*** FINAL DRAFT ****

WATER CONSERVATION PLAN
FOR CITY OF DENISON, TEXAS

1. INTRODUCTION AND OBJECTIVES

Water supply has always been a key issue in the development of Texas. In recent years, the increasing population and economic development in Region C have led to growing demands for water. At the same time, local and less expensive sources of water supply are largely developed. Additional supplies to meet higher demands will be expensive and difficult to develop. Therefore, it is important that we make efficient use of existing supplies and make them last as long as possible. This will delay the need for new supplies, minimize the environmental impacts associated with developing new supplies, and delay the high cost of additional water supply development.

Recognizing the need for efficient use of existing water supplies, the Texas Commission on Environmental Quality (TCEQ) has developed guidelines and requirements governing the development of water conservation and drought contingency plans for public water suppliers[2]. The TCEQ guidelines and requirements for water suppliers are included in Appendix B. The City of Denison has adopted this water conservation plan pursuant to TCEQ guidelines and requirements.

The objectives of the water conservation plan are:

- To reduce water consumption
- To reduce the loss and waste of water
- To identify the level of water reuse
- To improve efficiency in the use of water
- To extend the life of current water supplies by reducing the rate of growth and demand

2. TEXAS COMMISSION ON ENVIRONMENTAL QUALITY RULES

2.1 Conservation Plans

The TCEQ rules governing development of water conservation plans for public water suppliers are contained in Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2 of the Texas Administrative Code, which is included in Appendix B. For the purpose of these rules, a water conservation plan is defined as:

"A strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water, and for preventing the pollution of water. A water conservation plan may be a separate document identified as such or may be

contained within another water management documents(s)[2]."

According to TCEQ rules, water conservation plans for public water suppliers must have a certain minimum content (Section 3), and must have additional content for public water suppliers that are projected to supply 5,000 or more people in the next ten years (Section 4), and may have additional optional content (Section 5).

3. MINIMUM REQUIRED WATER CONSERVATION PLAN CONTENT

The minimum requirements in the Texas Administrative Code for water conservation plans for public drinking water suppliers covered in this report are as follows:

- §288.2(a)(1)(A) – Utility Profile – Section 3.1 and Appendix F
- §288.2(a)(1)(B) – Specification of Goals Before May 1, 2005 – Section 3.2
- §288.2(a)(1)(C) – Specification of Goals After May 1, 2005 – Section 3.2
- §288.2(a)(1)(D) – Accurate Metering – Sections 3.3 and 3.4
- §288.2(a)(1)(E) – Universal Metering – Section 3.4
- §288.2(a)(1)(F) – Determination and Control of Unaccounted Water – Section 3.5
- §288.2(a)(1)(G) – Public Education and Information Program –Section 3.6
- §288.2(a)(1)(H) – Non-Promotional Water Rate Structure – Section 3.7
- §288.2(a)(1)(I) – Reservoir System Operation Plan – Section 3.8
- §288.2(a)(1)(J) – Means of Implementing and Enforcement – Section 3.9, Appendix E
- §288.2(a)(1)(K) – Coordination with Regional Water Planning Group – Section 3.10 and Appendix D

3.1 Utility Profile

Appendix F to this water conservation plan is a water utility profile for the City of Denison, based on the format recommended by the TCEQ[5]. Table 3.1 summarizes key facts from the Water Utility Profile.

3.2 Specification of Water Conservation Goals

Table 3.2 shows historical and projected per capita municipal water use for the City of Denison. Water use is shown in units of gallons per capita per day (gpcd). Municipal water use is total use less wholesale sales to other municipal suppliers less sales to industrial users. Per capita municipal water use is municipal water use divided by population. The per capita municipal water use does not include industrial use.

Projected per capita municipal uses were obtained from the Texas Water Development Board (TWDB)[6] and interpolated to match the appropriate years for the five-year and ten-year goals. The TWDB Projections are applicable for a dry year, in which outdoor water use would be high. Per capita municipal water use in a year with normal or high precipitation during the summer should be less than projected here.

Table 3.1
Summary of Water Utility Profile for the City of Denison

Water Service Area = 35 square miles

Miles of Distribution Pipe = Approx. 250 miles

Population:

Current Population = _____ in _____
2000 Population – 22,773
Projected 2060 Population = 33,000 (Source: Region C)

Connections:

Current Connections = _____ in _____
Total Increase in Connections in Last Five Years = _____

Information on Water Use for the Last Five Years

Year	Use (Million Gallons)	Estimated Population*	Municipal per Capita	Unaccounted Water	Peak Day to Average Day
____	_____	_____	_____	_____	_____
____	_____	_____	_____	_____	_____
____	_____	_____	_____	_____	_____
____	_____	_____	_____	_____	_____
____	_____	_____	_____	_____	_____

*Source of population estimate is _____.

Water Supply Source(s) =

Lake Randell
Lake Texoma
Trinity Acquifer

Treatment and Distribution System:

Treatment Plant Capacity = 13.0 million gallons per day
Elevated Storage = 1.975 million gallons per day
Ground Storage = 4.36 million gallons

Current Total Annual Wastewater Flow = _____ million gallons in 2004.

The TWDB projections include the impact of low-flow plumbing fixtures and water conservation measures that have been in effect since at least 2000 but do not include the effect of water conservation measures recommended in this plan. The impact of low-flow plumbing fixtures has

been itemized to show the total amount of projected water conservation in the City of Denison. Table 3.2 shows the projected per capita water use after implementation of this water conservation and drought contingency plan. Table 3.2 also shows how much of the projected per capita water use is supplied by reclaimed water.

Table 3.2

Projected Per Capita Use Without Implementation of Water Conservation Measures Beyond Those in Effect in 2000 and Water Conservation Goals

Description	Highest Historical		Five-Year Goal	Ten-Year Goal
	Year	Gpcd	Gpcd	Gpcd
Highest Per Capita Municipal Use				
Projected Per Capita Municipal Use Without Low-Flow Plumbing Fixtures				
Projected Reduction Due to Low-Flow Plumbing Fixtures				
Projected Per Capita Municipal Use With Low-Flow Plumbing Fixtures				
Projected Reduction Due to Water Conservation Measures in this Plan				
Projected Per Capita Water use Goals				
Projected Per Capita Use of Reclaimed Water				
Projected Per Capita Use of Raw Water				

The City of Denison water conservation goals include the following:

- Achieve 2010 per capita municipal water use of 145 gpcd or less, as shown in Table 3.2.
- Achieve 2015 per capita municipal water use of 145 gpcd or less.
- Implement and maintain a meter replacement program (Section 3.4).
- Keep the level of unaccounted water in the system less than ____ percent in _____ *[target year]* and subsequent years (Section 3.5).
- Raise public awareness of water conservation and encourage responsible public behavior though a public education and information program, as discussed in Section 3.6
- Achieve metering of all un-metered public connections by 2008.

3.3 Accurate Metering of Raw Water Supplies and Treated Water Deliveries

Raw water and treated water pumpage for all customers of City of Denison, including public and governmental users, is metered. Each meter has an accuracy of plus or minus 5 percent. The meters are calibrated annually by qualified personnel to maintain the required accuracy and are repaired and/or replaced as needed.

3.4 Metering of Customer and Public Uses and Meter Testing, Repair and Replacement

Water usage for all customers of City of Denison, not including public and governmental users, is metered. As part of water conservation, the City of Denison operates a meter replacement program that will replace every meter on a 15-year cycle. In addition, meters registering any unusual or questionable readings are tested and repaired to restore full functionality.

3.5 Determination and Control of Unaccounted Water

Unaccounted water is the difference between raw water drawn from Lake Randell and metered deliveries to customers. (This includes authorized but unmetered uses such as fire fighting and releases for flushing of lines.) Unaccounted water can include several categories:

- Inaccuracies in customer meters (customer meters tend to run more slowly as they age and under-report actual use)
- Losses due to water main breaks and leaks in the water distribution system
- Losses due to illegal connections
- Other

The City of Denison will conduct a water audit every five years using the format recommended by the Texas Water Development Board. The audit will divide water losses into apparent losses and real losses. Apparent water losses include water that was actually used but not accounted for, such as customer meter errors or theft. Accounting for apparent losses increases the City's utility revenue but does not reduce water usage. Real losses include leakage and overflows at the water treatment plant. Identifying and preventing real losses decreases a utility's costs and decreases water usage. The City will target real losses under this conservation strategy.

As shown in Appendix F, unaccounted water for the City of Denison has varied from ___ percent to _____ percent in the last five years. With the measures described in this plan, the City of Denison intends to maintain the unaccounted water below _____ percent in_____ and subsequent years. If unaccounted water exceeds this goal, the City of Denison will implement a more intensive audit to determine the source(s) of water loss and reduce the unaccounted water.

3.6 Continuing Public Education and Information Campaign

The continuing public education and information campaign on water conservation for the City of Denison includes the following elements:

- Promote the City's water conservation measures (presented in Sections 3,4 and 5)
- Include inserts on water conservation with water bills or mail outs at least twice per year. Inserts will include material developed by City of Denison staff and material obtained from the TWDB, the TCEQ, and other sources.
- Encourage local media coverage of water conservation issues and the importance of water conservation
- Notify local organizations, schools, and civic groups that City of Denison staff is available to make presentations on the importance of water conservation and ways to save water
- Make the *Texas Smartscape CD*, water conservation brochures, and other water conservation materials available to the public at the Denison Public Library and other public places
- Make information on water conservation available online at www.ci.denison.tx.us and will include links to the *Texas Smartscape* website and to information on water conservation on the TWDB and TCEQ websites

3.7 Non-Promotional Water Rate Structure

Current water rates are shown in Table 3.3.

Table 3.3
Volume Unit Charges

Water User	Type/Volume	Volume Unit Charge ($1,000 gal.)
Single-Family	0-2,000 gallons	$
	2,001 – 9,000 gallons	$
	9,001 – 15,000 gallons	$
	More than 15,000 gallons	$
Multi-Family		$
Commercial		$
Large Volume/Industrial		$
Golf Courses		$

3.8 Reservoir System Operation Plan

The City of Denison has the following rights to divert water from city-owned Lake Randell and from Lake Texoma:

- Up to acre-feet per year based on the natural yield of the reservoir
- Up to acre-feet per year on the reclaimed water discharge from the _____

_____ is not operated in coordination with any other raw water supply sources; therefore, no additional yield can be gained through system operation.

3.9 Implementation and Enforcement of the Water Conservation Plan

Appendix E contains a copy of the resolution/ordinance by Denison's City Council adopting this water conservation and drought contingency plan. The resolution designated responsible officials to implant and enforce the water conservation and drought contingency plan.

3.10 Coordination with Regional Water Planning Group

Appendix D includes a copy of a letter sent to the Chair of the Region C Water Planning Group with this water conservation and drought contingency plan.

4. ADDITIONAL REQUIRED WATER CONSERVATION PLAN CONTENT

The Texas Administrative Code also includes additional requirements for water conservation plans for public drinking water suppliers that serve a population of 5,000 people or more and/or a projected population of 5,000 people or more within the next ten years:

- §288.2(a)(2)(A) – Leak Detection, Repair, and Water Loss Accounting – Sections 3.5 and 4.1 *[and 5.4 if city chooses to monitor with annual conservation report]*
- §288.2(a)(2)(B) – Record Management System – Section 4.2
- §288.2(a)(2)(C) – Requirement for Water Conservation Plans by Wholesale Customers – Section 4.3

4.1 Leak Detection and Repair; Pressure Control

Measures to control unaccounted water are part of the routine operations of the City of Denison. Meter readers watch for and report signs of illegal connections so they can be addressed quickly. Crews and personnel look for and report evidence of leaks in the water distribution system. Maintenance crews respond quickly to repair leaks reported by the public and city personnel. The City of Denison spends $____ per year to repair and replace water distribution lines and uses up to four distribution line maintenance crews. Areas of the water distribution system in which numerous

leaks and line breaks occur are targeted for replacement as funds are available.

To reduce real water losses, the City of Denison will maintain a proactive water loss program. As part of this program, the City will implement the following actions:

- *Conduct regular inspections and soundings of all water main fittings and connections*
- *Use a leakage modeling program*
- *Meter individual pressure zones*
- *Establish district metering areas and measure monthly flows*
- *Conduct intermittent night-flow measurements*
- *Install temporary leak noise detectors and loggers*
- *Reduce repair time on leaks by addition repair staff*
- *Control pressure to just above the minimum standard-of-service level including fire requirements*
- *Operate pressure zones based on topography*
- *Limit surges in pressure*
- *Reduce nighttime pressure where feasible to reduce losses from background leaks*

4.2 Record Management System

As required by TAC Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2(a)(2)(B), the record management system for the City of Denison records water pumped, water delivered, and water sold; estimates for water losses; and allows for the separation of water sales and uses into residential and commercial categories. This information will be included in an annual conservation report, as described in Section 5.4 below.

4.3 Requirement for Water Conservation Plans by Wholesale Customers

Wholesale water customers of the City of Denison are required to develop and implement a water conservation plan meeting the requirements of Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2 of the Texas Administrative Code. This requirement is also extended to each successive wholesale customer in the resale of water.

5. OPTIONAL WATER CONSERVATION PLAN CONTENT

TCEQ rules also list optional (not required) conservation strategies, which may be adopted by suppliers to achieve the stated goals of the plan. The following optional strategies are listed in the rules and included in this plan:

- §288.2(a)(3)(A) – Conservation Oriented Water Rates – Section 3.7
- §288.2(a)(3)(B) – Ordinances, Plumbing Codes or Rules on Water-Conserving Fixtures – Section 5.1
- §288.2(a)(3)(D) – Reuse and Recycling of Wastewater – Section 5.2
- §288.2(a)(3)(E) – Pressure Control and/or Reduction – Section 4.1

- §288.2(a)(3)(F) – Landscape Water Management Ordinance – Section 5.3 and Appendix ____
- §288.2(a)(3)(G) – Monitoring Method – Section 5.4 and Appendix G
- §288.2(a)(3)(H) – Other Conservation Methods – Sections 5.5 through 5.7

5.1 Ordinances, Plumbing Codes, or Rules on Water-Conserving Fixtures

The State of Texas has required water-conserving fixtures in new construction and renovations since 1992. The state standards call for flows of no more than 2.5 gallons per minute (gpm) for faucets, 3.0 gpm for showerheads, and 1.6 gallons per flush for toilets. Similar standards are also required under federal law. These state and federal standards assure that all new construction and renovations in the City of Denison will use water-conserving fixtures.

In addition, federal rules requiring energy-conserving clothes washers by 2007 are expected to assure that new clothes washers in the City of Denison will be water-efficient.

5.2 Reuse and Recycling of Wastewater

The City of Denison operates two wastewater treatment plants: *[Describe plants.]* The ___ wastewater treatment plant discharges approximately ____ of reclaimed water into _____, where it is mixed with ambient water. Based on its water right, the City of _____ withdraws up to _____ acre-feet of this water from _____ for water treatment and potable water use. This reuse project provides approximately ___ percent of the City's total water supply.

The _____ WWTP discharges approximately _____ acre-feet of reclaimed water to ____ Creek downstream of _____. Reclaimed water discharged from the _____ WWTP is used to satisfy downstream water rights and to maintain instream flows.

5.3 Monitoring of Effectiveness and Efficiency – Annual Conservation Report

Appendix G is a form that will be used in the development of an annual conservation report for _____. This form will be developed by March 31 for the preceding calendar year and will be used by _____ to monitor the effectiveness and efficiency of the water conservation program and to plan conservation-related activities for the next year. The form records the water use by category, per capita municipal use, and unaccounted water for the current year and compares them to historical values.