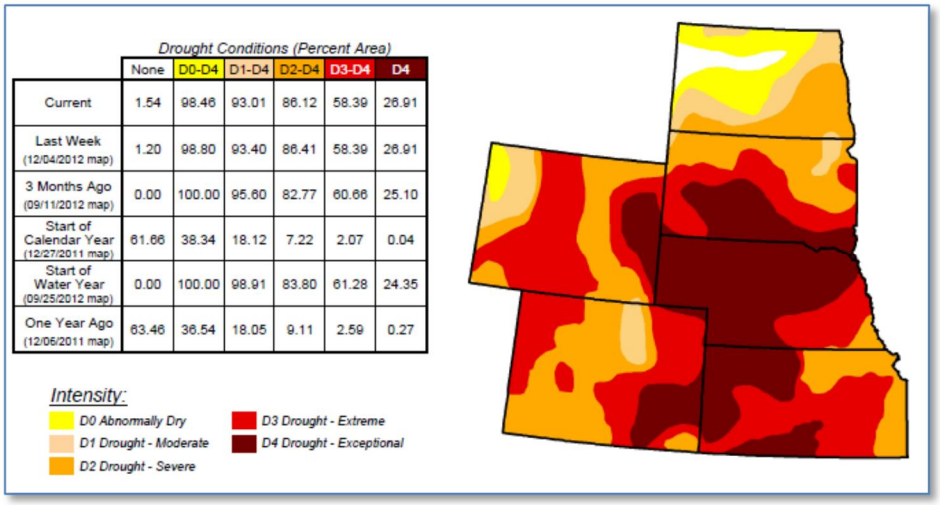
water shortage period. Even a reduction as small as 10%, can potentially create significant financial (revenue) issues for the utility. The Department has approximately $30 million in annual revenues and a reduction in 10% consumption can potentially translate to a $3 million revenue shortfall. This revenue shortfall simply places a greater strain on the limited financial resources and reserves of the water utility.

To address the issue of encouraging more efficient use through pricing and to attempt to keep the utility financially whole during a water shortage, water shortage rates may be developed. The water shortage rates are linked to the WMP and the various drought phases contained within the plan. The water shortage rates are designed to fairly treat both customers that achieve the desired savings and those customers that do not conserve. In essence, if a customer meets the targeted savings objectives, their utility bill should be approximately the same as under "normal water" conditions. If all customers conserve to the utility's targeted levels, then all customer bills should remain relatively stable. However, if a customer fails to conserve and ignores the utility's need for reduced consumption, then their utility bill will be higher than normal, and in the case of a customer that has excessive or wasteful use, their bill should provide a clear "price signal" to conserve.

As a part of this study, water shortage rates have been developed for possible adoption by the City and the Department. The intent is that the water shortage rates are adopted at the time the water shortage (and drought stage/phase) is declared.

1.4 Potential for Future Water Shortages

As of mid-December 2012, the drought within the mid-west U.S. continued. Based upon projections, the drought is expected to persist or intensify.



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	1.54	98.46	93.01	86.12	58.39	26.91
Last Week (12/04/2012 map)	1.20	98.80	93.40	86.41	58.39	26.91
3 Months Ago (09/11/2012 map)	0.00	100.00	95.60	82.77	60.66	25.10
Start of Calendar Year (12/27/2011 map)	61.66	38.34	18.12	7.22	2.07	0.04
Start of Water Year (09/25/2012 map)	0.00	100.00	98.91	83.80	61.28	24.35
One Year Ago (12/06/2011 map)	63.46	36.54	18.05	9.11	2.59	0.27

One well recognized source for data and information on the current drought conditions and the future (projected) drought conditions is the U.S. Drought Monitor. The drought monitor is produced in partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, the U.S. Department of Agriculture, and the National Oceanic and Atmospheric Administration. The illustration shown above is the Drought Monitor as of December 11, 2012 for the high plains region. As can be seen, for much of the region, the

current drought conditions are either extreme drought or exceptional drought. Looking ahead, the National Oceanographic and Atmospheric Administration (NOAA) official forecast for the next three months is for continued drought. Given that forecast, it is likely that the Department will still be in some phase of their water management plan and the recommendations of this report will need to be put in place as quickly as possible.

1.5 Report Organization

This report is organized as follows:

- Section 2 provides a brief background on industry trends associated with drought and drought management (water shortage) rates.
- Section 3 provides a brief overview of the Department's Water Management Plan.
- Section 4 reviews the development of the water shortage rates for the Department.

A technical appendix is attached at the end of the report which provides the analyses used in the preparation of this report.

1.6 Summary

This report will review the development of the water shortage rates for the City of Lincoln, Public Works and Utilities Department. The next section of the report will discuss industry trends and thinking as it relates to drought management and water shortage rates.

Section 2 – Current Industry Practices Related to Water Shortages and Pricing

2.1 Introduction

Drought and water shortages are not new to the water utility industry. What is relatively new is the water utility industry's response and approach to addressing water shortages and drought. Unfortunately, much of what is considered today's "industry best practices" was derived from "lessons learned" in prior water shortages or drought conditions.

Droughts have occurred since the beginning of time. However, only in the last 100 years or so have accurate records been recorded. For example, the earliest recorded drought records in Colorado indicate that 1890 to 1894 was a severe drought period. From an urban water management perspective, droughts from the late 1960's or early 1970's and beyond provide the best perspective for how best to address drought and water shortages. One of the more severe droughts from the perspective of meeting urban water demands was the California drought of 1987 – 1992. In 2002, Colorado suffered a severe drought and even more recently, the southeast U.S. had a severe drought from 2007 – 2009.

Each drought or water shortage period has provided an opportunity to learn different practices and approaches to meeting the challenges of the drought. This report is focused on the financial, revenue and rate aspects of a water shortage. To better understand current industry thinking and practices on this topic, a number of industry articles and research papers were reviewed. Provided below is a discussion of the current industry practices as they relate to water shortages and rates.

2.2 Defining Drought

Drought events are complex, particularly in trying to make a decision about when an area or utility is in a drought. The following illustrates the challenges of declaring a drought.

> *Drought is unique among natural hazards because it is not a clear event, like a flood, earthquake, hurricane or tornado. These events strike, leave their mark, and are gone. A drought, however, sneaks up on us quietly disguised as lovely, sunny weather. Unlike a hurricane, we cannot follow its course on a map. We are never sure when a drought began until after it is already well underway, and we are often unsure when it ends. Any day when it doesn't rain or snow . . . could be the beginning of the next drought."*[4]

While the above provides a good understanding of the challenges of determining a drought, the more relevant description may be as follows:

[4] Thomas B. McKee, et. al., A History of Drought in Colorado, Lessons Learned and What Lies Ahead, Colorado Climate Center, Atmospheric Science Department, Colorado State University, February 2000, p. 5.

"Drought is a shortage of water, usually associated with a deficiency of precipitation. Drought occurs when the demand for water exceeds the supply of water." [emphasis added][5]

"Drought is a shortage of water, usually associated with a deficiency of precipitation. Drought occurs when the demand for water exceeds the supply of water."

While the above would seem to be a clear and distinct definition of drought, there is no universal definition of a drought. Water demands and supply can vary by time period and by their use. Therefore, drought is often defined by their impact.

Finally, drought is also a relative term and must be defined in relation to "normal" for a particular region and time of year.

2.3 Price and Non-Price Approaches to Conservation

Conservation and efficient use of water can be achieved through a number of different means. These different means may be described as "price" and "non-price" means. In thinking of water conservation, the easy and logical perspectives for price versus non-price conservation are conservation-oriented rates and low-flow devices. While there are many other non-price means to achieve conservation, the point is conservation can be achieved in a number of different ways and through different means.

In a drought situation, utilities often turn to price and non-price means to achieve the desired savings. Stated another way, the conservation savings needed in a drought may be achieved in two different ways:

- **Economic Incentives** – Pricing of the water to provide direct economic incentives for efficient use
- **Command and Control** – Direct regulation of an activity by legislation that states what is permitted and what is illegal

Under normal water conditions, command and control approaches are generally discouraged since they are a form of rationing. However, in a water emergency or drought, a command and control approach (e.g. limited outdoor water use, etc.), along with economic incentives would appear to be appropriate. However, there is generally a higher cost associated with command and control approaches. The following economic research highlights this issue.

"Based on both economic theory and empirical estimates, the inescapable conclusion is that using price increases to reduce demand, allowing households, industrial facilities, and other consumers to adjust their end-uses of water is more cost-effective than implementing non-price demand management programs."[6]

It is important to understand that non-price demand management programs do create certain costs on the system. As a part of developing water shortage rates, consideration must be given

[5] Ibid, p. 5.

[6] Sheila M. Olmstead and Robert N. Stavins, Comparing Price and Non-Price Approaches to Urban Water Conservation, Resources for the Future, June 2008, p. 7.

to the additional costs that may be incurred in implementing and managing the demand management program.

Ultimately, many utilities use a combination of price and non-price means to address water shortages. During the 1987 – 1992 California drought, the following methods were utilized:

- *"Quantity restrictions limiting the amount of water a household could buy in a given period, often accompanied by price surcharges for use above the limit.*
- *Type-of-use restrictions, such as prohibitions on washing off driveways and sidewalks or irrigating residential lots during the day.*
- *Public education programs, including bill inserts; television, radio, and newspaper announcements; school programs; and public displays.*
- *Device distribution programs, involving low-flow shower heads, toilet dams, toilet leak detectors, or rebates for installing ultra-low-flow toilets.*
- *Price increases, which can take the form of higher prices for all levels of water use, or increasing block rate structures.*
- *Supply augmentation strategies, including increased ground water pumping, greater use of reclaimed water, and water transfers through the state-run Drought Water Bank in 1991."*[7]

Many of the above strategies are still used today, and the Water Management Plan developed by the Department relies upon many of these same approaches.

2.4 Price and Water Demand

It is well understood that as the price of a commodity increases, the demand for that commodity should decrease. This response to price changes is referred to as the price elasticity of demand. Elasticity is also categorized as an "elastic" demand (i.e. highly sensitive to price) and "inelastic" demand (i.e. less sensitive to price). Water is considered to be inelastic, but certain portions of water consumption are more elastic than others. Elasticity varies along the demand curve. Water used for drinking water is highly inelastic, whereas, outdoor watering is more discretionary and elastic. For those reasons, most conservation programs target the elastic portion of water demand and focus on discretionary or outdoor water use.

"Water used for drinking water is highly inelastic, whereas, outdoor watering is more discretionary and elastic. For those reasons, most conservation programs target discretionary or outdoor water use. "

In addition to the above, water demand may vary in the short-run and the long-run.

> *"Customers are relatively more sensitive to water prices in the long run than they are in the short run because over longer time periods, capital investments are not fixed. For example, households might change appliance stocks, retrofit water-using fixtures, or alter landscaping from lawns to drought-tolerant plants; firms can be expected to*

[7] Lloyd Dixon, Nancy Y. Moore, Ellen M. Pint, Drought Management Policies and Economic Effects in Urban Areas of California, 1987 – 1992, RAND, 1996, p. xi.

change water consuming technologies, increase recycling, or relocate to areas in which water is more plentiful. In the long run, a 10% price increase can be expected to decrease demand by about six percent."[8]

Finally, the price elasticity of water is an estimate of consumer behavior and their response to changes in price. Price elasticity can vary with many other factors. For example, price elasticity response can vary based upon items such as household income, how the price information is communicated to customers and the rate structure used to bill the customer.

2.5 Mandatory Water Use Restrictions During Water Shortages

As was discussed above, reductions in use can be achieved via price and non-price methods. During water shortages, non-price demand management tools often include implementation of mandatory water use restrictions. These restrictions often center on the total quantity of water that may be used, as well as restrictions on when the usage can occur and on particular types of uses (e.g. no washing of cars, etc.). There has been limited research on the effectiveness of these non-price methods. Interestingly, the research that has been conducted appears to be mixed.

"Empirical evidence regarding the effects of these [mandatory water use restriction] programs is mixed. Summer 1996 water consumption restrictions in Corpus Christ, Texas including prohibitions on landscape irrigation and car washing, did not prompt statistically significant water savings in the residential sector (Schultz, et. al. 1997). However, a longer-term program in Pasadena, California resulted in aggregate water savings (Kiefer et. al. 1993), as did a program of mandatory water use restrictions in Santa Barbara, California (Renwick and Green 2000)."[9]

Even with somewhat mixed results, the use of water use restrictions is a nearly universal approach for water shortage plans. However, water utilities cannot rely solely on water use restrictions and customer compliance.

"In a comprehensive study of drought management policies among 85 urban water utilities during a prolonged drought in Southern California, analysts reported that 40 agencies adopted mandatory quantity restrictions, but also found that more than half of the customers violated the restrictions (Dixon et al. 1996). . . . In the same study, about three-quarters of participating urban water agencies implemented type-of-use restrictions (most of them mandatory). Few penalties were reported, and enforcement was weak, again raising questions regarding compliance. With such low rates of compliance with traditional quantity-based regulations, neither price nor non-price demand management programs have an advantage in terms of predicting water demand reductions."[10]

[8] Olmstead and Stavins, p. 8.
[9] Ibid, p. 11.
[10] Ibid, p. 12-13.

As can be seen from the above, non-price means of water demand management is not a perfect or "end-all" solution. While it can be effective, it also has certain drawbacks, particularly to businesses.

Businesses that use water within a production process are impacted by water use restrictions. It is often common to apply many of the same drought restrictions for residential customers on the business community. In some cases, those restrictions will have little or no impact upon a business (e.g. washing down hard surfaces). In contrast, water price increases may have a far greater and significant impact.

> *"Profits may fall in the face of higher prices both because firms must pay a higher cost for a given amount of water, and also because higher water cost may cause the firms to reduce the amount of water consumed and production levels, eliminating the profit from units that are no longer produced."*[11]

Interestingly, in the case of the California drought, most utilities did not explicitly establish differing reduction goals for residential, commercial and industrial customers. However, there were a limited number of utilities that chose to establish different target reduction levels by customer class of service.

> *"Clearly, some agencies were attempting to protect their commercial and industrial users from drought management strategies, but our data suggest that only a minority did so explicitly. However, agencies that did not vary requested cutbacks by customer class may have used other policies to protect their commercial and industrial customers. For example, as will be discussed shortly, quantity restrictions may have been less stringent or easier to appeal for commercial and industrial users than for residential users.*[12]

In the end, some businesses may be willing to pay the higher rates to maintain production levels. However, care should be taken in establishing drought surcharges for commercial and industrial customers.

Within many of the drought plans, consideration may be given to an appeal process, particularly when restriction levels are set at a specific level and usage over and above that level is surcharged. A formal appeal process allows for customers to discuss the basis for their quantity allotted. Examples of the basis for an appeal may be a medical reason for a residential customer, or a cut-back in employment for a commercial customer. In the case of the California experience, only a small percentage of customers requested an appeal.

2.6 Drought Rates

Drought rates are special surcharges that are implemented during times of severe drought (or water shortage). While many may consider drought rates to be "conservation rates" they do

[11] Dixon, et al., p. 15.
[12] Ibid, p. 44.

have one distinct difference from a conservation rate --- they are imposed for a temporary time period.

> *"Drought rates are often included in drought plans of state, regional, or local authorities. The first step in initiation of drought rates is drought declaration. The authority and responsibility to declare drought varies from state to state. Usually, the authority rests with districts or municipalities. For example, in Connecticut and Kentucky, droughts are declared by local governments (towns and municipalities) that may reflect spatial variation of physical conditions throughout the state. In California and Florida, water districts have declaring authority, and in Massachusetts, the state government declares a drought (Wang et al. 2005)."*[13]

How drought rates are developed and the form they take also varies from utility to utility. The following illustrates how selected utilities have developed their drought rates.

> *" . . . the East Bay Municipal Utility District (EBMUD), CA, imposes a 10 percent increase in volumetric rates for all customers and a $2 surcharge for each 100 cubic feet (748 gallons) of water used above an individual customers' allocations. "Residential customers using less than 100 gallons per day are exempt from the increased rates and charges" (EBMUD 2009). Olivehain Municipal Water District (OMWD), CA proposes increase in water rate structure during the times of drought depending on the drought alert level. For the drought alert level 1 ("drought watch"), no changes in water rates is proposed to the first block of the inclining block rate structure for residential customers. Increases in the second and third blocks are 5% and 15%. At the times of drought alert level 4 ("emergency"), water rates are proposed to increase by 35%, 65% and 75% for the first, second, and third rate blocks respectively (in comparison with non-drought rates) (OMWD 2009)."*[14]

While drought rates are a well-established concept, it is important to understand the limitations and concerns regarding drought rates. Among these limitations and concerns are the following:

- For certain customers, drought rates may yield little water use response (reductions). This is often referred to as "demand hardening" and refers to the situation where a customer may have limited ability to reduce demand (e.g. water use in a hospital, etc.). A customer may also have diminished capacity to reduce discretionary demand due to past investments in conservation devices (e.g. low-flow shower heads).
- The utility's metering and billing cycles may create problems for some customers who receive a price signal out of sync with the declaration of drought.
- Differences in socio-economic groups and income levels will have different impacts upon customers.
- It requires time for consumers to adjust their consumptive use, and customer education is paramount in the application of drought rates.

[13] Colin Rowls and Tatiana Borisova, Conservation and Drought Water Rates: State-of-the-art practices and their application, University of Florida-UF Water Institue, April 2009, p. 21.
[14] Ibid, p. 21.

2.7 Summary

This section of the report has discussed the current industry thinking and practices as it relates to water shortages and pricing. Some researchers believe that a combination of price and non-price programs can achieve the goal of water conservation more effectively.[15] This current industry thinking provides the basis for the City to develop their water management plan and water shortage rates. The next section of the report will review the City's water (shortage) management plan and compare it to other utility's plans.

[15] Ibid, p. 27.

Section 3 – Review of the City of Lincoln Water Management Plan

3.1 Introduction

The cornerstone of Department's proactive efforts to address water shortages is the City of Lincoln Water Management Plan. The Water Management Plan was first adopted in 1994[16] to provide guidance for imposing water restrictions and to supplement the activities of the Mayor's Water Conservation Task Force. From that plan, the City has been in the process of updating their Water Management Plan and the water shortage rates developed as a part of this study are based upon the key triggers for restrictions (i.e. water savings) and the targeted levels of savings for each of the phases of water shortage.

It is important to understand that HDR was not retained to draft, review or provide input, *per se,* on the Department's Water Management Plan. Rather, the intent of this section of the report is to review the City's draft Water Management Plan in the context of developing the water shortage rates. To accomplish that, this section will provide an overview of the Water Management Plan's key components, along with an explanation of how the Water Management Plan was incorporated into the development of the water shortage rates (Section 4). Finally, as a part of this study HDR did review a limited number of other utility's Drought Plans and Water Shortage Plans to provide a simple side-by-side comparison to the Department's plan. This information may be helpful in the Department finalizing their Water Management Plan.

3.2 Objectives of the Water Management Plan

The Department's Water Management Plan is currently being developed and is based, in part, on the prior 1994 plan. More importantly, it is also based upon the recent experience of the City and the Department in addressing the 2012 drought. While the Department was able to successfully address the 2012 drought, the need for a more proactive and up-to-date planning document became evident.

There are a number of different objectives of the updated Water Management Plan. In summary form, they are as follows:

- Keep water use within pumping capacity and delivery capability, based on recommendations of the Lincoln Water System
- Define procedures to be used when the above criteria cannot be met, and
- Familiarize citizens, businesses and industry with procedures which may be implemented when voluntary or mandatory water restrictions are required

[16] The Lincoln Water System Water Management Plan was adopted May 1994 through Executive Order 047122. It was subsequently revised in 2000, 2001 and 2003.

The plan is designed such that it outlines specific triggers for responding to and management of the City's water supply through various circumstances, particularly drought related. The Director of Public Works and Utilities is responsible for making a recommendation to the Mayor for either enactment of initial restrictions or acceleration to an appropriate phase in the Plan.

3.3 Conservation and the Water Management Plan

Under "normal" conditions, the Department still encourages their citizens to use water efficiently and conserve. Regardless of water supply conditions, customers should urged to voluntarily reduce water usage by practicing water conservation and efficiency measures.

3.4 Triggers for Restrictions

The Department's water management plan provides different "triggers" that the Director of Public Works and Utilities may consider before recommending voluntary or mandatory use restrictions. These trigger events are as follows:

- Drought (Supply Shortage)
- Natural Disaster (e.g. Tornado, Fire, Blizzard, Power Grid Failure)
- Failure of Water System Facilities

The Water Management Plan discusses each of these triggers and provides prescribed actions.

3.5 Water Restriction Phases

The Water Management Plan defines three different phases, and a fourth, or catastrophic water shortage. These phases are as follows:

- Phase 1: Moderate Shortage
- Phase 2: Severe Shortage
- Phase 3: Critical Shortage
- Catastrophic Water Shortage

In reviewing other water shortage and drought management plans of other utilities, there is no generally accepted or universal labeling of the various phases or stages of a plan. However, it is interesting to note that all of the plans reviewed contained four (4) phases or stages.

	Defining (Labeling) of Stages			
Water Utility	**1**	**2**	**3**	**4**
City of Lincoln (Proposed Plan)	Moderate Shortage	Severe Shortage	Critical Shortage	Catastrophic Water Shortage
City of Albuquerque	Drought Advisory	Drought Watch	Drought Warning	Drought Emergency
Contra Costa Water District (CA)	Water Alert	Water Warning	Water Emergency	Water Crisis
City of Dallas	Stage 1	Stage 2	Stage 3	Stage 4
Denver Water	Drought Watch	Stage 2	Stage 3	Stage 4
Dublin San Ramon Services Dist. (CA)	Stage 1	Stage 2	Stage 3	Stage 4
City of Fresno	Stage 1	Stage 2	Stage 3	Stage 4
City of Nashville (TN)	Drought Alert	Voluntary Reduction	Mandatory Water Restriction	Emergency Water Management
Olivenhaim Water District (CA)	Level 1 - Drought Watch	Level 2 - Drought Alert	Level 3	Level 4
City of Pleasanton (CA)	Minimal Reduction	Moderate Reduction	Severe Reduction	Critical Reduction
San Diego County Water Authority	Voluntary	Supply Enhancement	Mandatory Cutbacks	Mandatory Cutbacks
City of Scottsdale (AZ)	Water Alert	Water Warning	Water Emergency	Water Crisis

3.6 Voluntary and Mandatory Restrictions

For each of the phases, there is a distinction between voluntary and mandatory restrictions. As the names imply, a voluntary reduction is achieved through the voluntary willingness of customers to reduce their consumptive use. In contrast to this, mandatory restrictions use the "command and control" approach discussed in the previous section of the report. In the case of the Department's plan, as expected it combines both voluntary and mandatory restrictions within the various phases.

	Voluntary or Manadatory Stages			
Water Utility	**1**	**2**	**3**	**4**
City of Lincoln (Proposed Plan)	Volunary	Required - Outdoor	Required - Outdoor Vountary - Indoor	Varies Based Upon the Specific Situation
City of Albuquerque	Vountary	Mandatory	Mandatory	Rationing
Contra Costa Water District (CA)	Voluntary	Voluntary	Mandatory	Public Use - Prohibited other than Health and Safety, All others Mandatory
City of Dallas	Voluntary with Mandatory outdoor	Voluntary with Mandatory outdoor	Mandatory	Restricted - Outdoor
Denver Water	Voluntary	Mandatory	Mandatory	Rationing
Dublin San Ramon Services Dist. (CA)	Voluntary	Mandatory	Mandatory	Mandatory
City of Fresno	Voluntary	Mandatory	Mandatory	Mandatory
City of Nashville (TN)	None	Voluntary	Mandatory	Mandatory
Olivenhaim Water District (CA)	Voluntary	Mandatory	Mandatory	Mandatory
City of Pleasanton (CA)	Voluntary	Voluntary or Mandatory	Mandatory	Mandatory
San Diego County Water Authority	Voluntary	Voluntary with Supply Enhancement	Mandatory	Mandatory
City of Scottsdale (AZ)	Voluntary	Required - Outdoor	Required - Outdoor	Restricted - Outdoor

As can be seen in the comparison above, most initial stages are voluntary and then as the urgency to conserve increases, most plans move to some form of mandatory restrictions.

3.7 Targeted Level of Overall Savings

An important element of any water management (drought) plan is an understanding of the water conservation savings to be achieved from a particular stage or phase of the plan. Obviously, as a utility moves from the initial stages of a water shortage, to the latter stages of a water shortage, greater total savings are required. While there is no universal target for savings (reductions) by phase, many plans use similar levels of savings. Provided below is a comparison of the various targeted overall savings by phase.

	Targeted (Total Overall) Savings			
Water Utility	**1**	**2**	**3**	**4**
City of Lincoln (Proposed Plan)	Unspecified in Plan Assume Up to 10%	Unspecified in Plan Assume Up to 20%	Unspecified in Plan Assume Up to 30%	Unspecified in Plan Assume Up to 50%
City of Albuquerque	Up to 9%	Up to 17%	Up to 26%	Up to 26%
Contra Costa Water District (CA)	UP to 10%	10-20% reduction	20-35% reduction	35-50% Reduction
City of Dallas	Up to 5% reduction Gallons per capita per day	Up to 15% reduction Gallons per capita per day	Up to 20% reduction Gallons per capita per day	Up to 25% reduction Gallons per capita per day
Denver Water	UP to 10%	Up to 20%	Up to 35%	Up to 50%
Dublin San Ramon Services Dist. (CA)	Unspecified in Plan	Unspecified in Plan	Unspecified in Plan	Unspecified in Plan
City of Fresno	UP to 10%	Up to 25%	25 to 25%	35 to 50%
City of Nashville (TN)	N/A	Reduce demand to 80% of supply	Reduce demand to 85% of supply	Reduce demand to 90% of supply
Olivenhaim Water District (CA)	Up to 10%	Up to 20%	Up to 40%	40% or greater
City of Pleasanton (CA)	Up to 20%	Up to 20%	Up to 35%	35% or More
San Diego County Water Authority	Unspecified in Plan	Unspecified in Plan	Unspecified in Plan	Unspecified in Plan
City of Scottsdale (AZ)	Up to 5%	Up to 10% for Municipal	Up to 10%	Unspecified in Plan

As can be seen, each utility has targeted slightly different targeted savings or reductions. One distinction that is important to understand is how these savings may be defined. In some cases, a utility may be attempting to save 20% in total volumetric (annual) sales. In the case of a utility that uses impoundment to store water supply, the amount stored is of a limited quantity and, in theory, a gallon saved today, is a gallon available tomorrow. In contrast to this, a utility that has surface water supplies from a river may have a somewhat different issue. The issue for that utility may be related to meeting peak use requirements when river flows are low. In that case, a gallon of water saved in April is not a gallon of water available in July. In part, this latter example is the case for the City of Lincoln. Given that, the Water Management Plan does not define savings in terms of a percentage, but rather, as a targeted level of usage in million of gallons per day (MGD). For example, under normal water conditions, the peak day flow on the Department's system is about 77 MGD. The Water Management Plan assumes a reduction to 70 MGD or roughly a 10% reduction. It is from that perspective that HDR has described the Department's plan and the assumed percentage reductions. This aspect of the development of the water shortage rates is discussed in more detail in the next section of the report.

3.8 Triggers for Declaring a Phase

The final area of the plan reviewed was the triggers or factors used by utilities to determine when to declare a drought phase or water shortage. In many cases, the phases are triggered by water supply conditions. In the case of the Department, the triggers for declaring a phase is a function of the Platt River flows <u>and</u> water usage demands. The Department's triggers and examples of those for other utilities are provided below.

	Triggers for Stages			
Water Utility	**1**	**2**	**3**	**4**
City of Lincoln (Proposed Plan)	Platt River flow less than 3,000 cfs and water usage exceeds 80 MGD	Platt River flow less than 1,000 cfs and water usage exceeds 70 MGD	Platt River flow less than 200 cfs and water usage exceeds 60 MGD	System usage exceeds the ability to supply, a major transmission/distribution link is disrupted, or a system failure occurs which causes a loss of capability to provide adequate services
City of Albuquerque	Excess Acquifer Pumping of 10,000 Acre-Feet/year is predicted	Excess Acquifer Pumping of 20,000 Acre-Feet/year is predicted	Excess Acquifer Pumping of 30,000 Acre-Feet/year is predicted	Excess Acquifer Pumping of 40,000 Acre-Feet/year or 30,000 for 2+ years is predicted
Contra Costa Water District (CA)	10% deficit between demand and water supply allotment	Up to 10 to 20% deficit between demand and water supply allotment	20-35% deficit between demand and water supply allotment	30-50% deficit between demand and water supply allotment
City of Dallas	Total raw water supply is 35% depleted, or demand exceeded 85% or delivery capacity for 4 consecutive days, water demand approaches a reduced delivery capacity for all or part of the system, or contamination of water sources has occurred	Total raw water supply is 45% depleted, or demand exceeded 90% or delivery capacity for 3 consecutive days, water demand equals a reduced delivery capacity for all or part of the system, or contamination of water sources has occurred	Total raw water supply is 55% depleted, or demand exceeded 95% or delivery capacity for 2 consecutive days, water demand exceeds a reduced delivery capacity for all or part of the system, or contamination of water sources has occurred	Total raw water supply is 70% depleted, or demand exceeded 98% or delivery capacity for 1 day, water demand "seriously" exceeds a reduced delivery capacity for all or part of the system, or contamination of water sources has occurred
Denver Water	Forecasted July 1 Reservoir Storage Levels are Between 60 and 95% or normal	Forecasted July 1 Reservoir Storage Levels are Between 35 and 75% or normal	Forecasted July 1 Reservoir Storage Levels are Between 0 and 40% or normal	Forecasted July 1 Reservoir Storage Levels are less than 20 percent
Dublin San Ramon Services Dist. (CA)	5% or greater water supply shortage	15% or greater water supply shortage	30% or greater water supply shortage	50% or greater water supply shortage
City of Fresno	Minimal shortage up to 10%	Moderate shortage of 10 to 25%	Severe Shortage of 25 to 35%	Critical Shortage of 35 to 50%
City of Nashville (TN)	Demand exceeds 80% of capacity or USACOE notifies that service flows will not support all users	Demand exceeds 85% of capacity	Demand exceeds 90% of capacity	Demand exceeds 95% of capacity
Olivenhaim Water District (CA)	Notification by water authority of drought resulting in reasonable likelihood of shortages	Notification by water authority of drought conditions, or Olivenhain Municipal Board of Directors determines that cutbacks are necessary due to drought	Notification by water authority of drought conditions, or Olivenhain Municipal Board of Directors determines that cutbacks are necessary due to drought	Water Authority Board declares water shortage emergency under California Water Code section 350.
City of Pleasanton (CA)	Not clearly specified - declared when sufficient uncertainty of years or next couple years water supplies	Not clearly specified - declared when definable events that lead to conclusion that water supply shortage exists in coming year	Not clearly specified - declared when definable events that lead to conclusion that water supply shortage exists in coming year	Not clearly specified - declared when stage 3 has been in effect and reduction goals not being met or new definable events occur

	Triggers for Stages			
Water Utility	**1**	**2**	**3**	**4**
San Diego County Water Authority	Not Clearly Specified, Described as: shortages occur in imported water supply from either Colorado River or State Water Project resulting in removal of water from storage to meet water demand	Not Clearly Specified, Described as: Metropolitan may restrict water deliveries to its member agencies, but the Water Authority has adequate water either in storage or purchased from outside the region to avoid rationing to its member agencies	Not Clearly Specified, Described as: Metropolitan is unable to meet all member agency demands and locally supplied or purchased and wheeled water is inadequate to make up the difference.	Not Clearly Specified, Described as: Is a situation where water must be reserved for health and safety purposes. Metropolitan is drastically restricting deliveries through one means or another and the Water Authority, although enhancing Metropolitan's supplies with its own, is passing a large portion of the shortage through to its member agencies. The drought event will be major news within the region.
City of Scottsdale (AZ)	Water reduction notification from SRP, CAP, or Scottsdale Water Resources Dept.	Notification of either: SRP deliveries will be reducted to level insuffcent to 95% of demand, CAP expected deliveries to be 10% less than ordered, Any combination resulting in decrease of 10% of supplies, or City Manager determines declaration is necessary to preserve public health.	Notification of either: SRP deliveries will be reducted to level insuffcent to 90% of demand, CAP expected deliveries to be 20% less than ordered, Any combination resulting in decrease of 15% of supplies, or City Manager determines declaration is necessary to preserve public health.	Notification of either: SRP deliveries will be reducted to level insuffcent to 85% of demand, CAP expected deliveries to be 25% less than ordered, Any combination resulting in decrease of 20% of supplies, or City Manager determines declaration is necessary to preserve public health.

As can be seen from the above, the triggers for declaring a phase or stage of drought/water shortage is specific and unique to each utility.

3.9 Summary

This section of the report has provided a brief overview of the Department's Water Management Plan and some of the key elements of that plan. In developing the water shortage rates, much of the Department's information and definitions will be utilized. The next section of the report will discuss the development of the water shortage rate designs.

Section 4
Development of Water Shortage Rates

4.1 Introduction

In a water supply shortage or drought, water rates are one mechanism or tool used to encourage or create conservation savings. Economic theory suggests that when the price of a commodity increases the effect on demand for that commodity should decrease. When a utility enters a water shortage or drought stage, it is not uncommon for a utility to have a set of water shortage rates in place to encourage or induce some specified level of conservation savings. More importantly, water shortage rates are also a tool or mechanism to help the utility remain financially sustainable and whole within a shortage event. This section of the report will discuss the key assumptions used to develop the Department's water shortage rates and the specific water shortage rates.

4.2 Customer Responsiveness to Price

As discussed in subsection 2.4 of this report, it is well understood that customers respond to price. Economic theory suggests that as the price of a commodity increases there should be a corresponding decrease in consumption of that commodity. That change in consumption, in relation to the change in price, is technically referred to as the "price elasticity" of a commodity. Subsection 2.4 also noted that certain demands can be "inelastic" and less subject to changes from price, or "elastic" and more sensitive to changes in price. For the most part, water is "price inelastic" meaning that even with large changes in price the utility will likely not see large changes in consumption.[17] There are a number of reasons for this lack of consumer response to price. One of the key reasons is that that there is no substitute for water; we need it for drinking, food preparation and healthy living. However, at the same time, the current price of water is exceptionally low meaning that it has high value to consumers at a very low price.

The point to be made from this discussion is that in establishing water shortage rates, certain portions of consumption are more responsive to price than others. As an example, outdoor watering is a more discretionary use than the water used for drinking, food preparation and health needs. Therefore, water that is relatively non-discretionary may have a price elasticity of only -0.10, meaning that a 100% increase in price may result in only a 10% decrease in consumption. In contrast to this, outdoor use is far more discretionary and may have a price elasticity of -0.40, meaning that a 100% increase in price may result in a 40% decrease in consumption of that segment of water use. Given this observation, outdoor water use is

[17] This statement assumes it is absent any special encouragement or announcements from the utility to curb or reduce consumption.

typically the target savings for water shortage plans and water shortage surcharges. This same philosophy or approach has been used to develop the Department's water shortage surcharges.

4.3 Overview of the Current Water Rates

At the present time, the Department has three rate schedules in effect: residential, non-residential and high user (major user). Provided below in Table 4-1 are the present water rates adopted for time period of November 2012 through October 2013 and November 2013 through October 2014.

Table 4–1
Present Adopted Water Rates By Class of Service

	2012 Rate [1]	2013 Rate [2]
Monthly Meter Charges –		
5/8"	$3.60	$3.80
5/8" x 3/4"	4.55	5.75
3/4"	4.55	5.75
1"	7.60	9.60
1 1/2"	15.15	19.15
2"	24.25	30.65
3"	45.50	57.50
4"	75.85	95.85
6"	151.65	191.65
8"	242.65	306.65
10"	348.85	440.85
Residential Usage Charges ($/CCF)[3] –		
1 to 8 CCF [3]	$1.344	$1.344
8.1 to 23 CCF	1.911	1.911
All Usage Over 23 CCF	2.961	2.961
Non-Residential Usage Charges ($/CCF) –		
1 to 80 CCF	$1.344	$1.344
All Usage Over 80 CCF	1.911	1.911
High User Usage Charges ($/CCF) –		
All Usage	$1.276	$1.276

[1] – Rates are effective November 2012
[2] – Rates are effective November 2013
[3] – CCF = one hundred cubic feet of water = 748 gallons

As can be seen, the Department's current water rates are composed of two components; a monthly water service charge which varies by the customer's meter size and a usage charge. The usage charges vary by the customer class of service. The residential class of service has a three-block rate structure, non-residential a two-block structure and the high user is a uniform

rate structure. In developing the water shortage rates, the focus was on the usage charges and not on the fixed water service charges.

4.4 Targeted Water Savings

The water rates in place today (Table 4-1) assume "normal" water conditions. This implies "normal" water supply conditions, normal weather, and normal customer demands. Under abnormal water shortage or drought conditions, the Department will need to have customers reduce their consumption and provide sufficient conservation savings to meet the Department's constrained supply conditions under the various stages of drought.

For purposes of establishing water shortage rates, three phases and a catastrophic phase for water shortages and a target water savings for each phase were established. These water shortage stages are summarized below.

- Phase 1 – Moderate Shortage: Target 10% water savings
- Phase 2 – Severe Shortage: Target 20% water savings
- Phase 3 – Critical Shortage: Target 30% water savings
- Catastrophic Water Shortage: Target up to 50% water savings

To achieve these water savings under each stage, the Department will take a number of different actions. The targeted water savings would be achieved via a combination of voluntary savings, restrictive actions and savings achieved via price signals (i.e. as the price of a commodity increases, consumption will be reduced). A customer's responsiveness to price will vary based upon a number of different factors (e.g., price levels, targeted block of consumption, income level of the customer, perception of the need for conservation savings, etc.).

To help achieve the needed savings in each water shortage stage, HDR developed a set of rates applicable to each water shortage phase. The overall targeted savings, or reductions in use, will be achieved through "voluntary" and "mandatory" savings and via price incentives. In developing the water shortage rates, HDR has assumed that under each phase there will be some level of "voluntary" and "mandatory" savings by the customers based on education and individual conservation practices. The remaining savings will need to be achieved through price incentives, price elasticity, responsiveness to changes in price. Provided below in Table 4-2 is a summary of the assumptions regarding voluntary/mandatory versus price induced savings.

> "*. . .* the water shortage rates, . . . assumed that under each phase there will be some level of "voluntary" and "mandatory" savings by the customers based on education and individual conservation practices. The remaining savings will need to be achieved through price incentives, price elasticity, responsiveness to changes in price."

Table 4-2 Summary of the Estimated Voluntary Versus Price Induced Conservation Savings					
	Normal Water Conditions	Moderate Shortage Phase 1	Severe Shortage Phase 2	Critical Shortage Stage 3	Catastrophic Water Shortage
Targeted Reduction Goal	**0%**	**10%**	**20%**	**30%**	**50%**
Voluntary Savings	0.0%	7.0%	14.0%	20.0%	35.0%
Price Induced Savings	0.0%	3.0%	6.0%	10.0%	15.0%
Total Targeted Water Savings	0.0%	10.0%	20.0%	30.0%	50.0%

At the same time, the Department would anticipate incurring additional expenses over and above the "normal water conditions" revenue requirement. These additional expenses will be incurred for items such as advertising and notification, additional pumping/electrical costs, increased leak detection and repair, etc. As a part of developing the water shortage surcharges these additional or incremental costs have been considered and factored into the water shortage rates to attempt to minimize the financial impacts of these incremental costs.

4.5 Development of the Water Shortage Rate Options

Different options or approaches to developing the water shortage rates were examined. Three different options were developed and examined for residential customers. Provided below is an overview of each residential option developed.

- **Option 1** Maintain the existing rate structure and adjust the consumption charges
- **Option 2** Same as Option 1, but leave block 1 "as is" for Phase 1.
- **Option 3** Similar to Option 1, but add a 4th block of consumption for residential customers for Phase 2 and 3.

In developing the water shortage rates, the monthly water service charge (based upon meter size) remains fixed at the same level regardless of the water shortage rate option selected. Under each option, the additional costs incurred under each water shortage phase will be collected within a usage portion of the rate design.

In developing the various water shortage rate options, the intent is to have the utility essentially remain revenue neutral (i.e. collect approximately the same revenue as would be collected under "normal water" conditions. Each option, while slightly different, is designed to collect approximately the same level of revenue for each phase of the water shortage.

"In developing the various water shortage rate options, the intent is to have the utility essentially remain revenue neutral (i.e. collect approximately the same revenue as would be collected under "normal water" conditions."

4.6 Residential Water Shortage Rates

As noted above, three options were developed for consideration. Each option is slightly different in how it addresses the various phases of the water shortage. Provided below is a discussion of each of the water shortage rate options for the residential customers.

4.6.1 Residential Option 1 – Maintain Existing Rate Structure

The first residential rate option maintains the existing rate structure. At the present time, the Department's water rates include a three-block increasing price rate structure. Under this option, the same three blocks are maintained and the prices adjusted for each phase. Presented below in Table 4-3 is the Option 1 water shortage rate structure.

Table 4-3
Residential Water Shortage Rate Option 1

	Water Shortage Rate - $/CCF[1]				
	Normal Water Conditions	Moderate Shortage Phase 1	Severe Shortage Phase 2	Critical Shortage Phase 3	Catastrophic Water Shortage
Targeted Reduction Goal	**0%**	**Up to10%**	**10% - 20%**	**20% - 30%**	**30% - 50%**
Block 1: 1 – 8 CCF	$1.344	$1.478	$1.667	$1.962	$2.937
Block 2: 8.1 – 23 CCF	1.911	2.293	2.574	3.344	4.963
Block 3: Over 23 CCF	2.961	3.790	4.593	5.833	8.587

[1] – A CCF of water = one hundred cubic feet of water = 748 gallons

The above rates are to be charged in addition to the currently monthly service charges. In moving from normal water conditions, the rate shown for each phase and block is the rate charged to the customer. The rate shown for each phase and block is not in addition to the normal water condition rate.

Table 4-4 provides an overview of the percentage adjustments by phase and rate structure block.

Table 4-4
Residential Water Shortage Rate Option 1
Percentage Adjustments by Water Shortage Phase and Rate Block

	Drought Conditions - % Change from Normal			Catastrophic Water Shortage
	Phase 1	Phase 2	Phase 3	
Rate Structure - Option 1 (Adjust the current block prices)				
Block 1: 0 - 8 CCF	10.0%	24.0%	46.0%	118.5%
Block 2: 8 - 23 CCF	20.0%	34.7%	75.0%	159.7%
Block 3: Over 23 CCF	28.0%	55.1%	97.0%	190.0%

As can be seen in Table 4-4, greater increases are applied to the more discretionary (outdoor) usage blocks (blocks 2 and 3). This provides a greater price incentive for reductions in outdoor water and inefficient (high) water use. Under this option, block 1 rates are adjusted in all phases, since 72% of residential consumption occurs in block 1. While block 1 is generally considered to be more non-discretionary, usage in block 1 can certainly be more efficient. For some customers, there can also be some outdoor use in block 1.

As the Department declares a water shortage phase, the rates would automatically adjust and reflect that phase. To better understand how these water shortage rates work, Table 4-5 shows a comparison of the bill assuming a customer does and does not adjust their consumption in response to the water shortage.

Table 4-5
Residential Water Shortage Rate Option 1
Bill Impacts at Varying Levels of Consumption With and Without Conservation

	Total Monthly Bill				
	Normal Water Conditions	Moderate Shortage Phase 1	Severe Shortage Phase 2	Critical Shortage Phase 3	Catastrophic Water Shortage
Targeted Reduction Goal	**0.0%**	**10.0%**	**20.0%**	**30.0%**	**50.0%**
Tier 1 Customer Using 8 CCF					
Assuming No Change in Use - 8 CCF	$15.30	$16.37	$17.89	$20.25	$28.05
Assuming Reduced Usage -					
Revised CCF Usage	8 CCF	7 CCF	6 CCF	5 CCF	4 CCF
Total Monthly Bill	$15.30	$14.90	$14.55	$14.36	$16.30
Tier 2 Customer Using 23 CCF					
Assuming No Change in Use - 23 CCF	$43.97	$50.77	$56.50	$70.41	$102.49
Assuming Reduced Usage -					
Revised CCF Usage	23 CCF	21 CCF	18 CCF	16 CCF	12 CCF
Total Monthly Bill	$43.97	$46.18	$43.63	$47.00	$47.90
Tier 3 Customer Using 40 CCF					
Assuming No Change in Use - 40 CCF	$94.30	$115.20	$134.58	$169.57	$248.47
Assuming Reduced Usage -					
Revised CCF Usage	40 CCF	36 CCF	32 CCF	28 CCF	20 CCF
Total Monthly Bill	$94.30	$100.04	$97.83	$99.57	$87.60

As can be seen in the above table, three values have been circled. At the present time, a customer using 8 CCF in a month will pay $15.30 (red circle). If the utility declares Phase 2 restrictions (i.e. the need for up to 20% reduction in use) and the customer does not modify their consumption, the customer's utility bill will be greater than their "normal water" bill. In this case, the customer would pay $17.89 (blue circle) for that same 8 CCF of water. However, if the customer does their part to conserve and reduce their consumption by 20%, their usage

will no longer be 8 CCF, but instead 6 CCF[18]. The customer would be charged the Phase 2 rates, but because the customer reduced their consumption, their bill is actually less than the normal water bill. The customer would pay $14.55 (green circle) which is $0.80 less than the normal water bill of $15.30.

For the customer that does not conserve water, price elasticity should then provide a "price signal" to the consumer to reduce their consumption. In contrast to this, a consumer that does reduce their consumption will not see a significant change in their bill and may see a slight reduction in their bill. The bill comparison has also developed bill comparisons for moderate and high volume users of water. High volume residential users will see more significant bill impacts if they do not conserve water, but the bill impacts come from their high outdoor usage, which is the target of water shortage rates (discretionary usage).

4.6.2 Residential Option 2 – Maintain Existing Rate Structure and Hold Block 1

The next residential rate option maintains the existing rate structure, but attempts to hold the 1st block of usage constant. Presented below in Table 4-6 is the Option 2 water shortage rate structure.

Table 4-6
Residential Water Shortage Rate Option 2

	Water Shortage Rate - $/CCF[1]				
	Normal Water Conditions	Moderate Shortage Phase 1	Severe Shortage Phase 2	Critical Shortage Phase 3	Catastrophic Water Shortage
Targeted Reduction Goal	**0%**	**Up to10%**	**10% - 20%**	**20% - 30%**	**30% - 50%**
Block 1: 1 – 8 CCF	$1.344	$1.344	$1.559	$1.855	$2.873
Block 2: 8.1 – 23 CCF	1.911	2.624	2.771	3.726	5.446
Block 3: Over 23 CCF	2.961	4.587	5.635	7.249	10.393

[1] – A CCF of water = one hundred cubic feet of water = 748 gallons

The objective of this option is to attempt to minimize the impacts of the water shortage on block 1 consumption. In this option, the block 1 rate has been held at the "normal water condition" rate for the Phase 1 water shortage. Even the block 1 rates charged in each of the subsequent phases are less than the Option1, block 1 rates. While this may achieve the objective of not harming low use customers, the reality is the vast majority of residential consumption (72%) is contained in block 1. It will be difficult, if not impossible to achieve the desired reductions in usage without some of those savings occurring in block 1. While this option may be attractive for a variety of reasons, the impact is to place greater impacts on blocks 2 and 3, and even more pressure to have significant savings in those blocks. This impact can be seen in Table 4-7.

[18] In this case, a reduction of 2 CCF is equal to approximately 1,500 gallons. On a daily basis, assuming 30 days in a month, this would be a reduction of 50 gallons per day to achieve the target conservation goal.

Table 4-7 Residential Water Shortage Rate Option 2 Percentage Adjustments by Water Shortage Phase and Rate Block				
	Drought Conditions - % Change from Normal			Catastrophic Water Shortage
	Phase 1	Phase 2	Phase 3	
Rate Structure - Option 2 (Only adjust current blocks 2 & 3 prices; block 1 remains the same)				
Block 1: 0 - 8 CCF	0.0%	16.0%	38.0%	113.8%
Block 2: 8 - 23 CCF	37.3%	45.0%	95.0%	185.0%
Block 3: Over 23 CCF	54.9%	90.3%	144.8%	251.0%

When Table 4-7 is compared to Table 4-4, it is easy to see that the higher blocks are increased in this option. Each option is designed to collect the same level of revenue (i.e. revenue neutral). If the initial blocks are not raised as much as the Option 1, that means that the rates for the tail blocks (blocks 2 and 3) must be increased to even higher levels.

To better understand how this water shortage rate option compares to Residential Option 1, Table 4-8 shows the bill comparison for this option for a customer that does and does not adjust their consumption in response to the water shortage.

Table 4-8 Residential Water Shortage Rate Option 2 Bill Impacts at Varying Levels of Consumption With and Without Conservation					
	Total Monthly Bill				
	Normal Water Conditions	Moderate Shortage Phase 1	Severe Shortage Phase 2	Critical Shortage Phase 3	Catastrophic Water Shortage
Targeted Reduction Goal	**0.0%**	**10.0%**	**20.0%**	**30.0%**	**50.0%**
Tier 1 Customer Using 8 CCF					
Assuming No Change in Use - 8 CCF	$15.30	$15.30	$17.02	$19.39	$27.53
Assuming Reduced Usage -					
Revised CCF Usage	8 CCF	7 CCF	6 CCF	5 CCF	4 CCF
Total Monthly Bill	$15.30	$13.96	$13.90	$13.83	$16.04
Tier 2 Customer Using 23 CCF					
Assuming No Change in Use - 23 CCF	$43.97	$54.66	$58.59	$75.28	$109.22
Assuming Reduced Usage -					
Revised CCF Usage	23 CCF	21 CCF	18 CCF	16 CCF	12 CCF
Total Monthly Bill	$43.97	$49.41	$44.73	$49.20	$49.32
Tier 3 Customer Using 40 CCF					
Assuming No Change in Use - 40 CCF	$94.30	$132.64	$154.38	$198.51	$285.91
Assuming Reduced Usage -					
Revised CCF Usage	40 CCF	36 CCF	32 CCF	28 CCF	20 CCF
Total Monthly Bill	$94.30	$114.29	$109.30	$111.53	$92.89

Similar to the previous bill comparison, the customer that reduces their consumption will see a reduced impact in comparison to the customer that does not conserve. The impacts to customers are slightly different under this option. As would be expected, low use customers, using 8 CCF or less will have lower bills whether they conserve or don't conserve when compared to Option 1. In contrast to that, customers using more than 8 CCF will actually see higher bills under this option. For example, in a Phase 2 Severe Shortage, a customer using 23 CCF will pay approximately $2.00 per month more under this option, than the Option 1 water shortage rate design ($58.59 vs. $56.50). This option does provide a much stronger price signal for higher use customers (e.g. using 40 CCF). A customer using 40 CCF in a Phase 2 Severe Shortage will pay approximately $20.00 per month more than the Option 1 water shortage rate ($154.38 vs. $134.58)

4.6.3 Residential Option 3 – Maintain Existing Rate Structure and Add a 4th Block

The final residential rate option maintains the existing rate structure, but adds a 4th block for consumption. Presented below in Table 4-9 is the Option 3 water shortage rate structure.

Table 4-9
Residential Water Shortage Rate Option 3

	Water Shortage Rate - $/CCF[1]				
	Normal Water Conditions	Moderate Shortage Phase 1	Severe Shortage Phase 2	Critical Shortage Phase 3	Catastrophic Water Shortage
Targeted Reduction Goal	**0%**	**Up to10%**	**10% - 20%**	**20% - 30%**	**30% - 50%**
Block 1: 1 – 8 CCF	$1.344	$1.344	$1.478	$1.814	$2.829
Block 2: 8.1 – 23 CCF	1.911	2.624	3.134	4.099	6.025
Block 3: 23.1 - 46 CCF	2.961	4.587	6.109	7.817	11.163
Block 4: Over 46 CCF	n/a	4.587	7.088	9.078	12.640

[1] – A CCF of water = one hundred cubic feet of water = 748 gallons

As can be seen, this option has added a fourth block. The fourth block pricing is only for Phase 2 and 3 water shortages and a catastrophic water shortage. The intent of adding a fourth block is if a residential customer is using over 46 CCF month (34,400 gallons), then the customer may clearly need a price signal to reign in their consumption, particularly when the Department is in a Phase 2 or Phase 3 water shortage. In that case, most likely the customer is ignoring or violating the mandatory restrictions. Ideally, no customers will be charged consumption in the fourth block, but the Department should anticipate a very minor amount of customers using this volume of water and ignoring the City's mandatory restrictions or pleas for conservation.

Table 4-10 provides an understanding of the percentage adjustments by water shortage phase and rate block.

Table 4-10 Residential Water Shortage Rate Option 3 Percentage Adjustments by Water Shortage Phase and Rate Block				
	Drought Conditions - % Change from Normal			Catastrophic Water Shortage
	Phase 1	Phase 2	Phase 3	
Rate Structure - Option 3 (Only adjust blocks 2, 3, & 4 prices; block 1 remains the same)				
Block 1: 0 - 8 CCF	0.0%	10.0%	35.0%	110.5%
Block 2: 8 - 23 CCF	37.3%	64.0%	114.5%	215.3%
Block 3: 23 - 46 CCF	54.9%	106.3%	164.0%	277.0%
Block 4: Over 46 CCF	0.0%	239.4%	306.6%	426.9%

Table 4-11 shows the bill comparison for this option.

Table 4-11 Residential Water Shortage Rate Option 3 Bill Impacts at Varying Levels of Consumption With and Without Conservation					
	Total Monthly Bill				
	Normal Water Conditions	Moderate Shortage Phase 1	Severe Shortage Phase 2	Critical Shortage Phase 3	Catastrophic Water Shortage
Targeted Reduction Goal	**0.0%**	**10.0%**	**20.0%**	**30.0%**	**50.0%**
Tier 1 Customer Using 8 CCF					
Assuming No Change in Use - 8 CCF	$15.30	$15.30	$16.37	$19.06	$27.18
Assuming Reduced Usage -					
Revised CCF Usage	8 CCF	7 CCF	6 CCF	5 CCF	4 CCF
Total Monthly Bill	$15.30	$13.96	$13.42	$13.62	$15.87
Tier 2 Customer Using 23 CCF					
Assuming No Change in Use - 23 CCF	$43.97	$54.66	$63.38	$80.55	$117.56
Assuming Reduced Usage -					
Revised CCF Usage	23 CCF	21 CCF	18 CCF	16 CCF	12 CCF
Total Monthly Bill	$43.97	$49.41	$47.71	$51.85	$51.28
Tier 3 Customer Using 40 CCF					
Assuming No Change in Use - 40 CCF	$94.30	$132.64	$167.24	$213.44	$307.33
Assuming Reduced Usage -					
Revised CCF Usage	40 CCF	36 CCF	32 CCF	28 CCF	20 CCF
Total Monthly Bill	$94.30	$114.29	$118.37	$119.63	$99.48
Tier 4 Customer Using 56 CCF					
Assuming No Change in Use - 56 CCF	$141.68	$206.03	$274.77	$351.12	$500.71
Assuming Reduced Usage -					
Revised CCF Usage	56 CCF	50 CCF	45 CCF	39 CCF	28 CCF
Total Monthly Bill	$141.68	$178.51	$197.78	$205.62	$173.37

Similar to the previous bill comparisons, the customer that reduces their consumption will see a bill impact comparable to their "normal water" bill. For the very high use customer, the water

rate surcharges should gain the attention of the high users and spur them to conserve. A customer using 56 CCF (41,888 gallons) in a month, will see their bill go from $141,68 to up to $351.12 under a Phase 3 Critical Shortage. However, with conservation, their bill will still be less, but the extent of the usage will produce a bill that is greater than "normal water" conditions, which only seems logical under those water conditions and the extent of that level of usage.

4.7 Non-Residential Water Shortage Rates

The development of the water shortage rates for non-residential customers is similar, but different from the residential customers. While the non-residential customers have a two-block consumption rate, the blocks sizes, unlike the residential rates, are not related to indoor and outdoor usage. Given that understanding of non-residential consumptive use, no distinction or differential in the percentage adjustment of pricing is made between the first block and the second block for non-residential water shortage rates. It is important to understand that for non-residential customers, large volumetric usage does not necessarily imply inefficient or wasteful use. Rather, the volume of consumption may be a part of a production process. Typically, large volume water customers are some of the more efficient water users on a water system.

4.7.1 Non-Residential Water Shortage Rate – Maintain Existing Rate Structure

The non-residential water shortage rate maintains the existing two-block rate structure. Presented below in Table 4-12 is a summary of the water shortage rates for non-residential customers.

Table 4-12
Non-Residential Water Shortage Rate

	Water Shortage Rate - $/CCF[1]				
	Normal Water Conditions	Moderate Shortage Phase 1	Severe Shortage Phase 2	Critical Shortage Phase 3	Catastrophic Water Shortage
Targeted Reduction Goal	**0%**	**Up to10%**	**10% - 20%**	**20% - 30%**	**30% - 50%**
Block 1: 1 – 80 CCF	$1.344	$1.496	$1.688	$1.934	$2.714
Block 3: Over 80 CCF	1.911	2.128	2.400	2.750	3.858

[1] – A CCF of water = one hundred cubic feet of water = 748 gallons

As can be seen, the block sizes for non-residential are 1 to 80 CCF and over 80 CCF (≅ 60,000 gallons). This water shortage rate has maintained the same structure and adjusted both the first and second block of consumption equally. Table 4-13 provides a summary of the percentage adjustments by phase and rate block. This table clearly demonstrates that both blocks were adjusted equally within a phase.

Table 4-13 Non-Residential Water Shortage Rate Percentage Adjustments by Water Shortage Phase and Rate Block				
	Drought Conditions - % Change from Normal			Catastrophic Water Shortage
	Phase 1	Phase 2	Phase 3	
Rate Structure - Option 1 (Adjust the current block prices)				
Block 1: 0 - 80 CCF	11.3%	25.6%	43.9%	101.9%
Block 2: OVER 80+ CCF	11.4%	25.6%	43.9%	101.9%

A bill comparison at varying levels of usage for the non-residential water shortage rate is presented below in Table 4-14.

Table 4-14 Non-Residential Water Shortage Rate Bill Impacts at Varying Levels of Consumption With and Without Conservation					
	Total Monthly Bill				
	Normal Water Conditions	Moderate Shortage Phase 1	Severe Shortage Phase 2	Critical Shortage Phase 3	Catastrophic Water Shortage
Targeted Reduction Goal	**0.0%**	**10.0%**	**20.0%**	**30.0%**	**50.0%**
Tier 1 Customer Using 80 CCF					
Assuming No Change in Use - 80 CCF	$112.07	$124.23	$139.59	$159.27	$221.67
Assuming Reduced Usage -					
Revised CCF Usage	80 CCF	72 CCF	64 CCF	56 CCF	40 CCF
Total Monthly Bill	$112.07	$112.26	$112.58	$112.85	$113.11
Tier 2 Customer Using 125 CCF					
Assuming No Change in Use - 125 CCF	$198.07	$219.99	$247.59	$283.02	$395.28
Assuming Reduced Usage -					
Revised CCF Usage	125 CCF	113 CCF	100 CCF	88 CCF	63 CCF
Total Monthly Bill	$198.07	$194.45	$187.59	$181.27	$175.53

As can be seen in Table 4-14, the non-residential customer that manages their consumption should have bills which approximate their bill under “normal” water conditions. If a customer does not conserve water, their bill will be higher and should provide an incentive to encourage more efficient use.

4.8 High User Water Shortage Rates

A “high user” is any non-residential customer who used more than 12 million cubic feet of water the previous calendar year[19]. These customers are billed according to the high user schedule. On a calendar year basis, a "base usage" of each high user customer is determined.

[19] This customer uses at least an average of 1.0 million cubic feet per month, or 7,480,000 gallons per month

The base usage is an average of the water usage of each high user customer for the previous three calendar years. The current rate for a higher user customer is as follows:

- $1.276 per CCF for water usage less than base to 5% above base
- $1.323 per CCF for water usage 5% to 15% above base
- $1.365 per CCF for water usage 15% to 25% above base
- $1.407 per CCF for all water usage more than 25% above base

As can be seen, the rate for these customers is uniform. However, the rate does change for customers that are less efficient than their base use. Therefore, there is an incentive for these customers to be efficient and remain within their base level of usage. Similar to the non-residential customers, it is important to understand that a high usage customer does not necessarily imply inefficient or wasteful use.

4.8.1 High User Water Shortage Rate – Maintain Existing Rate Structure

The high use rate option maintains the existing rate structure, but adjusts the rates more for customers that are less efficient (i.e. in the higher blocks from base usage). Presented below in Table 4-15 is a summary of the water shortage rate developed for high users.

Table 4-15
High User Water Shortage Rate

	Water Shortage Rate - $/CCF[1]				
	Normal Water Conditions	Moderate Shortage Phase 1	Severe Shortage Phase 2	Critical Shortage Phase 3	Catastrophic Water Shortage
Targeted Reduction Goal	**0%**	**Up to10%**	**10% - 20%**	**20% - 30%**	**30% - 50%**
Up to 5% Above Base	$1.276	$1.276	$1.289	$1.302	$1.340
5% to 15% Above Base	1.323	1.323	1.349	1.376	1.402
15% to 25% Above Base	1.365	1.365	1.420	1.447	1.474
Usage Over 25% of Base	1.407	1.407	1.491	1.520	1.548

[1] – A CCF of water = one hundred cubic feet of water = 748 gallons

The adjustments for these customers are lower than those for residential and non-residential customers. In discussing this class of service with the City, it was noted that these customers while using large volumes of water through the year, do not necessarily create large system peak demands in the summer period. In that sense, their demands are much easier to predict and are not driven by weather or outdoor use. Given that observation, the adjustments for this class of service was moderated. Table 4-16 provides an overview of the percentage adjustments by phase and rate block.

Table 4-16 High User Water Shortage Rate Percentage Adjustments by Water Shortage Phase and Rate Block				
	Drought Conditions - % Change from Normal			Catastrophic Water Shortage
	Phase 1	Phase 2	Phase 3	
Rate Structure - Option 1 (Adjust the current block prices)				
Rate 1: Base or Below	0.0%	1.0%	2.0%	5.0%
Rate 2: Usage 5%-15% above base	0.0%	2.0%	4.0%	6.0%
Rate 3: Usage 15%-25% above base	0.0%	4.0%	6.0%	8.0%
Rate 4: Usage 25% above base	0.0%	6.0%	8.0%	10.0%

As can be seen, during phase 1 (moderate water shortage) the rates remain at normal water rates. However, as a drought enters phase 2 and 3, the larger adjustments are for customers in the lower rates (rates 2 – 4).

A bill comparison for this high user water shortage option is presented below in Table 4-17.

Table 4-17 High User Water Shortage Rates Bill Impacts at Varying Levels of Consumption With and Without Conservation					
	Total Monthly Bill				
	Normal Water Conditions	Moderate Shortage Phase 1	Severe Shortage Phase 2	Critical Shortage Phase 3	Catastrophic Water Shortage
Targeted Reduction Goal	**0.0%**	**10.0%**	**20.0%**	**30.0%**	**50.0%**
Tier 1 Customer Using 1,000 CCF					
Assuming No Change in Use - 1,000 CCF	$1,316.90	$1,316.90	$1,329.90	$1,342.90	$1,380.90
Assuming Reduced Usage -					
Revised CCF Usage	1000 CCF	900 CCF	800 CCF	700 CCF	500 CCF
Total Monthly Bill	$1,316.90	$1,189.30	$1,072.10	$952.30	$710.90

As noted above, in this particular water shortage rate schedule, in comparison to the other water shortage rate schedules, high users were not significantly penalized for failure to reduce consumption. The City recognized the unique usage characteristics of these customers and the level of their non-discretionary and discretionary usage.

4.9 Summary

This section of the report has discussed the development of the water shortage rates for the Department. The development of these water shortage rates should assist the Department in meeting the challenges of a water shortage; from both a water supply resource and financial/rate perspective.

Technical Appendices

	NORMAL WATER CONDITIONS						
	Annual CCF Sales At the Meter	Losses @ 6.50%	CCF @ Production	CCF to Gallons	Ave. Day Production (MGD)	System Peak Day Factor [1]	Peak Day Use (MGD)
Residential							
1 to 8 CCF	7,207,331	468,477	7,675,808	5,741,504,021	15.73	2.2	34.61
8.1 to 23 CCF	2,236,710	145,386	2,382,096	1,781,807,920	4.88	2.7	13.18
Over 23 CCF	596,797	38,792	635,589	475,420,426	1.30	3.7	4.82
Total	10,040,838	652,654	10,693,492	7,998,732,368	21.91	2.4	52.61
Non- Residential							
1 to 80 CCF	1,433,659	93,188	1,526,847	1,142,081,433	3.13		
Over 80 CCF	3,088,441	200,749	3,289,190	2,460,313,869	6.74		
Total	4,522,100	293,937	4,816,037	3,602,395,302	9.87	2.3	22.70
High User							
All Usage	682,047	44,333	726,380	543,332,281	1.49		
Total					1.49	1.3	1.94
SYSTEM TOTAL	**15,244,985**	**990,924**	**16,235,909**	**12,144,459,951**	**33.27**		**77.24**

[1] - Peaking factors utilized from the Lincoln cost of service study conducted by HDR. Peaking factors were established by class of service, and not by rate block. Residential peaking factors by block have been estimated to tie to the overall class peaking factor contained within the rate study.

	PHASE 1: MODERATE SHORTAGE; TARGETED SAVINGS UP TO 10%										
	Annual CCF Sales At the Meter	Targeted Savings %	Revised CCF Sales At the Meter	Losses @ 6.50%	CCF @ Production	CCF to Gallons	Ave. Day Production (MGD)	System Peak Day Factor [1]	Peak Day Use (MGD)	Reduction from Normal Water (MGD)	(%)
Residential											
1 to 8 CCF	7,207,331	2.5%	7,027,148	456,765	7,483,912	5,597,966,421	15.34	2.1	32.90	(1.71)	-4.9%
8.1 to 23 CCF	2,236,710	9.0%	2,035,406	132,301	2,167,707	1,621,445,207	4.44	2.5	10.91	(2.27)	-17.2%
Over 23 CCF	596,797	14.0%	513,245	33,361	546,606	408,861,566	1.12	3.2	3.56	(1.25)	-26.0%
Total	10,040,838		9,575,799	622,427	10,198,226	7,628,273,195	20.90	2.3	47.38	(5.23)	-9.9%
Non- Residential											
1 to 80 CCF	1,433,659	10.0%	1,290,293	83,869	1,374,162	1,027,873,289	2.82				
Over 80 CCF	3,088,441	10.0%	2,779,597	180,674	2,960,271	2,214,282,482	6.07				
Total	4,522,100		4,069,890	264,543	4,334,433	3,242,155,772	8.88	2.3	20.43	(2.27)	-10.0%
High User											
All Usage	682,047	10.0%	613,842	39,900	653,742	488,999,053	1.34				
Total							1.34	1.3	1.74	(0.19)	-10.0%
SYSTEM TOTAL	**15,244,985**		**14,259,532**	**926,870**	**15,186,401**	**11,359,428,019**	**31.12**		**69.55**	(7.69)	-10.0%
MGD Reduction from Normal Water Conditions							***(2.15)***		***(7.69)***		
% MGD Savings on Peak Day Use									***-10.0%***		

	PHASE 2: SEVERE SHORTAGE; TARGETED SAVINGS UP TO 20%										
	Annual CCF Sales At the Meter	Targeted Savings %	Revised CCF Sales At the Meter	Losses @ 6.50%	CCF @ Production	CCF to Gallons	Ave. Day Production (MGD)	System Peak Day Factor [1]	Peak Day Use (MGD)	Reduction from Normal Water (MGD)	(%)
Residential											
1 to 8 CCF	7,207,331	5.0%	6,846,964	445,053	7,292,017	5,454,428,820	14.94	2.1	31.23	(3.37)	-9.8%
8.1 to 23 CCF	2,236,710	20.0%	1,789,368	116,309	1,905,677	1,425,446,336	3.91	2.2	8.44	(4.74)	-36.0%
Over 23 CCF	596,797	30.0%	417,758	27,154	444,912	332,794,298	0.91	2.6	2.36	(2.46)	-51.0%
Total	10,040,838		9,054,090	588,516	9,642,606	7,212,669,455	19.76	2.1	42.03	(10.58)	-20.1%
Non- Residential											
1 to 80 CCF	1,433,659	20.0%	1,146,927	74,550	1,221,477	913,665,146	2.50				
Over 80 CCF	3,088,441	20.0%	2,470,753	160,599	2,631,352	1,968,251,096	5.39				
Total	4,522,100		3,617,680	235,149	3,852,829	2,881,916,242	7.90	2.3	18.16	(4.54)	-20.0%
High User											
All Usage	682,047	20.0%	545,638	35,466	581,104	434,665,825	1.19				
Total							1.19	1.3	1.55	(0.39)	-20.0%
SYSTEM TOTAL	**15,244,985**		**13,217,408**	**859,132**	**14,076,539**	**10,529,251,521**	**28.85**		**61.74**	(15.50)	-20.1%
MGD Reduction from Normal Water Conditions							***(4.43)***		***(15.50)***		
% MGD Savings on Peak Day Use									***-20.1%***		

	PHASE 3: CRITICAL SHORTAGE; TARGETED SAVINGS UP TO 30%										
	Annual CCF Sales At the Meter	Targeted Savings %	Revised CCF Sales At the Meter	Losses @ 6.50%	CCF @ Production	CCF to Gallons	Ave. Day Production (MGD)	System Peak Day Factor [1]	Peak Day Use (MGD)	Reduction from Normal Water (MGD)	(%)
Residential											
1 to 8 CCF	7,207,331	10.0%	6,486,598	421,629	6,908,227	5,167,353,619	14.16	2.0	28.03	(6.58)	-19.0%
8.1 to 23 CCF	2,236,710	25.0%	1,677,533	109,040	1,786,572	1,336,355,940	3.66	2.0	7.41	(5.77)	-43.8%
Over 23 CCF	596,797	50.0%	298,399	19,396	317,794	237,710,213	0.65	1.9	1.20	(3.61)	-75.0%
Total	10,040,838		8,462,529	550,064	9,012,593	6,741,419,772	18.47	2.0	36.65	(15.96)	-30.3%
Non- Residential											
1 to 80 CCF	1,433,659	30.0%	1,003,561	65,231	1,068,793	799,457,003	2.19				
Over 80 CCF	3,088,441	30.0%	2,161,909	140,524	2,302,433	1,722,219,709	4.72				
Total	4,522,100		3,165,470	205,756	3,371,226	2,521,676,711	6.91	2.3	15.89	(6.81)	-30.0%
High User											
All Usage	682,047	30.0%	477,433	31,033	508,466	380,332,597	1.04				
Total							1.04	1.3	1.35	(0.58)	-30.0%
SYSTEM TOTAL	**15,244,985**		**12,105,432**	**786,853**	**12,892,285**	**9,643,429,081**	**26.42**		**53.89**	(23.35)	-30.2%
MGD Reduction from Normal Water Conditions							***(6.85)***		***(23.35)***		
% MGD Savings on Peak Day Use									***-30.2%***		

	CATASTROPHIC WAER SHORTAGE; TARGETED SAVINGS UP TO 50%										
	Annual CCF Sales At the Meter	Targeted Savings %	Revised CCF Sales At the Meter	Losses @ 6.50%	CCF @ Production	CCF to Gallons	Ave. Day Production (MGD)	System Peak Day Factor [1]	Peak Day Use (MGD)	Reduction from Normal Water (MGD)	(%)
Residential											
1 to 8 CCF	7,207,331	20.0%	5,765,865	374,781	6,140,646	4,593,203,217	12.58	1.8	22.15	(12.46)	-36.0%
8.1 to 23 CCF	2,236,710	45.0%	1,230,191	79,962	1,310,153	979,994,356	2.68	1.5	3.99	(9.19)	-69.8%
Over 23 CCF	596,797	90.0%	59,680	3,879	63,559	47,542,043	0.13	0.4	0.05	(4.77)	-99.0%
Total	10,040,838		7,055,735	458,623	7,514,358	5,620,739,616	15.40	1.7	26.18	(26.42)	-50.2%
Non- Residential											
1 to 80 CCF	1,433,659	50.0%	716,830	46,594	763,423	571,040,716	1.56				
Over 80 CCF	3,088,441	50.0%	1,544,221	100,374	1,644,595	1,230,156,935	3.37				
Total	4,522,100		2,261,050	146,968	2,408,018	1,801,197,651	4.93	2.3	11.35	(11.35)	-50.0%
High User											
All Usage	682,047	50.0%	341,024	22,167	363,190	271,666,141	0.74				
Total							0.74	1.3	0.97	(0.97)	-50.0%
SYSTEM TOTAL	**15,244,985**		**9,657,809**	**627,758**	**10,285,566**	**7,693,603,407**	**21.08**		**38.50**	(38.74)	-50.2%
MGD Reduction from Normal Water Conditions							***(12.19)***		***(38.74)***		
% MGD Savings on Peak Day Use									***-50.2%***		

Phase 1 DROUGHT CONDITIONS - RESIDENTIAL - OPTION 1

Step 1 - Determine Total Targeted Phase 1 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 1 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 1 - Target Conservation (Savings)	10.0%	1,004,084	CCF
- Savings Achieved From Voluntarily (Education, etc.)	7.0%	702,859	CCF
- Saving Achieved Via Price Elasticity (Rates)	3.0%	301,225	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 8 CCF	7,207,331	4.0%	288,293	6,919,038	1.0%	69,190	6,849,847	-5.0%
Block 2:	8 - 23 CCF	2,236,710	12.9%	288,536	1,948,174	9.0%	175,336	1,772,839	-20.7%
Block 3:	Over 23 CCF	596,797	21.0%	125,327	471,470	12.0%	56,576	414,893	-30.5%
Total Consumption		10,040,838		702,156	9,338,682		301,102	9,037,579	-10.0%
Target Savings				702,859			301,225		
Difference (CCF)				(702)			(123)		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 1: % Adjst. to Rates	Phase 1: Rate $/CCF	Phase 1: Commodity Revenue
Block 1:	0 - 8 CCF	6,849,847	10.0%	$1.478	$10,124,074
Block 2:	8 - 23 CCF	1,772,839	20.0%	$2.293	4,065,119
Block 3:	Over 23 CCF	414,893	28.0%	$3.790	1,572,446
Total		9,037,579			$15,761,639
Target - Total Revenue					$15,728,122
$ Difference					$33,518
Plus: Targeted Additional Phase 1 Costs (Residential Share)					*$32,932*

Check of Elasticity Impacts from Assumed Rates

Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
-0.100	1.0%	1.0%	0.0%
-0.200	4.0%	9.0%	-5.0%
-0.300	8.4%	12.0%	-3.6%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 2 DROUGHT CONDITIONS - RESIDENTIAL - OPTION 1

Step 1 - Determine Total Targeted Phase 2 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 2 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 2 - Target Conservation (Savings)	20.0%	2,008,168	CCF
- Savings Achieved From Voluntarily (Education, etc.)	14.0%	1,405,717	CCF
- Saving Achieved Via Price Elasticity (Rates)	6.0%	602,450	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 8 CCF	7,207,331	11.0%	792,806	6,414,525	5.0%	320,726	6,093,798	-15.5%
Block 2:	8 - 23 CCF	2,236,710	20.0%	447,342	1,789,368	10.0%	178,937	1,610,431	-28.0%
Block 3:	Over 23 CCF	596,797	27.8%	165,910	430,887	24.0%	103,413	327,474	-45.1%
Total Consumption		10,040,838		1,406,058	8,634,780		603,076	8,031,704	-20.0%
Target Savings				1,405,717			602,450		
Difference (CCF)				341			626		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 2: % Adjst. to Rates	Phase 2: Rate $/CCF	Phase 2: Commodity Revenue
Block 1:	0 - 8 CCF	6,093,798	24.0%	$1.667	$10,158,362
Block 2:	8 - 23 CCF	1,610,431	34.7%	$2.574	4,145,250
Block 3:	Over 23 CCF	327,474	55.1%	$4.593	1,504,090
Total		8,031,704			$15,807,702
Target - Total Revenue					$15,761,639
$ Difference					$46,063
Plus: Targeted Additional Phase 2 Costs (Residential Share)					*$46,104*

Check of Elasticity Impacts from Assumed Rates

Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
-0.150	3.6%	5.0%	-1.4%
-0.250	8.7%	10.0%	-1.3%
-0.300	16.5%	24.0%	-7.5%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 3 DROUGHT CONDITIONS - RESIDENTIAL - OPTION 1

Step 1 - Determine Total Targeted Phase 3 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 3 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 3 - Target Conservation (Savings)	30.0%	3,012,251	CCF
- Savings Achieved From Voluntarily (Education, etc.)	20.0%	2,008,168	CCF
- Saving Achieved Via Price Elasticity (Rates)	10.0%	1,004,084	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 8 CCF	7,207,331	12.5%	900,916	6,306,415	8.0%	504,513	5,801,901	-19.5%
Block 2:	8 - 23 CCF	2,236,710	34.8%	778,375	1,458,335	26.0%	379,167	1,079,168	-51.8%
Block 3:	Over 23 CCF	596,797	55.0%	328,238	268,559	45.0%	120,851	147,707	-75.3%
Total Consumption		10,040,838		2,007,530	8,033,308		1,004,532	7,028,777	-30.0%
Target Savings				2,008,168			1,004,084		
Difference (CCF)				(638)			448		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 3: % Adjst. to Rates	Phase 3: Rate $/CCF	Phase 3: Commodity Revenue
Block 1:	0 - 8 CCF	5,801,901	46.0%	$1.962	$11,383,331
Block 2:	8 - 23 CCF	1,079,168	75.0%	$3.344	3,608,737
Block 3:	Over 23 CCF	147,707	97.0%	$5.833	861,576
Total		7,028,777			$15,853,644
Target - Total Revenue					$15,761,639
$ Difference					$92,005
Plus: Targeted Additional Phase 3 Costs (Residential Share)					*$92,209*

Check of Elasticity Impacts from Assumed Rates	Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
Block 1: 0 - 8 CCF	-0.150	6.9%	8.0%	-1.1%
Block 2: 8 - 23 CCF	-0.350	26.3%	26.0%	0.2%
Block 3: Over 23 CCF	-0.500	48.5%	45.0%	3.5%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 4 DROUGHT CONDITIONS - RESIDENTIAL - OPTION 1

Step 1 - Determine Total Targeted Phase 4 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 4 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 4 - Target Conservation (Savings)	50.0%	5,020,419	CCF
- Savings Achieved From Voluntarily (Education, etc.)	35.0%	3,514,293	CCF
- Saving Achieved Via Price Elasticity (Rates)	15.0%	1,506,126	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 8 CCF	7,207,331	25.0%	1,801,833	5,405,498	16.4%	886,502	4,518,997	-37.3%
Block 2:	8 - 23 CCF	2,236,710	53.9%	1,205,587	1,031,123	54.9%	566,087	465,037	-79.2%
Block 3:	Over 23 CCF	596,797	85.0%	507,277	89,520	60.0%	53,712	35,808	-94.0%
Total Consumption		10,040,838		3,514,697	6,526,141		1,506,300	5,019,841	-50.0%
Target Savings				3,514,293			1,506,126		
Difference (CCF)				404			174		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 4: % Adjst. to Rates	Phase 4: Rate $/CCF	Phase 4: Commodity Revenue
Block 1:	0 - 8 CCF	4,518,997	118.5%	$2.937	$13,272,293
Block 2:	8 - 23 CCF	465,037	159.7%	$4.963	2,307,977
Block 3:	Over 23 CCF	35,808	190.0%	$8.587	307,482
Total		5,019,841			$15,887,751
Target - Total Revenue					$15,761,639
$ Difference					$126,112
Plus: Targeted Additional Phase 4 Costs (Residential Share)					*$125,140*

Check of Elasticity Impacts from Assumed Rates

		Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
Block 1:	0 - 8 CCF	-0.150	17.8%	16.4%	1.4%
Block 2:	8 - 23 CCF	-0.350	55.9%	54.9%	1.0%
Block 3:	Over 23 CCF	-0.600	114.0%	60.0%	54.0%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 1 DROUGHT CONDITIONS - RESIDENTIAL - OPTION 2

Step 1 - Determine Total Targeted Phase 1 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 1 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 1 - Target Conservation (Savings)	10.0%	1,004,084	CCF
- Savings Achieved From Voluntarily (Education, etc.)	7.0%	702,859	CCF
- Saving Achieved Via Price Elasticity (Rates)	3.0%	301,225	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 8 CCF	7,207,331	4.0%	288,293	6,919,038	1.0%	69,190	6,849,847	-5.0%
Block 2:	8 - 23 CCF	2,236,710	12.9%	288,536	1,948,174	9.0%	175,336	1,772,839	-20.7%
Block 3:	Over 23 CCF	596,797	21.0%	125,327	471,470	12.0%	56,576	414,893	-30.5%
Total Consumption		10,040,838		702,156	9,338,682		301,102	9,037,579	-10.0%
Target Savings				702,859			301,225		
Difference (CCF)				(702)			(123)		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 1: % Adjst. to Rates	Phase 1: Rate $/CCF	Phase 1: Commodity Revenue
Block 1:	0 - 8 CCF	6,849,847	0.0%	$1.344	$9,206,195
Block 2:	8 - 23 CCF	1,772,839	37.3%	$2.624	4,651,929
Block 3:	Over 23 CCF	414,893	54.9%	$4.587	1,903,115
Total		9,037,579			$15,761,239
Target - Total Revenue					$15,728,122
$ Difference					$33,118
Plus: Targeted Additional Phase 1 Costs (Residential Share)					*$32,932*

Check of Elasticity Impacts from Assumed Rates

Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
-0.100	0.0%	1.0%	-1.0%
-0.200	7.5%	9.0%	-1.5%
-0.300	16.5%	12.0%	4.5%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 2 DROUGHT CONDITIONS - RESIDENTIAL - OPTION 2

Step 1 - Determine Total Targeted Phase 2 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 2 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 2 - Target Conservation (Savings)	20.0%	2,008,168	CCF
- Savings Achieved From Voluntarily (Education, etc.)	14.0%	1,405,717	CCF
- Saving Achieved Via Price Elasticity (Rates)	6.0%	602,450	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 8 CCF	7,207,331	11.0%	792,806	6,414,525	5.0%	320,726	6,093,798	-15.5%
Block 2:	8 - 23 CCF	2,236,710	20.0%	447,342	1,789,368	10.0%	178,937	1,610,431	-28.0%
Block 3:	Over 23 CCF	596,797	27.8%	165,910	430,887	24.0%	103,413	327,474	-45.1%
Total Consumption		10,040,838		1,406,058	8,634,780		603,076	8,031,704	-20.0%
Target Savings				1,405,717			602,450		
Difference (CCF)				341			626		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 2: % Adjst. to Rates	Phase 2: Rate $/CCF	Phase 2: Commodity Revenue
Block 1:	0 - 8 CCF	6,093,798	16.0%	$1.559	$9,500,232
Block 2:	8 - 23 CCF	1,610,431	45.0%	$2.771	4,462,505
Block 3:	Over 23 CCF	327,474	90.3%	$5.635	1,845,319
Total		8,031,704	45.3%		$15,808,055
			74.3%		
Target - Total Revenue					$15,761,239
$ Difference					$46,816
Plus: Targeted Additional Phase 2 Costs (Residential Share)					*$46,104*

Check of Elasticity Impacts from Assumed Rates			
Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
-0.150	2.4%	5.0%	-2.6%
-0.250	11.3%	10.0%	1.3%
-0.300	27.1%	24.0%	3.1%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 3 DROUGHT CONDITIONS - RESIDENTIAL - OPTION 2

Step 1 - Determine Total Targeted Phase 3 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 3 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 3 - Target Conservation (Savings)	30.0%	3,012,251	CCF
- Savings Achieved From Voluntarily (Education, etc.)	20.0%	2,008,168	CCF
- Saving Achieved Via Price Elasticity (Rates)	10.0%	1,004,084	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 8 CCF	7,207,331	12.5%	900,916	6,306,415	8.0%	504,513	5,801,901	-19.5%
Block 2:	8 - 23 CCF	2,236,710	34.8%	778,375	1,458,335	26.0%	379,167	1,079,168	-51.8%
Block 3:	Over 23 CCF	596,797	55.0%	328,238	268,559	45.0%	120,851	147,707	-75.3%
Total Consumption		10,040,838		2,007,530	8,033,308		1,004,532	7,028,777	-30.0%
Target Savings				2,008,168			1,004,084		
Difference (CCF)				(638)			448		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 3: % Adjst. to Rates	Phase 3: Rate $/CCF	Phase 3: Commodity Revenue
Block 1:	0 - 8 CCF	5,801,901	38.0%	$1.855	$10,762,527
Block 2:	8 - 23 CCF	1,079,168	95.0%	$3.726	4,020,979
Block 3:	Over 23 CCF	147,707	144.8%	$7.249	1,070,730
Total		7,028,777	49.8%		$15,854,236
			106.8%		
Target - Total Revenue					$15,761,239
$ Difference					$92,997
Plus: Targeted Additional Phase 3 Costs (Residential Share)					*$92,209*

Check of Elasticity Impacts from Assumed Rates			
Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
-0.150	5.7%	8.0%	-2.3%
-0.350	33.3%	26.0%	7.3%
-0.500	72.4%	45.0%	27.4%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 4 DROUGHT CONDITIONS - RESIDENTIAL - OPTION 2

Step 1 - Determine Total Targeted Phase 4 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 4 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 4 - Target Conservation (Savings)	50.0%	5,020,419	CCF
- Savings Achieved From Voluntarily (Education, etc.)	35.0%	3,514,293	CCF
- Saving Achieved Via Price Elasticity (Rates)	15.0%	1,506,126	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 8 CCF	7,207,331	25.0%	1,801,833	5,405,498	16.4%	886,502	4,518,997	-37.3%
Block 2:	8 - 23 CCF	2,236,710	53.9%	1,205,587	1,031,123	54.9%	566,087	465,037	-79.2%
Block 3:	Over 23 CCF	596,797	85.0%	507,277	89,520	60.0%	53,712	35,808	-94.0%
Total Consumption		10,040,838		3,514,697	6,526,141		1,506,300	5,019,841	-50.0%
Target Savings				3,514,293			1,506,126		
Difference (CCF)				404			174		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 4: % Adjst. to Rates	Phase 4: Rate $/CCF	Phase 4: Commodity Revenue
Block 1:	0 - 8 CCF	4,518,997	113.8%	$2.873	$12,983,077
Block 2:	8 - 23 CCF	465,037	185.0%	$5.446	2,532,589
Block 3:	Over 23 CCF	35,808	251.0%	$10.393	372,151
Total		5,019,841	66.0%		$15,887,817
			137.2%		
Target - Total Revenue					$15,761,239
$ Difference					$126,578
Plus: Targeted Additional Phase 4 Costs (Residential Share)					*$125,140*

Check of Elasticity Impacts from Assumed Rates			
Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
-0.150	17.1%	16.4%	0.7%
-0.350	64.8%	54.9%	9.8%
-0.600	150.6%	60.0%	90.6%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 1 DROUGHT CONDITIONS - RESIDENTIAL - OPTION 3

Step 1 - Determine Total Targeted Phase 1 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 1 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 1 - Target Conservation (Savings)	10.0%	1,004,084	CCF
- Savings Achieved From Voluntarily (Education, etc.)	7.0%	702,859	CCF
- Saving Achieved Via Price Elasticity (Rates)	3.0%	301,225	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 8 CCF	7,207,331	4.0%	288,293	6,919,038	1.0%	69,190	6,849,847	-5.0%
Block 2:	8 - 23 CCF	2,236,710	12.9%	288,536	1,948,174	9.0%	175,336	1,772,839	-20.7%
Block 3:	23 - 46 CCF	596,797	21.0%	125,327	471,470	12.0%	56,576	414,893	-30.5%
Block 3:	Over 46 CCF	0		0	0		0	0	#DIV/0!
Total Consumption		10,040,838		702,156	9,338,682		301,102	9,037,579	-10.0%
Target Savings				702,859			301,225		
Difference (CCF)				(702)			(123)		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 1: % Adjst. to Rates	Phase 1: Rate $/CCF	Phase 1: Commodity Revenue
Block 1:	0 - 8 CCF	6,849,847	0.0%	$1.344	$9,206,195
Block 2:	8 - 23 CCF	1,772,839	37.3%	$2.624	4,651,929
Block 3:	23 - 46 CCF	414,893	54.9%	$4.587	1,903,115
Block 3:	Over 46 CCF	0	0.0%	$3.461	-
Total		9,037,579			$15,761,239
Target - Total Revenue					$15,728,122
$ Difference					$33,118
Plus: Targeted Additional Phase 1 Costs (Residential Share)					*$32,932*

Check of Elasticity Impacts from Assumed Rates

Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
-0.100	0.0%	1.0%	-1.0%
-0.200	7.5%	9.0%	-1.5%
-0.300	16.5%	12.0%	4.5%
-0.400	0.0%	0.0%	0.0%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 2 DROUGHT CONDITIONS - RESIDENTIAL - OPTION 3

Step 1 - Determine Total Targeted Phase 2 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 2 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 2 - Target Conservation (Savings)	20.0%	2,008,168	CCF
- Savings Achieved From Voluntarily (Education, etc.)	14.0%	1,405,717	CCF
- Saving Achieved Via Price Elasticity (Rates)	6.0%	602,450	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 8 CCF	7,207,331	10.0%	720,733	6,486,598	5.0%	324,330	6,162,268	-14.5%
Block 2:	8 - 23 CCF	2,236,710	19.7%	440,632	1,796,078	10.0%	179,608	1,616,470	-27.7%
Block 3:	23 - 46 CCF	298,399	27.0%	80,568	217,831	23.7%	51,626	166,205	-44.3%
Block 3:	Over 46 CCF	298,399	55.0%	164,119	134,279	35.0%	46,998	87,282	-70.8%
Total Consumption		10,040,838		1,406,052	8,634,786		602,561	8,032,225	-20.0%
Target Savings				1,405,717			602,450		
Difference (CCF)				334			111		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 2: % Adjst. to Rates	Phase 2: Rate $/CCF	Phase 2: Commodity Revenue
Block 1:	0 - 8 CCF	6,162,268	10.0%	$1.478	$9,107,832
Block 2:	8 - 23 CCF	1,616,470	64.0%	$3.134	5,066,018
Block 3:	23 - 46 CCF	166,205	106.3%	$6.109	1,015,346
Block 3:	Over 46 CCF	87,282	122.5%	$7.088	618,652
Total		8,032,225			$15,807,848
Target - Total Revenue					$15,761,239
$ Difference					$46,609
Plus: Targeted Additional Phase 2 Costs (Residential Share)					*$46,104*

Check of Elasticity Impacts from Assumed Rates				
	Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
Block 1: 0 - 8 CCF	-0.150	1.5%	5.0%	-3.5%
Block 2: 8 - 23 CCF	-0.250	16.0%	10.0%	6.0%
Block 3: 23 - 46 CCF	-0.300	31.9%	23.7%	8.2%
Block 3: Over 46 CCF	-0.450	55.1%	35.0%	20.1%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 3 DROUGHT CONDITIONS - RESIDENTIAL - OPTION 3

Step 1 - Determine Total Targeted Phase 3 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 3 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 3 - Target Conservation (Savings)	30.0%	3,012,251	CCF
- Savings Achieved From Voluntarily (Education, etc.)	20.0%	2,008,168	CCF
- Saving Achieved Via Price Elasticity (Rates)	10.0%	1,004,084	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 8 CCF	7,207,331	12.0%	864,880	6,342,451	7.8%	494,711	5,847,740	-18.9%
Block 2:	8 - 23 CCF	2,236,710	35.0%	782,849	1,453,862	25.7%	373,642	1,080,219	-51.7%
Block 3:	23 - 46 CCF	298,399	55.0%	164,119	134,279	45.0%	60,426	73,854	-75.3%
Block 3:	Over 46 CCF	298,399	65.8%	196,346	102,052	74.0%	75,519	26,534	-91.1%
Total Consumption		10,040,838		2,008,194	8,032,644		1,004,298	7,028,346	-30.0%
Target Savings				2,008,168			1,004,084		
Difference (CCF)				26			214		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 3: % Adjst. to Rates	Phase 3: Rate $/CCF	Phase 3: Commodity Revenue	Check of Elasticity Impacts from Assumed Rates: Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
Block 1:	0 - 8 CCF	5,847,740	35.0%	$1.814	$10,607,801	-0.150	5.3%	7.8%	-2.6%
Block 2:	8 - 23 CCF	1,080,219	114.5%	$4.099	4,427,818	-0.350	40.1%	25.7%	14.4%
Block 3:	23 - 46 CCF	73,854	164.0%	$7.817	577,314	-0.500	82.0%	45.0%	37.0%
Block 3:	Over 46 CCF	26,534	189.7%	$9.078	240,872	-0.600	113.8%	74.0%	39.8%
Total		7,028,346			$15,853,804				
Target - Total Revenue					$15,761,239				
$ Difference					$92,565				
Plus: Targeted Additional Phase 3 Costs (Residential Share)					*$92,209*				

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 4 DROUGHT CONDITIONS - RESIDENTIAL - OPTION 3

Step 1 - Determine Total Targeted Phase 4 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 4 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 4 - Target Conservation (Savings)	50.0%	5,020,419	CCF
- Savings Achieved From Voluntarily (Education, etc.)	35.0%	3,514,293	CCF
- Saving Achieved Via Price Elasticity (Rates)	15.0%	1,506,126	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 8 CCF	7,207,331	25.0%	1,801,833	5,405,498	16.0%	864,880	4,540,619	-37.0%
Block 2:	8 - 23 CCF	2,236,710	55.2%	1,234,664	1,002,046	54.7%	548,119	453,927	-79.7%
Block 3:	23 - 46 CCF	298,399	75.0%	223,799	74,600	70.0%	52,220	22,380	-92.5%
Block 3:	Over 46 CCF	298,399	85.0%	253,639	44,760	90.0%	40,284	4,476	-98.5%
Total Consumption		10,040,838		3,513,934	6,526,904		1,505,502	5,021,401	-50.0%
Target Savings				3,514,293			1,506,126		
Difference (CCF)				(359)			(623)		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 4: % Adjst. to Rates	Phase 4: Rate $/CCF	Phase 4: Commodity Revenue
Block 1:	0 - 8 CCF	4,540,619	110.5%	$2.829	$12,845,410
Block 2:	8 - 23 CCF	453,927	215.3%	$6.025	2,734,909
Block 3:	23 - 46 CCF	22,380	277.0%	$11.163	249,827
Block 3:	Over 46 CCF	4,476	310.0%	$12.640	56,576
Total		5,021,401			$15,886,722
Target - Total Revenue					$15,761,239
$ Difference					$125,483
Plus: Targeted Additional Phase 4 Costs (Residential Share)					*$125,140*

Check of Elasticity Impacts from Assumed Rates

Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
-0.150	16.6%	16.0%	0.6%
-0.350	75.4%	54.7%	20.7%
-0.600	166.2%	70.0%	96.2%
-0.600	186.0%	90.0%	96.0%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 1 DROUGHT CONDITIONS - NONRESIDENTIAL - OPTION 1

Step 1 - Determine Total Targeted Phase 1 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 1 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 1 - Target Conservation (Savings)	10.0%	452,210	CCF
- Savings Achieved From Voluntarily (Education, etc.)	8.0%	361,768	CCF
- Saving Achieved Via Price Elasticity (Rates)	2.0%	90,442	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 80 CCF	1,433,659	5.14%	73,690	1,359,969	5.14%	69,902	1,290,067	-10.0%
Block 2:	OVER 80+ CCF	3,088,441	5.14%	158,746	2,929,695	5.14%	150,586	2,779,109	-10.0%
Total Consumption		4,522,100		232,436	4,289,664		220,489	4,069,175	-10.0%
Target Savings				361,768			90,442		
Difference (CCF)				(129,332)			130,047		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 1: % Adjst. to Rates	Phase 1: Rate $/CCF	Phase 1: Commodity Revenue
Block 1:	0 - 80 CCF	1,290,067	11.3%	$1.496	$1,929,940
Block 2:	OVER 80+ CCF	2,779,109	11.3%	$2.128	5,913,944
Total		4,069,175			$7,843,883
Target - Total Revenue					$7,828,848
$ Difference					$15,035
Plus: Targeted Additional Phase 1 Costs (NonResidential Share)					*$14,831*

$203 s/b positive #

Check of Elasticity Impacts from Assumed Rates

Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
-0.100	1.1%	5.1%	-4.0%
-0.150	1.7%	5.1%	-3.4%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 2 DROUGHT CONDITIONS - NONRESIDENTIAL - OPTION 1

Step 1 - Determine Total Targeted Phase 2 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 2 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 2 - Target Conservation (Savings)	20.0%	904,420	CCF
- Savings Achieved From Voluntarily (Education, etc.)	16.0%	723,536	CCF
- Saving Achieved Via Price Elasticity (Rates)	4.0%	180,884	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 80 CCF	1,433,659	10.56%	151,394	1,282,265	10.56%	135,407	1,146,857	-20.0%
Block 2:	OVER 80+ CCF	3,088,441	10.56%	326,139	2,762,302	10.56%	291,699	2,470,603	-20.0%
Total Consumption		4,522,100		477,534	4,044,566		427,106	3,617,460	-20.0%
Target Savings				723,536			180,884		
Difference (CCF)				(246,002)			246,222		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 2: % Adjst. to Rates	Phase 2: Rate $/CCF	Phase 2: Commodity Revenue
Block 1:	0 - 80 CCF	1,146,857	25.6%	$1.688	$1,935,895
Block 2:	OVER 80+ CCF	2,470,603	25.6%	$2.400	5,929,446
Total		3,617,460			$7,865,342
Target - Total Revenue					$7,843,883
$ Difference					$21,459
Plus: Targeted Additional Phase 2 Costs (NonResidential Share)					*$20,764*

$695 s/b positive #

Check of Elasticity Impacts from Assumed Rates

Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
-0.150	3.8%	10.6%	-6.7%
-0.300	7.7%	10.6%	-2.9%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 3 DROUGHT CONDITIONS - NONRESIDENTIAL - OPTION 1

Step 1 - Determine Total Targeted Phase 3 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 3 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 3 - Target Conservation (Savings)	30.0%	1,356,630	CCF
- Savings Achieved From Voluntarily (Education, etc.)	24.0%	1,085,304	CCF
- Saving Achieved Via Price Elasticity (Rates)	6.0%	271,326	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 80 CCF	1,433,659	16.3%	234,260	1,199,399	16.3%	195,982	1,003,417	-30.0%
Block 2:	OVER 80+ CCF	3,088,441	16.3%	504,651	2,583,790	16.3%	422,191	2,161,598	-30.0%
Total Consumption		4,522,100		738,911	3,783,189		618,173	3,165,016	-30.0%
Target Savings				1,085,304			271,326		
Difference (CCF)				(346,393)			346,847		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 3: % Adjst. to Rates	Phase 3: Rate $/CCF	Phase 3: Commodity Revenue
Block 1:	0 - 80 CCF	1,003,417	43.9%	$1.934	$1,940,609
Block 2:	OVER 80+ CCF	2,161,598	43.9%	$2.750	5,944,396
Total		3,165,016			$7,885,005
Target - Total Revenue					$7,843,883
$ Difference					$41,122
Plus: Targeted Additional Phase 3 Costs (NonResidential Share)					*$41,528*

($406) s/b positive #

Check of Elasticity Impacts from Assumed Rates

Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
-0.200	8.8%	16.3%	-7.6%
-0.350	15.4%	16.3%	-1.0%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 4 DROUGHT CONDITIONS - NONRESIDENTIAL - OPTION 1

Step 1 - Determine Total Targeted Phase 4 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 4 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 4 - Target Conservation (Savings)	50.0%	2,261,050	CCF
- Savings Achieved From Voluntarily (Education, etc.)	40.0%	1,808,840	CCF
- Saving Achieved Via Price Elasticity (Rates)	10.0%	452,210	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	% Reduction
Block 1:	0 - 80 CCF	1,433,659	29.3%	420,062	1,013,597	29.3%	296,984	716,613	-50.0%
Block 2:	OVER 80+ CCF	3,088,441	29.3%	904,913	2,183,528	29.3%	639,774	1,543,754	-50.0%
Total Consumption		4,522,100		1,324,975	3,197,125		936,758	2,260,367	-50.0%
Target Savings				1,808,840			452,210		
Difference (CCF)				(483,865)			484,548		

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 4: % Adjst. to Rates	Phase 4: Rate $/CCF	Phase 4: Commodity Revenue
Block 1:	0 - 80 CCF	716,613	101.9%	$2.714	$1,944,888
Block 2:	OVER 80+ CCF	1,543,754	101.9%	$3.858	5,955,803
Total		2,260,367			$7,900,691
Target - Total Revenue					$7,843,883
$ Difference					$56,808
Plus: Targeted Additional Phase 4 Costs (NonResidential Share)					*$56,359*

$449 s/b positive #

Check of Elasticity Impacts from Assumed Rates

Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
-0.200	20.4%	29.3%	-8.9%
-0.500	51.0%	29.3%	21.7%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 1 DROUGHT CONDITIONS - HIGH USER - OPTION 1

Step 1 - Determine Total Targeted Phase 1 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 1 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 1 - Target Conservation (Savings)	10.0%	68,205	CCF
- Savings Achieved From Voluntarily (Education, etc.)	8.0%	54,564	CCF
- Saving Achieved Via Price Elasticity (Rates)	2.0%	13,641	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)
Rate 1:	Base or Below	682,047	0.0%	0	682,047	0.0%	0	682,047
Rate 2:	Usage 5%-15% above base	0	0.0%	0	0	0.0%	0	0
Rate 3:	Usage 15%-25% above base	0	0.0%	0	0	0.0%	0	0
Rate 4:	Usage 25% above base	0	0.0%	0	0	0.0%	0	0
Total Consumption		682,047		0	682,047		0	682,047
Target Savings				54,564			13,641	
Difference (CCF)				(54,564)			(13,641)	

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 1: % Adjst. to Rates	Phase 1: Rate $/CCF	Phase 1: Commodity Revenue
Rate 1:	Base or Below	682,047	0.00%	$1.276	$870,292
Rate 2:	Usage 5%-15% above base	0	0.00%	$1.323	$0
Rate 3:	Usage 15%-25% above base	0	0.00%	$1.365	$0
Rate 4:	Usage 25% above base	0	0.00%	$1.407	$0
Total		682,047			$870,292
Target - Total Revenue					$870,292
$ Difference					$0
Plus: Targeted Additional Phase 1 Costs (High User Share)					*$2,237*

Check of Elasticity Impacts from Assumed Rates

Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
0.000	0.0%	0.0%	0.0%
0.000	0.0%	0.0%	0.0%
0.000	0.0%	0.0%	0.0%
0.000	0.0%	0.0%	0.0%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 2 DROUGHT CONDITIONS - HIGH USER - OPTION 1

Step 1 - Determine Total Targeted Phase 2 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 2 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 2 - Target Conservation (Savings)	20.0%	136,409	CCF
- Savings Achieved From Voluntarily (Education, etc.)	16.0%	109,128	CCF
- Saving Achieved Via Price Elasticity (Rates)	4.0%	27,282	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)
Rate 1:	Base or Below	682,047	10.6%	72,024	610,023	10.6%	64,418	545,604
Rate 2:	Usage 5%-15% above base	0	10.6%	0	0	10.6%	0	0
Rate 3:	Usage 15%-25% above base	0	10.6%	0	0	10.6%	0	0
Rate 4:	Usage 25% above base	0	10.6%	0	0	10.6%	0	0
Total Consumption		682,047		72,024	610,023		64,418	545,604
Target Savings				109,128			27,282	
Difference (CCF)				(37,103)			37,137	

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 2: % Adjst. to Rates	Phase 2: Rate $/CCF	Phase 2: Commodity Revenue
Rate 1:	Base or Below	545,604	1.0%	$1.289	$703,284
Rate 2:	Usage 5%-15% above base	0	2.0%	$1.349	$0
Rate 3:	Usage 15%-25% above base	0	4.0%	$1.420	$0
Rate 4:	Usage 25% above base	0	6.0%	$1.491	$0
Total		545,604			$703,284
Target - Total Revenue					$870,292
$ Difference					($167,008)
Plus: Targeted Additional Phase 2 Costs (High User Share)					*$3,132*

Check of Elasticity Impacts from Assumed Rates

		Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
Rate 1:	Base or Below	-0.075	0.1%	10.6%	-10.5%
Rate 2:	Usage 5%-15% above base	-0.100	0.2%	10.6%	-10.4%
Rate 3:	Usage 15%-25% above base	-0.100	0.4%	10.6%	-10.2%
Rate 4:	Usage 25% above base	-1.500	9.0%	10.6%	-1.6%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 3 DROUGHT CONDITIONS - HIGH USER - OPTION 1

Step 1 - Determine Total Targeted Phase 3 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 3 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 3 - Target Conservation (Savings)	30.0%	204,614	CCF
- Savings Achieved From Voluntarily (Education, etc.)	24.0%	163,691	CCF
- Saving Achieved Via Price Elasticity (Rates)	6.0%	40,923	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	
Rate 1:	Base or Below	682,047	16.4%	111,515	570,532	16.4%	93,282	477,250	
Rate 2:	Usage 5%-15% above base	0	16.4%	0	0	16.4%	0	0	
Rate 3:	Usage 15%-25% above base	0	16.4%	0	0	16.4%	0	0	
Rate 4:	Usage 25% above base	0	16.4%	0	0	16.4%	0	0	
Total Consumption		682,047		111,515	570,532		93,282	477,250	
Target Savings				163,691			40,923		
Difference (CCF)				(52,177)			52,359		183

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 3: % Adjst. to Rates	Phase 3: Rate $/CCF	Phase 3: Commodity Revenue
Rate 1:	Base or Below	477,250	2.0%	$1.302	$621,380
Rate 2:	Usage 5%-15% above base	0	4.0%	$1.376	$0
Rate 3:	Usage 15%-25% above base	0	6.0%	$1.447	$0
Rate 4:	Usage 25% above base	0	8.0%	$1.520	$0
Total		477,250			$621,380
Target - Total Revenue					$870,292
$ Difference					($248,912)
Plus: Targeted Additional Phase 3 Costs (High User Share)					*$6,263*

Check of Elasticity Impacts from Assumed Rates

		Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
Rate 1:	Base or Below	-0.100	0.2%	16.4%	-16.2%
Rate 2:	Usage 5%-15% above base	-1.500	6.0%	16.4%	-10.4%
Rate 3:	Usage 15%-25% above base	-2.000	12.0%	16.4%	-4.4%
Rate 4:	Usage 25% above base	-2.000	16.0%	16.4%	-0.4%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season

Phase 4 DROUGHT CONDITIONS - HIGH USER - OPTION 1

Step 1 - Determine Total Targeted Phase 4 Savings and Savings Achieved from Voluntary and Price Elasticity Impacts

	Phase 4 - REQUIRED TOTAL SAVINGS		
	Estimated % Savings	Est. Savings in Total CCF	
Phase 4 - Target Conservation (Savings)	50.0%	341,024	CCF
- Savings Achieved From Voluntarily (Education, etc.)	40.0%	272,819	CCF
- Saving Achieved Via Price Elasticity (Rates)	10.0%	68,205	CCF

Step 2 - Estimate the Voluntary and Price Elasticity Impacts (Savings) By Price Block

		Normal Water Conditions (CCF)	Voluntary Savings Impacts: Estimated % Savings by Block	Voluntary Savings Impacts: Estimated Savings (CCF)	Voluntary Savings Impacts: After Vol. Savings (CCF)	Price Elasticity Savings Impact: Targeted Savings By Block	Price Elasticity Savings Impact: Elasticity Savings (CCF)	Price Elasticity Savings Impact: After Vol. & Rate Impact (CCF)	
Rate 1:	Base or Below	682,047	29.3%	199,840	482,207	29.3%	141,287	340,921	
Rate 2:	Usage 5%-15% above base	0	29.3%	0	0	29.3%	0	0	
Rate 3:	Usage 15%-25% above base	0	29.3%	0	0	29.3%	0	0	
Rate 4:	Usage 25% above base	0	29.3%	0	0	29.3%	0	0	
Total Consumption		682,047		199,840	482,207		141,287	340,921	
Target Savings				272,819			68,205		
Difference (CCF)				(72,979)			73,082		103

Step 3 - Determine the Price (Rate) By Block Needed to Achieve Needed Savings and Meet Revenue Requirement

		Usage After Vol. & Rate Impact (CCF)	Phase 4: % Adjst. to Rates	Phase 4: Rate $/CCF	Phase 4: Commodity Revenue
Rate 1:	Base or Below	340,921	5.0%	$1.340	$456,833
Rate 2:	Usage 5%-15% above base	0	6.0%	$1.402	$0
Rate 3:	Usage 15%-25% above base	0	8.0%	$1.474	$0
Rate 4:	Usage 25% above base	0	10.0%	$1.548	$0
Total		340,921			$456,833
Target - Total Revenue					$870,292
$ Difference					($413,458)
Plus: Targeted Additional Phase 4 Costs (High User Share)					*$8,500*
					($421,959) s/b positive #

Check of Elasticity Impacts from Assumed Rates

Estimated Price Elasticity [1]	Estimated Savings %	Targeted Elasticity Savings	% Difference
-0.100	0.5%	29.3%	-28.8%
-1.500	9.0%	29.3%	-20.3%
-2.250	18.0%	29.3%	-11.3%
-2.500	25.0%	29.3%	-4.3%

[1] - Note: Price elasticity is estimated and is a range of impacts and will vary based upon the block being impacted, the price of water and the season