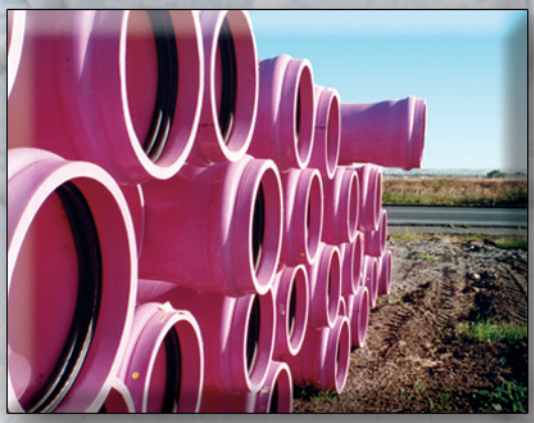

City of Lodi
2005 Urban Water Management Plan

FINAL

March 2006

RMC
Water and Environment

City of Lodi
2005 Urban Water Management Plan

Final Report

Prepared by:

RMC
Water and Environment

March 2006

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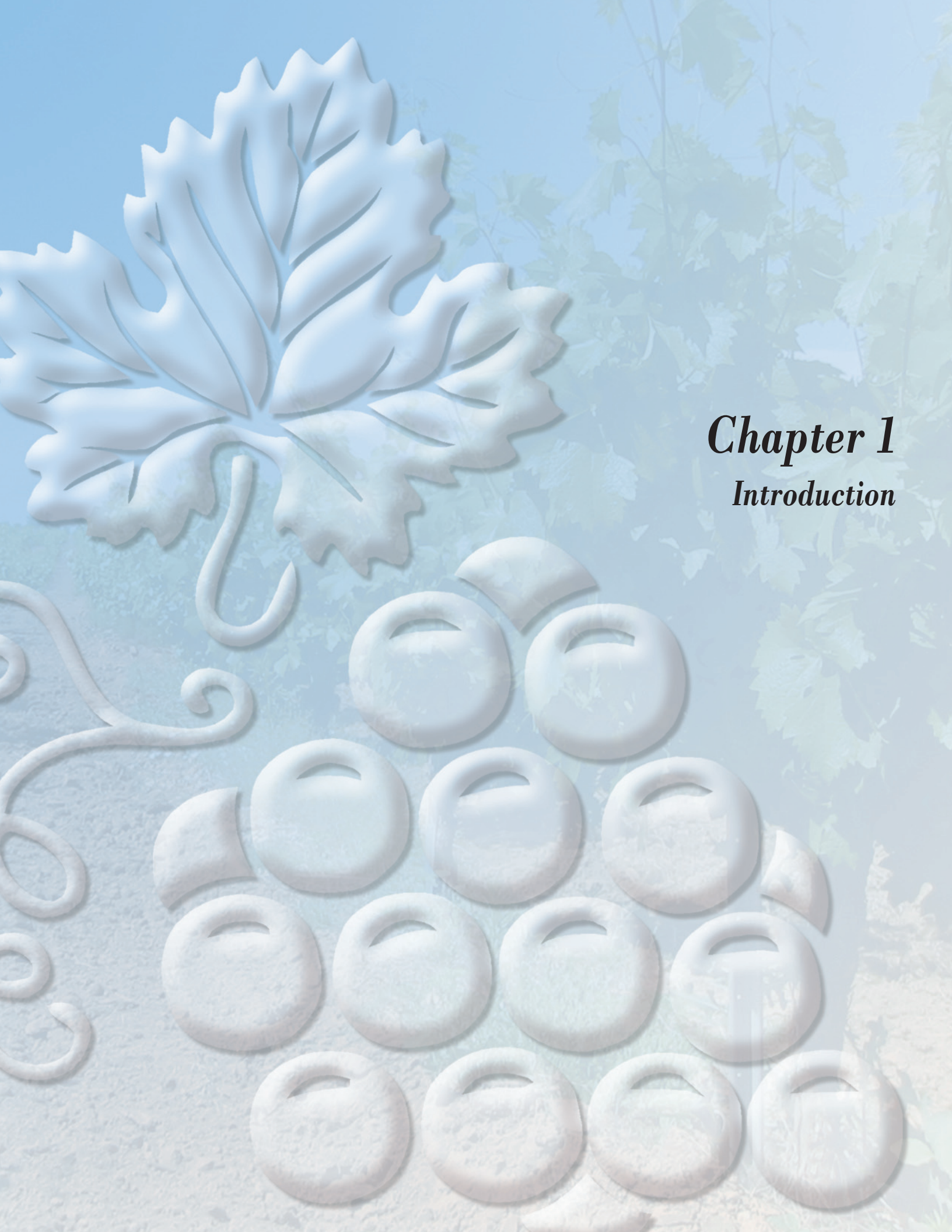
Acknowledgements

This 2005 Urban Water Management Plan Update represents a collaborative effort between RMC, the City of Lodi, and the Department of Water Resources. We would like to take an opportunity to thank the following key individuals:

Richard Prima, Jr.	Public Works Director, City of Lodi
Charles Swimley, Jr.	Senior Civil Engineer, City of Lodi
Wally Sandelin	City Engineer, City of Lodi
Frank Beeler	Assistant Water/Wastewater Superintendent
Del Kerlin	Assistant Wastewater Treatment Superintendent

List of Abbreviations

AB	Assembly Bill
Act	Urban Water Management Planning Act
AF	acre-feet
AFY	acre-feet annually or acre-feet per year
B/C	benefit to cost
BMP	best management practice
City	City of Lodi
CUWCC	California Urban Water Conservation Council
DBCP	dibromochloropropane
DHS	California Department of Health Services
DMM	demand management measure
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
EPA	United States Environmental Protection Agency
ET_o	reference evapotranspiration
GAC	granular activated carbon
GBA	Northeastern San Joaquin County Groundwater Banking Authority
gpm	gallons per minute
gpcd	gallons per capita per day
gpd	gallons per day
Guidebook	"Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan"
mgd	million gallons per day
MG	million gallons
MOU	Memorandum of Understanding
MSL	mean sea level
RWMP	Recycled Water Master Plan
SB	Senate Bill
TDS	total dissolved solids
USGS	United States Geological Survey
UV	ultraviolet
UWMP	Urban Water Management Plan
WID	Woodbridge Irrigation District
WSWPCF	White Slough Water Pollution Control Facility



Chapter 1

Introduction

Chapter 1 Introduction

This 2005 City of Lodi Urban Water Management Plan (UWMP) was prepared in compliance with the Urban Water Management Planning Act, as amended. It includes all information necessary to meet the requirements of California Water Code, Division 6, Part 2.6.

1.1 Background

1.1.1 Urban Water Management Act

The Urban Water Management Act (Act) was created by Assembly Bill 797 (AB 797) which was signed into law by Governor Deukmejian on September 21, 1983. The Act requires that urban water suppliers (i.e. municipal water suppliers providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 AF annually) prepare and adopt Urban Water Management Plans containing certain specified elements.

The Act was amended by Assembly Bill 2661 (AB 2661), which was signed into law by Governor Deukmejian on July 18, 1990. AB 2661 deleted the January 1, 1991 termination date specified in AB 797. AB 2661 also expanded the elements which are to be addressed in Urban Water Management Plans.

The Act was also amended by Assembly Bill 1869 (AB 1869), which was signed by Governor Wilson on October 13, 1991. AB 1869 requires that urban water suppliers update (not just review) Urban Water Management Plans every five years to include projections of both potable and recycled water use, identify current reclamation practices, address additional alternative conservation measures, and describe findings, actions, and planning related to a number of water conservation and reclamation measures.

The Act was further amended by Assembly Bill 11X (AB 11X) signed by Governor Wilson on October 13, 1991. AB 11X requires that urban water suppliers prepare an Urban Water Shortage Contingency Plan as an amendment to its Urban Water Management Plan. Water Shortage Contingency Plans must be updated every five years and specify proposed measures for response to short and long term water shortages.

1.1.2 Purpose of Plan Preparation

The City of Lodi (City) has prepared this UWMP to ensure the efficient use of available water supplies, describe and evaluate the existing water system and historical and projected water use, evaluate current and projected water supply reliability, describe and evaluate demand management measures, and provide water shortage contingency plans as required by the UWMP Act.

By preparing this UWMP, the City continues its commitment to intelligent planning and management of its water supplies. With this document, the City meets the UWMP requirement for funding under the Proposition 50, Chapter 8 Integrated Regional Water Management Plan Grant Program. Data from the UWMP can also be linked to California Water Plan Updates. Additionally, a complete UWMP serves as a foundational document for Water Supply Assessments (SB 610) and Written Verification of Water Supply (SB 221) requirements.

1.1.3 Resource Maximization/Input Minimization

The City of Lodi understands that water is a limited, though renewable resource, and that a long-term reliable supply of water is essential to protect the local and state economy. It also recognizes

that, while conservation and efficient use of water is a statewide concern, planning for this use is best done at the local level.

The main focuses for the City are to 1) maximize the efficient use of water and install water meters, 2) develop and implement a Recycled Water Master Plan (RWMP), and 3) develop the necessary infrastructure to utilize surface water. In addition, the City is increasing its other water conservation measures as described later in the UWMP.

1.2 Agency Coordination

1.2.1 Plan Preparation Coordination

The City is a member of the Northeastern San Joaquin County Groundwater Banking Authority (GBA). Through involvement in GBA, the City works together with a number of water agencies in the surrounding area to develop solutions for groundwater management. The City coordinated the preparation of this UWMP with GBA through notification of the UWMP update process and by providing a copy of the Draft 2005 UWMP for review. GBA was also sent a notice of intention to adopt, a copy of which is included in **Appendix B**.

By coordinating with neighboring water agencies through GBA, the City will ensure that its groundwater supply needs, as outlined in this UWMP, will be incorporated into regional groundwater management efforts.

1.3 Plan Updates

This 2005 UWMP serves as an update to the City's 2000 UWMP. The City's UWMP was first developed in 1990, and addressed water supply and demand for the City. The 1990 Plan and 1995 Plan update were prepared by the City. The 1995 Plan update included a description of the water system, historical and projected water use, water supply alternatives, recycled water use, water conservation programs, and a water shortage contingency plan. The 2000 Plan update (prepared by Brown and Caldwell) added discussions of water supply constraints, detailed economic analyses of the City's best management practices for water conservation, and descriptions of the City's wastewater system.

1.4 City and County Notification and Participation

San Joaquin County was sent a copy of the UWMP and a notice of intention to adopt.

1.5 Public Participation

The City encouraged public participation in the development of the 2005 UWMP and provided opportunities for public review and comment. On February 15, 2006, the City placed a Notice of Intention to Adopt on its website stating that its UWMP was being updated and that a public review period would be provided to address comments and concerns from members of the community. The notice stated that the public review period would be scheduled from February 15 through March 15, 2006. A copy of this Notice of Intention to Adopt is included in **Appendix B**. The notice, as well as the Draft 2005 UWMP, was made available for public inspection on the City's website. On March 15, 2006, the City conducted a public hearing to hear comments from the public regarding the UWMP. This hearing provided an opportunity for the City's customers/residents and employees in the area to learn about the water supply situation and the plans for providing a reliable, safe, high-quality water supply for the future. Information regarding the public hearing and the public review period is included in **Appendix B**. This UWMP was finalized after the public review period and was placed on the City's website.

1.6 Plan Adoption

The City prepared this 2005 UWMP Update during the fall and winter of 2005. The plan was adopted by its City Council on March 15, 2006 and was submitted to the California Department of Water Resources within 30 days of the council approval. See **Appendix A** for a copy of the resolution. The UWMP was also sent to the California State Library.

1.7 Other Agencies

Upon completion, this UWMP was submitted to the following agencies not listed above:

- California Department of Health Services
- California State Library
- Lodi Public Library

Chapter 2

Supplier Service Area

Chapter 2 Supplier Service Area

2.1 Service Area Description

The City is located in the Northern San Joaquin Valley in San Joaquin County and borders the Mokelumne River. The bulk of the City's geographical area extends from the Mokelumne River on the north, WID South Main Canal and Lower Sacramento Road on the west, Harney Lane on the south, and portions of Highway 99 and Central California Traction (CCT) Railroad on the east. The City's White Slough Water Pollution Control Facility (WSWPCF) lies approximately six miles to the southwest of the City. The City has an estimated 2005 population of 62,467 (California Department of Finance, 2005).

The City of Lodi Water Utility (Utility) is the sole water purveyor for the City of Lodi. The Utility's service area is contiguous with the City boundaries and covers approximately 12 square miles. There are a few minor connections outside the City. The service area includes a mix of residential, commercial, and industrial land use, and is characterized by essentially flat terrain. All future development being considered for the City is expected to occur within the present service area.

2.2 Climate

The City has cool, humid winters, and hot, dry summers. Temperatures average 60°F annually, ranging from average winter morning lows in the upper 30's to average summer afternoon highs in the upper 80's (Western Regional Climate Center, 2005). Relative humidity ranges from 91 percent in winter months to 26 percent in summer months. During summer months, temperatures may exceed 100 ˚F, impacting water demands significantly. Annual rainfall averages approximately 18 inches, with most rainfall occurring between November and April. The combination of warmer temperatures and low precipitation during the summer results in peak water demands during that period. Reference evapotranspiration (ET_o) values, which serve as indicators of how much water is required to maintain healthy agriculture and landscaping, range from 0.93 inches during December to 8.06 inches in July. Temperature, rainfall and evapotranspiration averages for the City are presented in **Table 2-1**.

Table 2-1: Service Area Climate (Guidebook Table 3)[a]

Month	January	February	March	April	May	June
Average ET_o[b] (in)	1.24	1.96	3.41	5.10	6.82	7.80
Average Rainfall[c] (in)	3.47	2.95	2.60	1.35	0.49	0.13
Average Temperature[c] (F)	45.65	50.40	54.15	58.90	64.90	70.30

(continued on next page)

Table 2-1 (Continued)

Month	July	August	September	October	November	December	Annual
Average ET_o (in)	8.06	7.13	5.40	3.72	1.80	0.93	***54.30***
Average Rainfall (in)	0.04	0.05	0.30	0.93	2.29	3.03	***17.63***
Average Temperature (^oF)	73.70	72.70	69.95	62.60	52.55	45.65	***60.12***

Footnotes:

a. The term "Guidebook X" refers to the table in the *Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan* by DWR.
b. California Irrigation Management Information System (CIMIS).
c. Western Regional Climate Center.

2.3 Other Demographic Factors

Lodi is built on a strong and broad based agricultural industry with national and industrial markets for its commodities and products. Wines, processed foods, nuts, fruit and milk are major commodities of the Lodi area and provide the basic material for food processing and packaging. These commodities support the operations of General Mills, and Pacific Coast Producers, three companies in the business of processing local agricultural commodities.

In addition, Lodi has a wide range of small, financially sound businesses. These companies range in size from 10 to 150 employees and produce a wide variety of products, services and commodities.

Recently, there has been an increase in industrial and residential development within the City. This new development, combined with the growing strength of the wine/grape industry, is a positive economic indicator for Lodi. Recently, several industries moved to Lodi. These industries collectively have created approximately 850 new jobs.

The demographic factors affecting the City's water supply management planning include data on the largest customers, including those listed in Table 2-2 below.

Table 2-2: Large Water Customers

Customer	2004 Water Use, MG	% of Total System
Lodi Unified School District	150,703,608	2.7
Pacific Coast Producers	130,632,769	2.4
City of Lodi (incl. parks)	113,024,617	2.0
General Mills	69,261,284	1.2
Cottage Bakery	35,077,460	0.6
Lodi Memorial Hospital	28,502,316	0.5
Certainteed	7,763,492	0.1
Valley Industries	8,334,291	0.2
Wine & Roses	8,371,534	0.2
Miller Packing Co.	8,442,676	0.2
Total	***560,114,047***	***10.1%***

2.4 Population Projections

Currently, the City's population is approximately 62,467. Based on the City's assumed annual population growth rate of 1.5 percent, which was presented in the Lodi Wastewater Master Plan (West Yost & Associates, 2001) and reaffirmed during discussions with City staff, population in 2030 is expected to be approximately 90,636. Population projections from 2005 to 2030 are presented in **Table 2-3** below. In addition, Table 2-3 presents population projections based on population growth rates of 1 percent and 2 percent; the population projections for these growth rates are provided for comparative purposes only.

Table 2-3: Current and Projected Population (Guidebook Table 2)

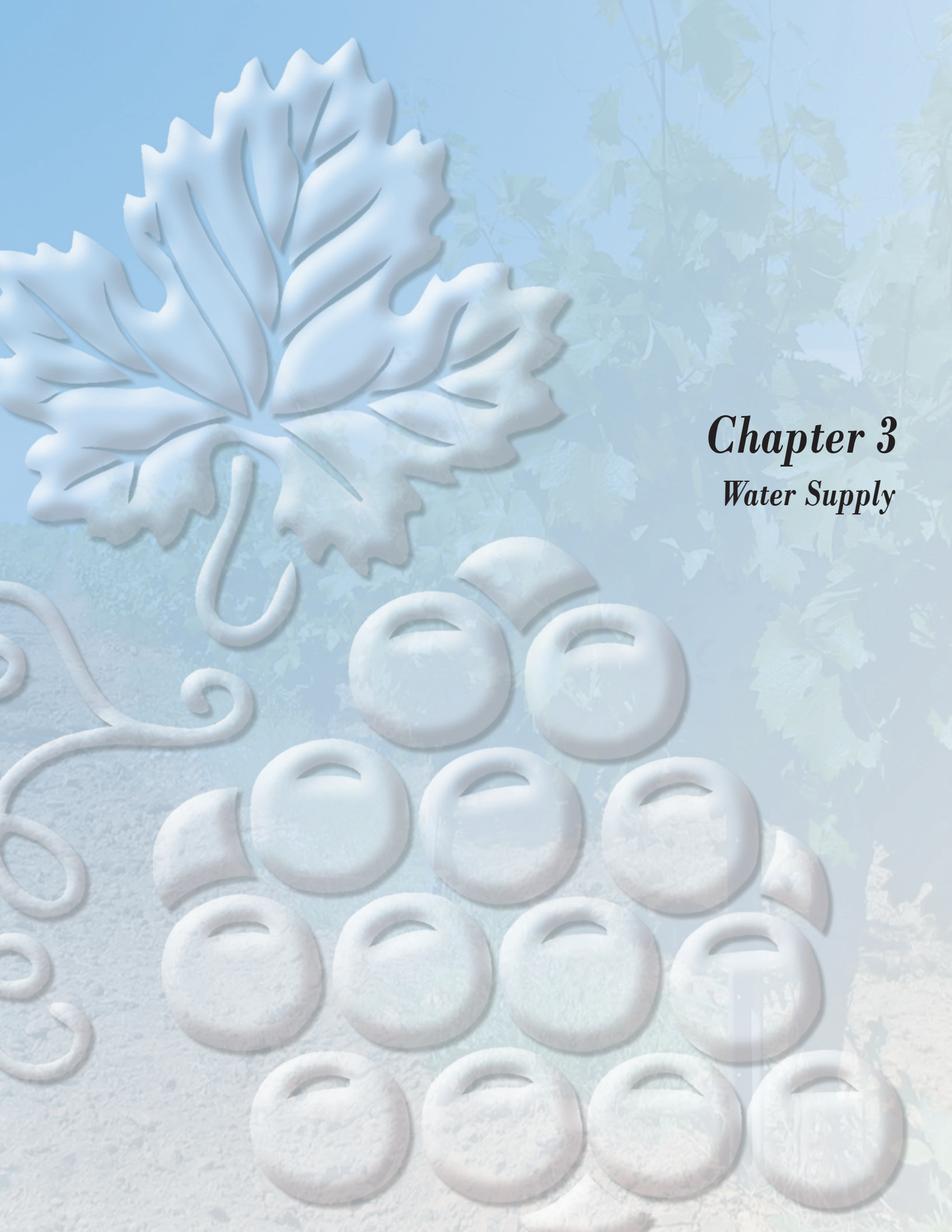
Population Growth Rate [b]	Service Area Population					
	2005 [a]	2010	2015	2020	2025	2030
1.00%	62,467	65,653	69,002	72,522	76,222	80,110
1.50%	***62,467***	***67,295***	***72,496***	***78,098***	***84,134***	***90,636***
2.00%	62,467	68,969	76,147	84,072	92,823	102,484

Footnotes:

a. California Department of Finance (DoF).

b. For the purposes of this UWMP, the City has assumed an annual population growth rate of 1.5 percent, used in previous reports (e.g., Wastewater Master Plan) for facilities planning. Growth rates of 1 and 2 percent are shown here for comparative purposes only.

As an additional comparison, the City's existing (1991) General Plan estimated the City's population for 2007 at 71,944 (not including the Planned Residential Reserve area), and 96,589 (including the Planned Residential Reserve area). The higher population estimates presented in the existing General Plan reflect a 1987-2007 growth rate of 2.0 percent.



Chapter 3

Water Supply

Chapter 3 Water Supply

3.1 Current Water Supply

3.1.1 Background

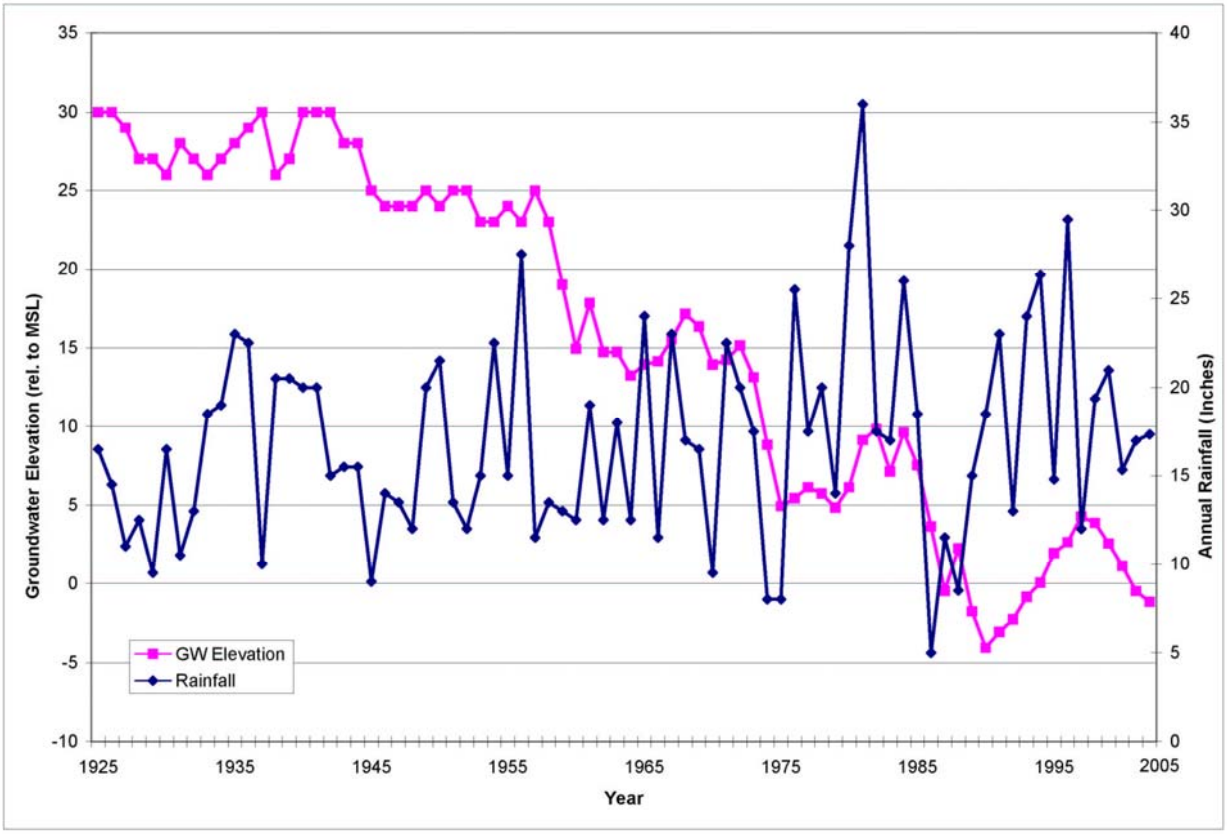
The City currently uses groundwater as its sole source of supply. The City overlies a portion of the San Joaquin Valley groundwater basin, which is not currently adjudicated. The groundwater in the Lodi area exists under unconfined and semi-confined conditions. The Mehrten Formation is the most productive fresh water-bearing unit.

The City is located within the geomorphic province known as the Central Valley, which is divided into the Sacramento Valley and the San Joaquin Valley. The Central Valley is a large, northwestward-trending, asymmetric structural trough that has been filled with several miles of thick sediment (USGS 1986). The City lies within the San Joaquin Hydrologic Basin (DWR, Bulletin 118) which straddles portions of both the Sacramento and San Joaquin Valleys. Sediments of the San Joaquin Valley consist of interlayered gravel, sand, silt, and clay derived from the adjacent mountains and deposited in alluvial-fax, floodplain, flood-basin, lacustrine, and marsh environments. Hydrogeologic units in the San Joaquin Basin include both consolidated rocks and unconsolidated deposits. The consolidated rocks include 1) the Victor Formation, 2) the Laguna Formation, and 3) the Mehrten Formation. The consolidated rocks generally yield small quantities of water to wells except for the Mehrten Formation, which is an important aquifer (DWR). The unconsolidated deposits include) continental deposits, 2) lacustrine and marsh deposits), 3) older alluvium, 4) younger alluvium, and 5) flood-basin deposits. The continental deposits and older alluvium are the main water-yielding units in the unconsolidated deposits.

Groundwater flow direction is generally toward the south in agreement with the regional groundwater flow gradient but may vary from south-southwest to south-southeast with local gradients likely influenced by pumping form municipal supply wells. Pumping tests on municipal wells indicate that they possess a large capture zone, and thus have a large influence upon groundwater flow. Pumping of municipal supply wells in the City is performed between 100 and 500 feet below ground surface (Geomatrix, 2006).

DWR has declared that the groundwater basin underlying Eastern San Joaquin County is overdrafted, and groundwater levels in the County and the City are generally decreasing. The groundwater levels also fluctuate over time depending on precipitation, aquifer recharge, and pumping demands. Groundwater elevations relative to mean sea level (MSL), and the corresponding annual precipitation from 1927 through 2004 are shown in **Figure 3-1**. Overall, the average annual decrease in groundwater levels from 1927 to 2004 has been 0.39 feet per year. Generally, groundwater elevations have decreased with the increase in population and water production. However, annual rainfall also influences groundwater elevation. The groundwater level increase from 1981 to 1984 can be partially attributed to the increase in annual rainfall from 1981 to 1983. Groundwater elevations for the years 1927 to 1961 were obtained from East Bay Municipal Utilities District (EBMUD) for the City's 12 square mile area. Groundwater elevation data from 1962 to the present were obtained from the City's Public Works Department for Well No. 2, one of the oldest production wells in the City.

Figure 3-1: Historical Groundwater Elevation

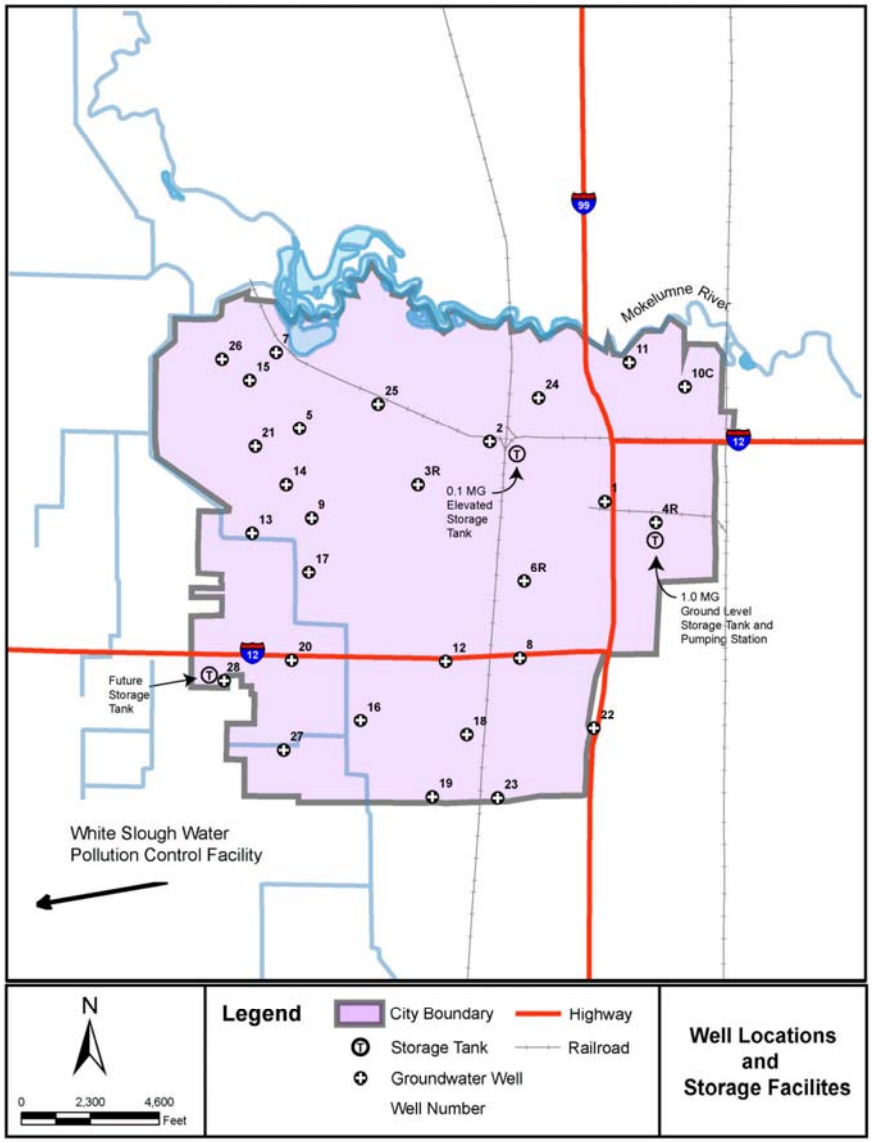


Source: City of Lodi Public Works Department

3.1.2 Water Supply Facilities

The Utility operates 26 groundwater production wells. The locations of the wells are presented in **Figure 3-2** and discussed in further detail below.

Figure 3-2: Well Locations and Storage Facilities



3.1.3 Current Groundwater Supply

The 26 wells that currently provide water to the City have a combined capacity of 35,210 gallons per minute (gpm), or 50.7 million gallons per day (mgd). The wells operate automatically on water pressure demand and pump directly into the distribution system. All wells are equipped to provide emergency chlorination as needed. Historically, water has not required chlorination. Six wells are equipped with granular activated carbon (GAC) for the removal of dibromochloropropane (DBCP). Capacity information for the existing wells is summarized in **Table 3-1**.

Table 3-1: Groundwater Well Capacity

Well Number	Well Capacity, gpm[b]	Well Capacity, mgd[c]
1R	1,130	1.6
2	820	1.2
3R	820	1.2
4R[a]	1,960	2.8
5	1,180	1.7
6R	1,580	2.3
7	1,160	1.7
8	800	1.2
9	900	1.3
10C	1,300	1.9
11R	1,320	1.9
12	800	1.2
13	1,150	1.7
14	1,670	2.4
15	1,500	2.2
16[a]	1,110	1.6
17	1,800	2.6
18[a]	1,800	2.6
19	1,110	1.6
20[a]	2,070	3.0
21	2,050	3.0
22[a]	1,400	2.0
23[a]	1,410	2.0
24	1,420	2.0
25	1,580	2.3
26	1,370	2.0
Total	**35,210**	**50.7**

Footnotes:
a. Wells equipped with GAC
b. gpm = gallons per minute
c. mgd = million gallons per day

Table 3-2 presents the amounts of groundwater extracted by the City between 1970 and 2004.

Table 3-2: Historical Groundwater Production (Guidebook Table 5)[a]

Year	Groundwater Production, AF	Percent of Total Water Supply
1970	11,462	100%
1971	12,303	100%
1972	11,686	100%
1973	12,204	100%
1974	12,002	100%
1975	12,294	100%
1976	13,607	100%
1977	10,578	100%
1978	11,477	100%
1979	12,349	100%
1980	12,312	100%
1981	12,487	100%
1982	11,560	100%
1983	11,539	100%
1984	13,997	100%
1985	14,813	100%
1986	15,080	100%
1987	15,304	100%
1988	15,359	100%
1989	14,653	100%
1990	15,387	100%
1991	13,313	100%
1992	13,985	100%
1993	14,013	100%
1994	14,301	100%
1995	14,390	100%
1996	15,102	100%
1997	16,330	100%
1998	14,461	100%
1999	16,588	100%
2000	16,724	100%
2001	17,108	100%
2002	16,641	100%
2003	16,185	100%
2004	17,011	100%

Footnotes:

a. The term "Guidebook X" refers to the table in the *Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan* by DWR.

3.1.4 Current Surface Water Supply

In May 2003, the City entered into an agreement with Woodbridge Irrigation District (WID) to purchase 6,000 acre-feet per year (AFY) of surface water for a period of 40 years. However, at the time this UWMP was prepared, the City had not yet begun using water from this supply. A copy of the City's agreement with WID is included in **Appendix D**.

3.1.5 Current Recycled Water Supply

The City's wastewater discharge permit requires an agronomic application rate. According to discussions with City staff, approximately 2,500 AFY of secondary treated recycled water is currently used, primarily for irrigation in the area surrounding WSWPCF. This represents approximately 35 percent of the total treated wastewater produced at WSWPCF. The City discharges the non-irrigation water, treated to Title 22 tertiary standards, to the Delta. The Utility currently lacks the necessary infrastructure to distribute additional recycled water to more of its customers.

For a more detailed discussion of the City's recycled water supply, as well as the processes by which it is treated, refer to Chapter 8.

3.1.6 Water Distribution System

The City of Lodi's distribution system consists of a 100,000 gallon elevated storage tank, a 1 million gallon (MG) storage facility and pumping station, and the piping system. The 1 MG storage tank, located east of Highway 99 on Thurman Street, stores groundwater from an onsite well to meet peak hour demands and fire flows. The 100,000 gallon elevated storage tank is located on North Main Street. The storage facilities and their capacities are presented in Table 3-3. Their locations are shown in Figure 3-2.

Table 3-3: Water Storage Facilities

Storage Facility	Storage Volume, MG
Elevated storage tank	0.10
Ground level storage tank	1.00
Total	***1.10***

Distribution mains in the City's piping system range from 14 inches to 2 inches in diameter, and the entire distribution system consists of approximately 225 miles of pipe. The City is in the process of replacing the 2-inch and 3-inch diameter mains as well as other deficient pipes.

A summary of the City's current and planned water supplies is presented in **Table 3-5**.

3.2 Future Water Supply

3.2.1 Constraints on Existing Supplies

The City's current water supply system is constrained by 1) the pumping capacity of its currently active wells, and 2) a longer-term reduction in supply due to the overdrafting currently taking place in the City's groundwater basin. Although the declining groundwater basin is a result of groundwater extraction by all groundwater pumpers in the area, including other cities, agriculture, private well owners, and the City itself, the City plans to reduce its groundwater pumping in the long term as part of what will have to be a regional effort to stabilize the groundwater basin. A copy of the GBA Groundwater Management Plan is included in **Appendix F**.

3.2.2 Future Groundwater Supply

The continuing decline of groundwater levels in the aquifer underlying the City means that the sustainable annual groundwater supply available to the City is something less than what is currently extracted. As a member agency of GBA, the City is participating in the development of policies and programs, including groundwater recharge and conjunctive use programs, intended to help eliminate the eastern San Joaquin County groundwater basin overdraft condition. Additionally, the City plans to reduce its overall groundwater pumping in the future. A safe yield of approximately 15,000 AFY (Treadwell and Rollo, 2005) has been estimated for the aquifer serving Lodi based on water balance calculations (see **Appendix G**) performed using data primarily from the Eastern San Joaquin Groundwater Management Plan (**Appendix F**). This safe yield estimate reflects an acreage-based relationship. Therefore, as the City's land area increases, the estimated safe yield of the underlying aquifer will likely increase. The safe yield estimate will be revisited in the 2010 UWMP update. For the purposes of this UWMP, 15,000 AFY has been assumed as the amount of groundwater available during all future (post-2005) years. Although rigorous scientific analyses have not been performed, the City projects that some recharge of the groundwater basin will occur as the amount of groundwater pumped annually decreases. This result, however, is contingent on the cooperative efforts of all groundwater users within the basin, including other cities, agriculture, and private well owners, to reduce groundwater extraction. The City does not expect development of cones of depression, significant changes in direction or amount of groundwater flow, changes in the movement or levels of contaminants, or changes in salinity and/or total dissolved solids (TDS) concentrations. The amount of groundwater that is projected to be pumped over the next twenty-five years is presented in **Table 3-4**.

Table 3-4: Projected Groundwater Pumping (Guidebook Table 7)

Year	2005	2010	2015	2020	2025	2030
Annual Volume, AF	17,300	15,000	15,000	15,000	15,000	15,000
Percent of Total Available Supply [a]	57%	52%	51%	50%	49%	48%

Footnote:
a. Refers to the total supplies shown in Table 3-5.

3.2.3 Future Surface Water Supply

As discussed in Section 3.1.4, in May 2003 the City entered into a 40-year agreement with WID for 6,000 AFY of surface water from the Mokelumne River. The diversion point has not yet been determined. The City is considering options for implementing this source before 2010. Therefore, 6,000 AFY of treated surface water is included in the supply projections presented in Table 3-5 below. The City is also considering the possibility of obtaining additional surface water supplies from WID; these supplies are not included in Table 3-5, however, as they are not yet considered "firm" supplies.

3.2.4 Future Recycled Water Supply

As discussed in Section 3.1.5, the City currently treats approximately 7,200 AFY of wastewater at WSWPCF, of which 2,500 AFY is recycled in the vicinity of WSWPCF. WSWPCF has adequate capacity to treat all wastewater flows to Title 22 standards. The City is in the process of developing a Recycled Water Master Plan (RWMP) that will outline additional distribution of this supply to the Utility's customers. For the purposes of this UWMP, all treated wastewater produced at WSWPCF has been treated as recycled water supply and is included in Table 3-5 below. The amount of recycled water available increases with time, because as the City's population increases, the amount of wastewater available for reclamation will also increase. For a more detailed discussion of recycled water supply projections, refer to Section 8.6

Table 3-5: Current and Planned Water Supplies (Guidebook Table 4)

Water Supply Source	2005	2010	2015	2020	2025	2030
Groundwater [a], AFY	17,300	15,000	15,000	15,000	15,000	15,000
WID Surface Water, AFY	6,000	6,000	6,000	6,000	6,000	6,000
Recycled Water [b], AFY	7,200	7,700	8,300	8,940	9,630	10,380
Total [c], AFY	***30,500***	***28,700***	***29,300***	***29,900***	***30,600***	***31,400***

Footnotes:

a. Refer to Section 3.2.2 for more information.
b. Based on the amount of wastewater treated during 2004, according to City staff. Future recycled water supplies are extrapolated from the 2004 amount. Assumes that the permitted capacity of WSWPCF will be increased as necessary.
c. Rounded to nearest hundred.

3.2.5 Planned Water Supply Projects

At the present time the City does not have approved plans for any additional water supply projects. The City has participated in the Mokelumne River Regional Water Storage and Conjunctive Use (MORE WATER) Feasibility Analysis. The MORE WATER project, if approved, would capture unappropriated flows from the Mokelumne River for storage and beneficial use.

3.3 Exchange or Transfer Opportunities

The City does not currently have any approved plans to pursue exchange or transfer opportunities.

3.4 Desalinated Water

At the present time the City does not foresee any opportunities for the use of desalinated water, which includes ocean water, brackish ocean water, and brackish groundwater, as long-term supplies.

3.5 Wholesale Supplies

Since surface water will be purchased from WID, WID is considered a wholesale water supplier by DWR. As such, the City has provided demand projections to WID for the next 25 years. Similarly, the City has received availability projections from WID for the same time period. These demand and availability projections are presented in **Table 3-6** and **Table 3-7** below. As discussed previously, the City has not yet begun to use this water supply. As stated in the City's contract with WID, any water not taken by the City during the first three years of the contract (May 2003 to May 2006) may be "banked" and delivered to the City in subsequent years, provided WID has sufficient water available. The banked supply may not exceed 18,000 AF. To date, over 16,000 AF of water has been banked. The City has not made any formal plans at this time to use any of its banked supply, in addition to the normal 6,000 AFY, for any of the years shown in the tables below. However, the projected supplies and demands shown below may increase if and when the City decides to use its banked supply. The magnitude and availability of banked supply to be delivered will be discussed with WID at an appropriate time(s) in the future.

Table 3-6: Demand Projections for Wholesale Supply

Wholesale Supply	Projected Demand [a]					
	2005	2010	2015	2020	2025	2030
WID Surface Water, AFY	0	6,000	6,000	6,000	6,000	6,000

Footnotes:

a. Subject to change with WID and City approval. Although the City may take water deliveries in excess of 6,000 AFY from its "banked" supply, no formal plans to do so have been developed at this time.

Table 3-7: Availability Projections from Wholesale Supplier

Wholesale Supply	Projected Availability [a]					
	2005	2010	2015	2020	2025	2030
WID Surface Water, AFY	6,000	6,000	6,000	6,000	6,000	6,000

Footnotes:

a. Subject to change with WID and City approval. Although the City may take water deliveries in excess of 6,000 AFY from its "banked" supply, no formal plans to do so have been developed at this time.

b. Reliability of WID supply is indicated in the City's contract with WID in **Appendix D**.

Wholesale supply reliability is presented in Chapter 6. Although changes in deliverable volumes of water for future hydrologic scenarios have not been formally predicted at this time, Chapter 6 presents the most restrictive possible cases for the future.

Chapter 4
Water Demand

Chapter 4 Water Demand

4.1 Past, Current, and Projected Water Demand

Water demand projections provide the basis for sizing and staging future water supply facilities. Water use and production records, combined with projections of population and urban development, provide the basis for estimating future water requirements. This chapter presents a summary of available demographic and water use data and the resulting projections of future water needs for the City.

4.1.1 Past and Current Water Demand

Records of historical water production were obtained from the City's Public Works Department. These data include both maximum day and annual water production. Water production is the volume of water measured at the source, which includes all water delivered to residential, commercial, and public authority connections, as well as unaccounted-for water.

Annual Water Production

Groundwater production from 1970 to 2004 is presented in Table 3-2. Total water production in 2004 was 17,011 acre-feet (AF). Water use by customer class can only be estimated, as most of the Utility's customers are not currently metered.

Maximum Day Demand

Daily demand fluctuates throughout the year, due primarily to seasonal climate changes. Water demands are significantly higher in the summer than the winter. System production facilities must be sized to meet the demand on the maximum day of the year, not just the average. Water systems are sized to meet the greater of 1) the maximum day demands plus fire flow, or 2) peak hour demand. Fire flow and peak hour demand are not addressed in this UWMP.

The average day and maximum day demands for years 1977 through 2004 are presented in **Table 4-1**. The maximum day demand in 2004 was 19,014 gpm, in comparison with the total well production capacity of 35,210 gpm. The ratio between average and maximum day demands provides a maximum day peaking factor that can be used to scale annual demand projections to maximum day levels. The average maximum day peaking factor from 1995 to 2004 is 1.91.

Table 4-1: Maximum Day Demand and Peaking Factors

Annual average				Maximum day		
Year	AFY	mgd	gpm	mgd	gpm	Peaking factor[b]
1977	10,578	9.44	6,556	19.28	13,389	**2.04**
1978	11,478	10.25	7,118	--[a]	--	**--[a]**
1979	12,349	11.02	7,653	22.50	15,625	**2.04**
1980	12,312	10.99	7,632	24.00	16,667	**2.18**
1981	12,487	11.15	7,743	22.34	15,514	**2.00**
1982	11,560	10.32	7,167	21.30	14,792	**2.06**
1983	11,539	10.30	7,153	21.67	15,049	**2.10**
1984	13,997	12.50	8,681	26.20	18,194	**2.10**
1985	14,814	13.22	9,181	--[a]	--	**--[a]**
1986	15,081	13.46	9,347	26.91	18,688	**2.00**
1987	15,305	13.66	9,486	27.00	18,750	**1.98**
1988	15,360	13.71	9,521	28.40	19,722	**2.07**
1989	14,654	13.08	9,083	28.50	19,792	**2.18**
1990	15,387	13.74	9,542	24.29	16,868	**1.77**
1991	13,313	11.88	8,250	21.55	14,965	**1.81**
1992	13,985	12.48	8,667	24.00	16,667	**1.92**
1993	14,013	12.51	8,688	24.10	16,736	**1.93**
1994	14,301	12.77	8,868	22.94	15,931	**1.80**
1995	14,390	12.85	8,924	24.64	17,111	**1.92**
1996	15,102	13.48	9,361	27.93	19,396	**2.07**
1997	16,330	14.58	10,125	28.68	19,917	**1.97**
1998	14,461	12.91	8,965	29.66	20,597	**2.30**
1999	16,587	14.81	10,285	28.32	19,667	**1.91**
2000	16,724	14.93	10,368	29.48	20,472	**1.97**
2001	17,108	15.27	10,606	30.10	20,903	**1.97**
2002	16,641	14.86	10,317	28.70	19,931	**1.93**
2003	16,185	14.45	10,034	26.68	18,530	**1.85**
2004	17,011	15.19	10,546	27.38	19,014	**1.80**
Average 1977 – 2004		13.48	9,364	27.45	19,063	**1.93**
Average 1995 – 2004		14.94	10,374	28.62	19,873	**1.91**

Source: City of Lodi Public Works Department

Footnotes:

a. Data unavailable
b. Maximum day peaking factor = maximum day demand/annual average day demand

Unaccounted-for Water

Unaccounted-for water use is unmetered water use, such as water use for fire protection and training, system and hydrant flushing, sewer cleaning, system leaks, and unauthorized connections. Unaccounted-

for water can also result from meter inaccuracies. Since the City's system is not completely metered, data are unavailable for determining the percent of unaccounted-for water. Unaccounted-for water is generally assumed to equal approximately 10 percent of total water production.

Unit Water Use

Recent historical unit water use, expressed as gallons per capita per day (gpcd), is shown in **Table 4-2**. These unit demands include commercial usage, industrial usage, and unaccounted-for water.

Table 4-2: Recent Historical Unit Water Use

Year	Population	Unit Water Use [a], gpcd
1999	56,926	260
2000	57,763	258
2001	58,600	261
2002	59,431	250
2003	60,521	239
2004	61,325	248

Footnote:

a. Based on total municipal water production provided by City of Lodi staff.

4.1.2 Future Water Demand

Future water demands are estimated based on 1) a constant 1.5 percent annual increase in the City's demand, 2) a constant 1.5 percent annual increase in the number of service connections, 3) the assumption that the City will install and begin reading water meters at a rate of approximately 950 per year, starting in 2006 or 2007, and 4) the assumption that as existing service connections become metered they will exhibit slightly lower unit demand factors than existing service connections without meters. It has been assumed that a residential service connection will exhibit a demand reduction of approximately 15 percent[1] once billing has commenced at commodity rates. Demands were projected based on actual water use in 2004. These projections are shown in **Table 4-5** and illustrated in **Figure 4-1**. By 2030, average annual water demands[2] are expected to have increased from current demands by approximately 20 percent, from about 19,800 AFY (17.7 mgd) in 2005 to 23,800 AFY (21.2 mgd) in 2030. Demand projections by water use sector are presented in **Table 4-3.**

The projections in Table 4-5 represent normal (average) conditions, as actual use varies based on a number of factors. For this reason, it can be expected that there will be variations in the City's future water usage. The values predicted in these tables have been used in this UWMP, as they are assumed to represent average conditions of water demand.

[1] Based on 1) information from the California Urban Water Conservation Council (CUWCC), 2005, and 2) judgement of City of Lodi staff.
[2] Including 2,500 AFY currently being recycled in the vicinity of WSWPCF.

Table 4-3: Past, Current, and Projected Water Use by Customer Class (Guidebook Table 12)[a]

Year	Customer Class	Unmetered Connections[e]	Unmetered Deliveries[f,g], AFY	Metered Connections[e,h]	Metered Deliveries[c,f,g], AFY	Total Number of Connections	Total Municipal Deliveries[d], AFY
2001	SFR	15,410	10,071	0	0	15,410	10,071
	MFR	577	2,828	0	0	577	2,828
	Commercial/Institutional	310	569	950	1,744	1,260	2,313
	Industrial	0	0	53	1,632	53	1,632
	Landscape	8	73	21	191	29	264
	TOTAL [b]	**16,300**	**13,500**	**1,000**	**3,600**	**17,300**	**17,100**
2005	SFR	16,537	9,955	0	0	16,537	9,955
	MFR	639	2,882	0	0	639	2,882
	Commercial/Institutional	310	750	1,018	2,462	1,328	3,211
	Industrial	0	0	56	945	56	945
	Landscape	8	76	23	219	31	295
	TOTAL [b]	**17,500**	**13,700**	**1,100**	**3,600**	**18,600**	**17,300**
2010	SFR	13,205	7,949	4,610	2,775	17,815	10,725
	MFR	509	2,294	180	811	688	3,105
	Commercial/Institutional	249	602	1,182	2,858	1,431	3,459
	Industrial	0	0	60	1,018	60	1,018
	Landscape	0	-2	34	320	33	318
	TOTAL [b]	**14,000**	**10,800**	**6,100**	**7,800**	**20,000**	**18,600**
2015	SFR	8,730	5,255	10,462	6,298	19,192	11,554
	MFR	334	1,504	408	1,840	742	3,345
	Commercial/Institutional	159	384	1,382	3,343	1,541	3,727
	Industrial	0	0	65	1,094	65	1,094
	Landscape	0	0	36	345	36	345
	TOTAL [b]	**9,200**	**7,100**	**12,400**	**12,900**	**21,600**	**20,100**
2020	SFR	4,255	2,561	16,420	9,885	20,675	12,446
	MFR	158	715	640	2,888	799	3,603
	Commercial/Institutional	69	167	1,591	3,848	1,660	4,015
	Industrial	0	0	70	1,178	70	1,178
	Landscape	0	0	39	372	39	372
	TOTAL [b]	**4,500**	**3,400**	**18,800**	**18,200**	**23,200**	**21,600**

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Table 4-3 (Continued)

Year	Customer Class	Unmetered Connections[e]	Unmetered Deliveries[f,g], AFY	Metered Connections[e,h]	Metered Deliveries[c,f,g], AFY	Total Number of Connections	Total Municipal Deliveries[d], AFY
2025	SFR	0	0	22,273	13,409	22,273	13,409
	MFR	0	0	861	3,884	861	3,884
	Commercial/Institutional	0	0	1,788	4,324	1,789	4,324
	Industrial	0	0	75	1,269	75	1,269
	Landscape	0	0	42	401	42	401
	TOTAL [b]	**0**	**0**	**25,000**	**23,300**	**25,000**	**23,300**
2030	SFR	0	0	23,994	14,445	23,994	14,445
	MFR	0	0	927	4,181	927	4,181
	Commercial/Institutional	0	0	1,927	4,659	1,927	4,659
	Industrial	0	0	81	1,371	81	1,371
	Landscape	0	0	45	428	45	428
	TOTAL [b]	**0**	**0**	**27,000**	**25,100**	**27,000**	**25,100**

Footnotes:

a. The term "Guidebook X" refers to the table in the *Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan* by DWR.
b. Rounded to the nearest hundred.
c. Does not reflect demand reductions as a result of meter implementation. Refer to **Table 4-5** for water savings as a result of meter implementation.
d. Does not include 2,500 AFY currently being recycled in the vicinity of WSWPCF.
e. Assumes 10 dwelling units per MFR connection.
f. Assumes 75% of total water deliveries go to SFR and MFR connections. This assumption is based on recent water usage statistics for the City, and is consistent with historical per capita water usage.
g. Assumes that the per-dwelling-unit demand factor for MFR connections is 75% of the unit demand factor for SFR connections.
h. Assumes that approximately 950 existing connections are retrofitted with meters every year between 2006 and 2025. The actual rate at which meters are installed/retrofitted may be greater.

4.2 Sales to Other Agencies

At the present time, the City does not foresee any opportunities for sales to other agencies.

4.3 Other Demands

Other water uses and losses in the City's service area are presented in **Table 4-4** below. The 2,500 AFY shown for recycled water includes the amount of water currently used to irrigate land in the vicinity of WSWPCF. Although the land is irrigated with non-potable secondary treated wastewater, the 2,500 AFY must be subtracted from the total amount of wastewater available to the City for reclamation and reuse in municipal applications. For the purposes of this UWMP, therefore, the 2,500 AFY is considered a demand.

Table 4-4: Additional Water Uses and Losses (Guidebook Table 14)

Water Use	2000	2005	2010	2015	2020	2025	2030
Recycled Water [a]	2,500	2,500	2,500	2,500	2,500	2,500	2,500
Unaccounted-for system losses [b]	1,672	1,727	1,774	1,801	1,837	1,883	2,029
Total	***4,172***	***4,227***	***4,274***	***4,301***	***4,337***	***4,383***	***4,529***

Footnotes:

a. Reflects the amount of recycled water currently recycled in the vicinity of WSWPCF. Does not include 1 mgd promised by the City in a "will serve" letter to Northern California Power Agency, as the power plant that would utilize this water is only *potential* at this time.

b. Unaccounted-for system losses are generally assumed to be approximately 10 percent of total water production. Because water usage is measured at the City's wells, unaccounted-for water is "accounted for" in the City's total demand projections in Table 4-5 (i.e., it *should not be added* to the demands in Table 4-5).

4.4 Total Demands

The City's total average annual demands are presented in **Table 4-5** and **Figure 4-1**. For the purposes of this UWMP, only the projected future demands *with* conservation are considered in subsequent analyses. It should be noted that while Table 4-3 includes projections for municipal demands only, Table 4-5 includes a demand of 2,500 AFY for non-municipal recycling (refer to previous section).

Table 4-5: Total Demands (Guidebook Table 15)

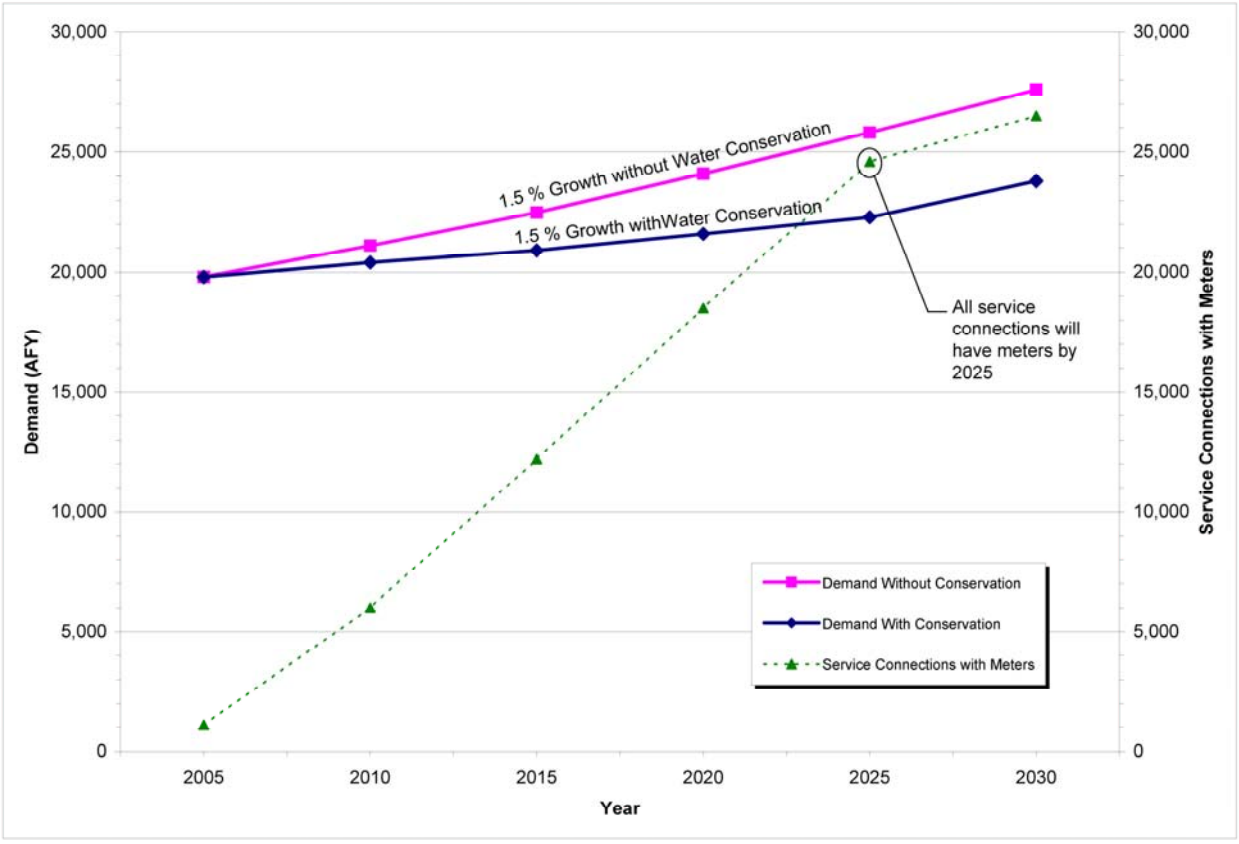
Year		2005	2010	2015	2020	2025	2030
Demand (AFY)	Without Conservation [a]	19,800	21,100	22,500	24,100	25,800	27,600
	With Conservation [a,b]	***19,800***	***20,400***	***20,900***	***21,600***	***22,300***	***23,800***

Footnotes:

a. Includes 2,500 AFY of recycled water currently recycled in the vicinity of WSWPCF. Table 4-3 includes municipal demands only, and therefore does not match this table.

b. Assumes a 15 percent reduction in demand for metered residential service connections.

Figure 4-1: Projected Water Demand



Chapter 5

Demand Management Measures

Chapter 5 Demand Management and Conservation

This chapter presents a detailed analysis of the Demand Management Measures (DMMs) contained in the UWMP Act, as well as the City's existing efforts to further develop its water conservation program. A DMM, also known as a Best Management Practice, is a program designed to maximize the efficient use of water and minimize water waste. The description, effectiveness, implementation schedule, costs, and methods of improvement for each of the DMMs has been included.

LAW

10631 (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures..

(2) A schedule of implementation for all demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of such savings on the supplier's ability to further reduce demand.

Introduction

The California Urban Water Conservation Council (CUWCC) was created to increase efficient water use statewide. CUWCC's goal is to integrate urban water conservation best management practices (BMPs) into the planning and management of California's water resources. A Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) was developed and has been signed by over 150 water suppliers and other concerned parties. The MOU includes definitions, implementation, requirements, and water savings assumptions for each of 14 Best Management Practices. As part of the evaluation, the recommendations by the CUWCC were used to evaluate each DMM.

The City is not currently a signatory of the MOU.

OVERVIEW

Water conservation in Lodi is supported by the City Council and Lodi's citizens. The current program consists mainly of outdoor watering restrictions enforced by water conservation patrol staff, public education, and an in-school education program.

The City has had an enforced ordinance for water conservation continuously since 1977 and it has developed into one of the most comprehensive on-going programs functioning in the San Joaquin Valley. A copy of the conservation ordinance information sheet, as well as the City's Water Conservation Ordinance, is included in **Appendix C** in English and Spanish. The program consists mainly of outdoor watering restrictions enforced by water conservation patrol officers, public education, and an in-school education program. From 1977 through 1988, a single water conservation officer patrolled during the

months of May through October. Since 1989, three to four water conservation officers have patrolled from May through October to intensify and enhance the program.

The City is committed to water conservation and has implemented several additional policies and on-going programs that promote and encourage water conservation. In addition, the City has several drought-specific programs that can be implemented if water supplies become limited and the need for more intensive water conservation becomes necessary.

Table 5-1 provides an overview of the City's current water conservation policies and programs as they relate to the fourteen DMMs included in the UWMP Act. Detailed descriptions of the City's policies and programs follow. Benefit-to-cost (B/C) ratios are provided for each DMM that is not currently being implemented. B/C ratios of less than one are not considered to be financially beneficial, and are not recommended for implementation.

Table 5-1: Water Conservation Policy Overview

DMM	Demand Management Measure Description	City Conservation Program	Compliance with UWMP Act
1	Water Survey Programs for Single Family and Multi-Family Residential Customers	None at this time	B/C Ratio = 0.9
2	Residential Plumbing Retrofit	Rebates offered at the time of purchase for water saving devices	Yes
3	System Water Audits, Leak Detection and Repair	Goal to replace 1% of pipeline system annually	Yes
4	Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections	Meter implementation program currently under development; majority of commercial, industrial, and landscape connections metered	In Process
5	Large Landscape Conservation Programs and Incentives	None at this time; Water Conservation Ordinance applies to large landscapes, however	B/C Ratio = 5.6
6	High Efficiency-Washing Machine Rebate Programs	None at this time	B/C Ratio = 0.7
7	Public Information Programs	Conservation information included in bill inserts, newsletters, brochures, demonstration gardens, special events	Yes

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Table 5-1 (Continued)

DMM	Demand Management Measure Description	City Conservation Program	Compliance with UWMP Act
8	School Education Programs	K-6 classroom presentations *Currently suspended until full-time Water Conservation Coordinator position is filled	Yes
9	Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts	Water surveys not offered at this time; ULFT replacement program is available to CII accounts, however	B/C Ratio = 2.2
10	Wholesale Agency Programs	*Not Applicable*	*Not applicable*
11	Conservation Pricing	Meter implementation program will enable future conservation pricing	In Process
12	Water Conservation Coordinator	Position is currently vacant; part-time employees fulfill similar water conservation enforcement duties	Yes
13	Water Waste Prohibitions	Restrictions and penalties in place and enforced for wasted water; emergency conservation measures in place for emergency conditions	Yes
14	Residential Ultra-Low Flush Toilet Replacement Program	Rebates offered at the time of purchase for ULFTs	Yes

5.1 Demand Management Measures

5.1.1 DMM 1: Water Survey Programs for Single Family and Multi-Family Residential Customers

Implementation Description:

Water survey programs typically involve residential interior and exterior water use reviews whereby staff assist homeowners in identifying potential leaks and areas for water savings. Interior fixtures are checked and leak tested and irrigation systems are evaluated. Residents are generally provided with recommendations for improvements, plumbing retrofit kits and water conservation literature. Such programs can be very labor intensive as they require time to set up appointments with residents, plus the actual survey and follow-up time.

The City does not currently have a water survey program in place.

Cost/Benefit Analysis:

For this and all subsequent cost/benefit analyses, the value of conserved water is estimated at $1,532/million gallons (MG), or $500/acre-foot (AF), and the real discount rate is estimated at 6.15 percent. The value of the conserved water is based upon: 1) estimated costs for new well construction; 2) the costs associated with treatment and distribution of surface water supplies; and, 3) non-water utility benefits, such as reduced wastewater conveyance and treatment costs. Because it is up to the individual customer to implement recommendations from a survey, results can vary widely.

The CUWCC has estimated that the outdoor water use could be decreased by up to 10 percent for each unit surveyed. If 124 surveys are completed the first year, the outdoor water use could be decreased by approximately 4 AF. The number of surveys would increase at intervals throughout a ten year implementation program (based on CUWCC recommendations), with 446 surveys completed during the tenth year, resulting in savings of approximately 47 AFY. A snapshot of these savings is shown in Table 5-2.

Table 5-2: Cost-Benefit Analysis of DMM 1 (Guidebook Table A3)[a]

Water Survey Programs for Single Family and Multi-Family Residential Customers	
Total Costs	$116,892
Total Benefits	$101,368
Discount Rate	6.15%
B/C Ratio	0.87
Time Horizon (years)	13
Cost of Water (per AF)	$500
Average Water Savings (AFY)	25

Footnotes:

a. The term "Guidebook X" refers to the table in the *Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan* by DWR.

The City does not currently budget for this program. With the filling of the currently vacant Water Conservation Coordinator position (DMM 12), the average cost of the survey program would be approximately $50 per survey. To complete the recommended 15 percent of the single-family unit surveys and 15 percent of the multi-family unit surveys over 10 years, it was assumed that the City would follow the implementation schedule provided by the CUWCC. Approximately 124 surveys would need to be completed the first year and 446 surveys in the tenth year. The life span of a water survey is approximately four years. This would result in a discounted cost of approximately $8,100 in the first year, and up to $17,040 in the tenth year. The benefit-to-cost (B/C) ratio is approximately 0.9. A B/C ratio below 1.0 is not considered beneficial; therefore, the City should not implement this program at this time.

Implementation Schedule:

Water Survey Programs: None at this time; will consider in the future

Methods to Improve Effectiveness:

As a member of CUWCC, the City could participate in a program to reduce the annual costs and increase the benefits to the City.

Non-Economic, Environmental, Social, Health, Technological, and Customer Impact Factors:

As the City becomes fully metered, this service may be requested by ratepayers. This factor will be taken into consideration.

Legal Authority:

The City has the legal authority to implement this DMM.

5.1.2 DMM 2: Residential Plumbing Retrofit

Implementation Description:

The City of Lodi's Water Conservation Rebate Program promotes the retrofitting of residential plumbing fixtures with low-flow and other water-saving devices, such as low-flow showerheads, hose bib manual timers for outside water hoses, and water heater blankets. Rebates of 50% of the cost of the device are given at the store at the time of purchase. The City of Lodi later reimburses the stores the cost of the rebate.

Methods to Evaluate Effectiveness:

The effectiveness of this program is based upon the number of rebates accepted for water conservation devices and the percentage of customers that install the equipment after purchasing the devices. The City currently tracks the number of rebates accepted. As the City becomes fully metered, the effectiveness of this DMM may be evaluated by comparing metered water use for customers before and after installation of water saving devices.

Conservation Savings:

Because it is up to the individual customer to purchase and install conservation devices, savings are difficult to quantify. The CUWCC estimates that a low-flow showerhead retrofit will save approximately 2.9 gallons per capita per day (gpcd) on post-1980 constructed homes and 7.2 gpcd on pre-1980 constructed homes. The average savings for a toilet retrofit is 1.3 gpcd on pre-1980 constructed homes only.

Based on the assumptions listed for Table 5-3, the City can expect to save approximately 0.2 AFY over the next five years. Additional water savings could be realized if the number of rebates accepted were to increase.

Budget:

The City's budget for this program has been between $600 and $2,300 for each of the last 5 years. The City's projected expenditures for future years are shown in the table below.

Implementation Schedule:

Rebate Program: On-going

Table 5-3 presents historical and projected data on the distribution and effectiveness of this DMM.

Table 5-3: Implementation of DMM 2 (Guidebook Tables B1-B2)

Category	2001	2002	2003	2004	2005
Low Flow Showerheads [a,b]	27	61	30	14	5
Hose Bib Timers [a,c]	5	10	2	8	0
Hot Water Heater Blankets [a,d]	7	10	13	6	2
Method of Replacement	Rebate	Rebate	Rebate	Rebate	Rebate
Water Savings, AFY	0.4	0.9	0.5	0.3	0.1
City Expenditures, $	2,278	1,398	1,540	1,066	658

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Table 5-3 (Continued)

Category	2006	2007	2008	2009	2010
Low Flow Showerheads [a,b]	10	10	10	10	10
Hose Bib Timers [a,c]	5	5	5	5	5
Hot Water Heater Blankets [a,d]	5	5	5	5	5
Method of Replacement	Rebate	Rebate	Rebate	Rebate	Rebate
Water Savings, AFY	0.2	0.2	0.2	0.2	0.2
City Expenditures, $	700	700	700	700	700

Footnotes:

a. Because rebates are offered at the store at the time of purchase, records for the rebate program did not distinguish between rebates accepted by single family or multi family accounts.
b. Water savings assume a savings of 2.9 gpcd, and 3.5 people/du.
c. Water savings assume a savings of 25 gpd/du, 3 watering days/wk, and 18 watering weeks/yr.
d. Water savings assume a savings of 3 gpcd, 3.5 people/du, and 1 shower/day.

Based on the assumptions listed above, the B/C ratio for this DMM is approximately 0.15. It should be noted, however, that this ratio is based on an assumptions that will be difficult to verify until the City becomes fully metered.

Methods to Improve Effectiveness:

The availability of the rebate program should be marketed towards areas with older homes that would not have low-flow fixtures installed. This marketing would maximize the benefit from these devices.

5.1.3 DMM 3: System Water Audits, Leak Detection and Repair

Implementation Description:

The City has implemented a capital improvement program to replace water lines, with an ultimate goal of replacing 1 percent of the system annually. Locations where current water main size is a problem (typically 2- and 3-inch diameter mains) are evaluated first. Next, mains which are in backyards, and therefore the hardest to access for maintenance and repair, are targeted. Finally, the City examines the frequency of call outs and interviews maintenance crews to determine which mains are most problematic. Projections for future water main surveying and replacement are included in Table 5-4 below. The water/wastewater main replacement program was implemented in 2001.

Methods to Evaluate Effectiveness:

The best way to evaluate the effectiveness of this program is to compare water production data at the City's wells with water consumption from the City's customers. Without residential water meters in place to compare water supply and demand data, it is very difficult to evaluate the effectiveness of the pipeline replacement program. The City is in the process, however, of developing and implementing a residential metering program. For more information on the City's metering implementation plans, see DMM 4.

Conservation Savings:

Because the effectiveness cannot be determined without meters in place, savings have to be estimated. With over 20 thousand linear feet scheduled for replacement between 2006 and 2010, water savings will be realized. Assuming a two percent reduction in annual water production, savings in 2010 could be approximately 200 AFY.

Additional water savings could be realized if the amount of pipeline replaced were increased.

Budget:

The City's average annual budget for water main replacement was approximately $470,000 over the last five years. The City's projected expenditures for future years are shown in the table below.

Implementation Schedule:

Water Pipeline Replacement Program: On-going

Table 5-4 presents historical data on the distribution and effectiveness of this DMM.

Table 5-4: Implementation of DMM 3 (Guidebook Tables C1-C2)

Category	2001	2002	2003	2004	2005
Unaccounted-for Water	10%	10%	10%	10%	10%
Length of Mains Surveyed, ft	4,200	3,300	0	6,800	1,440
Length of Mains Replaced, ft	4,200	3,300	0	6,800	1,440
City Expenditures, $	266,500	661,360	0	1,156,000	274,000
Water Savings, AFY	-- [a]	-- [a]	-- [a]	-- [a]	-- [a]

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Table 5-4 (Continued)

Category	2006	2007	2008	2009	2010
Unaccounted-for Water	10%	10%	10%	10%	10%
Length of Mains Surveyed, ft	1,000	5,000	5,000	5,000	5,000
Length of Mains Replaced, ft	1,000	5,000	5,000	5,000	5,000
City Expenditures, $	100,000	375,000	375,000	375,000	375,000
Water Savings [b], AFY	199	200	201	201	202

Footnotes:

a. Data unavailable.
b. Assumes a 1 percent reduction in annual demand based on water main replacement, based on discussions with City staff.

Based on the assumption listed above, the B/C ratio for this DMM is approximately 0.31. It should be noted, however, that this ratio is based on an assumption (i.e., 1% annual water savings as a result of water main replacement) that is rather difficult to verify.

Methods to Improve Effectiveness:

The City should develop a regular leak detection program to focus work areas for the future. In addition, as a member of CUWCC, the City could receive assistance to develop a leak detection program, especially in unmetered areas of the City.

5.1.4 DMM 4: Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

Assembly Bill 2572

Assembly Bill No. 2572 (AB 2572) became law in 2004 and promulgated that all urban water suppliers are required to install water meters on all residential, commercial, and industrial services constructed prior to 1992.

According to the language in AB 2572, the City must:

- Install water meters by January 1, 2025 on all municipal and industrial water service connections constructed before 1992; and,
- On or before January 1, 2010, to charge each customer that has a service connection for which a meter has been installed, based on volume of deliveries, as measured by the water meter.

Implementation Description:

Installing water meters and billing for actual water use provides a strong incentive for customers to use less water and equalizes service costs for each customer to their actual use (high water users pay a more equitable share of the system costs). Water metering can reduce exterior landscape water use and can also achieve a modest reduction in interior water use.

The City currently meters and bills for actual water used for most of its commercial/institutional, industrial, and landscape customers. These customers are billed monthly based on a monthly service charge (based on meter size) and a quantity charge (based on actual water consumption). For these customers, actual water use is billed at one rate ($0.723 per 100 cubic feet, or $314 per AF).

Although the City does not currently bill multi- or single-family residential units for actual water used, the City is in the process of developing a residential metering program.

Table 5-5: City of Lodi Water Service Commodity Rates

Type of Service Connection		Monthly Service Charge	
Metered Service Connection	**Metered Rate[a]**	$ 0.723	per 100 cu. ft. (approx. 96.7¢ per 1,000 gal.)
	Monthly Base Charge[a]	$ 19.27	¾" meter
		$ 28.90	1" meter
		$ 38.53	1½" meter
		$ 48.18	2" meter
		$ 67.45	3" meter
		$ 86.72	4" meter
		$ 125.27	6" meter
		$ 163.81	8" meter
		$ 202.35	10" meter

Footnotes:

a. Currently applies only to metered commercial/institutional, industrial, and landscape accounts. The City is in the process of gathering water use data to develop commodity billing rate structures for metered residential accounts.

Methods to Evaluate Effectiveness:

The best way to evaluate the effectiveness of metering is a periodic review of customer water use. Additionally, current water use per capita can be compared with historic data (before and after commodity rates are established.)

Conservation Savings:

CUWCC has estimated that metered accounts may result in a 10 to 20 percent reduction in demand compared to non-metered accounts. For the purposes of this UWMP, a reduction of 15 percent has been assumed. This reduction could result in a savings for the City of approximately 3,800 AFY in 2030. Depending on the commodity rate structure developed by the City, certain additional savings could possibly be realized.

Budget:

The total construction and implementation cost of the City's metering implementation program has not been formally projected at this time. Implementation costs include public outreach, engineering, inspections, and the City's administration of the program. Upon finalization of the City's Draft Water Meter Policy, budget projections for this program should become available.

Implementation Schedule

Billing at Commodity Rates for Existing Commercial/Industrial:	On-going
Retrofit Meter Installation:	Beginning in 2006 or 2007

Table 5-6: Implementation of DMM 4 (Guidebook Tables D1-D2)

Category	2001	2002	2003	2004	2005
Number of Unmetered Accounts [a]	15,990	16,350	16,640	16,920	17,500
Number of Retrofit Meters Installed [b]	0	0	0	0	0
Number of Accounts w/o Commodity Rates [c]	15,990	16,350	16,640	16,920	17,500
City Expenditures, $	0	0	0	0	0
Water Savings, AFY	0	0	0	0	0

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Table 5-6 (Continued)

Category	2006	2007	2008	2009	2010
Number of Unmetered Accounts [a]	17,760	16,800	15,850	14,890	13,940
Number of Retrofit Meters Installed [b]	0	950	950	950	950
Number of Accounts w/o Commodity Rates [c]	17,760	16,800	15,850	14,890	13,940
City Expenditures, $	--[d]	--[d]	--[d]	--[d]	--[d]
Water Savings, AFY	0	175	350	525	700

Footnotes:

a. Assumes a 1.5% annual increase in the number of service connections.
b. Based on discussions with City staff, a minimum of approximately 950 meters will need to be installed each year for 18 years if the City begins implementation in 2006-2007. Although it is likely that the City will fully implement its metering program in a shorter period of time (closer to 15 years, per discussions with City staff), the information in this UWMP reflects a more gradual timeline.
c. Based on preliminary discussions with City staff, metered accounts will be billed at commodity rates immediately upon meter installation.
d. Data unavailable at the time of UWMP preparation. The City is currently in the process of finalizing its Water Meter Policy, which will likely yield firm projections for expenditures.

Methods to Improve Effectiveness

As the first group of existing residential service connections become metered, the City should begin collecting meter data. This would establish a baseline of water use for later comparison. In addition, as a member of CUWCC, the City could receive assistance on obtaining grant funding to implement a meter retrofit program or feasibility study.

5.1.5 DMM 5: Large Landscape Conservation Programs and Incentives

Implementation Description:

The City's Parks Division has implemented a water management program for major parks. The Division has installed "Maxicom" irrigation controllers, telecommunications equipment and related hardware and software to better manage park irrigation. In addition, the City's water conservation ordinance applies to large landscaped areas.

The City does not currently perform water conservation surveys for large landscapes.

Cost/Benefit Analysis:

For this cost/benefit analysis, the value of conserved water is estimated at $500/AF, and the real discount rate is estimated at 6.15 percent. The value of the conserved water is based upon the City's water production costs. Because it is up to the individual customer to implement recommendations from a survey, results can vary widely.

CUWCC has estimated that surveys can reduce landscape water usage by 15 percent. If 10 surveys are completed during the first year, the outdoor water use could be decreased by approximately 12 AF. Savings of approximately 47 AFY would be realized during the tenth year. A snapshot of these savings is shown in Table 5-7. To complete the recommended number of surveys over 10 years (15 percent of the total number of large landscape accounts), it was assumed that the City would follow the implementation schedule provided by the CUWCC.

Table 5-7: Cost-Benefit Analysis of DMM 5 (Guidebook Table E3)

Large Landscape Conservation Programs and Incentives	
Total Costs	$26,678
Total Benefits	$150,207
Discount Rate	6.15%
B/C Ratio	5.6
Time Horizon (years)	13
Cost of Water (per AF)	$500
Average Water Savings (AFY)	34

The City does not currently budget for this program. The cost of a survey has been estimated at $250 per acre. Approximately 10 surveys would need to be completed the first year and 38 surveys in the tenth year. The life span of a large landscape water survey is approximately four years. This would result in a discounted cost of approximately $3,670 in the first year, and up to $2,590 in the tenth year. The benefit-to-cost (B/C) ratio is approximately 5.6. A B/C ratio above 1.0 is considered beneficial; therefore, the City should consider implementing this program.

Implementation Schedule:

Water Management Program for Major Parks:	On-going
Applicability of Water Conservation Ordinance to Large Landscapes:	On-going

Methods to Improve Effectiveness:

It is recommended that the City examine the evapotranspiration information available from the California Irrigation Management Information System (CIMIS). This information will allow the City to determine

the water required to efficiently irrigate turf and landscaping areas as weather conditions change over the year. As a member of CUWCC, the City could receive assistance in obtaining grant funding to develop a program to provide incentives to commercial and industrial customers and home developers to reduce landscape irrigation demands.

Non-Economic, Environmental, Social, Health, Technological, and Customer Impact Factors:

A program such as this may be requested by large landscape customers in the future. This factor will be taken into consideration.

Legal Authority:

The City has the legal authority to implement this DMM.

5.1.6 DMM 6: High-Efficiency Washing Machine Rebate Programs

Implementation Description:

Typically, a high-efficiency washing machine rebate would offer a $75 to $100 rebate to qualifying customers that install them in their homes. The City does not currently offer this program.

Cost/Benefit Analysis:

The cost/benefit analysis presented below reflects the following assumptions: each rebate will cost $75; a high-efficiency washing machine rebate will reduce water usage by 5,100 gallons per year; rebates will be accepted by one percent of single-family residences per year for 20 years; and, the lifespan of a high efficiency washing machine is 12 years.

Table 5-8: Cost-Benefit Analysis for DMM 6 (Guidebook Table F3)

High-Efficiency Washing Machine Rebate Programs	
Total Costs	$118,077
Total Benefits	$86,445
Discount Rate	6.15%
B/C Ratio	0.7
Time Horizon (years)	18
Cost of Water (per AF)	$500
Average Water Savings (AFY)	24

The B/C ratio for this DMM is approximately 0.7. Since this B/C ratio is less than 1.0, it is not currently cost-effective for the City to implement this DMM.

Implementation Schedule:

High-Efficiency Washing Machine Rebate Program: Not planned at this time

Methods to Improve Effectiveness:

The City should investigate if the local energy company would be interested in sharing the costs for a rebate program. Additionally, the City should pursue grant funding if it is available. As a member of CUWCC, the City could receive assistance obtaining grant funding to implement this program. The City should consider developing a rebate program for multi-family units and mandating the provision of high-efficiency washers in new multi-family construction.

Non-Economic, Environmental, Social, Health, Technological, and Customer Impact Factors:

As the City becomes fully metered, this service may be requested by ratepayers. This factor will be taken into consideration.

Legal Authority:

The City has the legal authority to implement this DMM.

5.1.7 DMM 7: Public Information Programs

Implementation Description:

The City's Water Conservation Program participates in local fairs, including the Crime Prevention Fair (sponsored by the City of Lodi Police Dept.), the Conservation Fair (sponsored by local agencies concerned with conservation), the Lodi Grape Festival and Harvest Fair, and other special events. Staff converse with fair visitors about Lodi's water conservation program and answer questions concerning water issues. The City also hands out information sheets, conservation kits and holds contests for prizes such as low-flow showerheads. Additionally, watering day reminders have been periodically included on the utility bills and on Lodi's cable TV station throughout the summer months. Newspaper articles and ads are also published throughout the year in Lodi's and Stockton's newspapers reminding Lodi residents of the water conservation regulations, offering conservation tips, and relaying the successes of the program. Refrigerator magnets with the watering day and hour schedules are given out by City staff and at the local fairs. The City provides all of the water conservation information on the City's website. This program was implemented in 1977.

Methods to Evaluate Effectiveness:

The effectiveness of this program is determined by the amount of information available to the community. To evaluate the information, the City tracks the number of brochures distributed, special events attended, and other activities pursued to promote water conservation. The City also tracks customer response and any commentary regarding the information provided.

Conservation Savings:

CUWCC has not determined any methods to quantify the savings from this DMM; however, the City believes that this program is beneficial and necessary to implement other DMMs effectively.

Budget:

This program does not have its own budget, and is instead funded from the City's Water Conservation Program account.

Implementation Schedule:

Table 5-9: Implementation of DMM 7 (Guidebook Tables G1-G2)

Category	2000-01	2001-02	2002-03	2003-04	2004-05
Paid Advertising	1	1	1	1	1
Bill Inserts/ Newsletters/ Brochures	20,000+ (CCR[a])	20,000+ (CCR[a])	20,000+ (CCR[a])	20,000+ (CCR[a])	20,000+ (CCR[a])
Bill showing Water Usage in Comparison to Previous Year's Usage [c]	1,024 x 12 mo.	1,060 x 12 mo.	1,065 x 12 mo.	1,075 x 12 mo.	1,085 x 12 mo.
Demonstration Gardens	1	1	1	1	1
Special Events/ Media Events	3	3	3	2	3
City Expenditures, $	--[b]	--[b]	--[b]	--[b]	--[b]

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Table 5-9 (Continued)

Category	2005-06	2006-07	2007-08	2008-09	2009-10
Paid Advertising [d]	1	1	1	1	1
Bill Inserts/ Newsletters/ Brochures	20,000+ (CCR[a])	20,000+ (CCR[a])	20,000+ (CCR[a])	20,000+ (CCR[a])	20,000+ (CCR[a])
Bill showing Water Usage in Comparison to Previous Year's Usage [c]	1095 x 12 mo.	1105 x 12 mo.	1115 x 12 mo.	1125 x 12 mo.	1135 x 12 mo.
Demonstration Gardens [d]	1	1	1	1	1
Special Events/ Media Events [d]	3	3	3	3	3
City Expenditures, $	--[b]	--[b]	--[b]	--[b]	--[b]

Footnotes:

a. "CCR" refers to the annual water quality report distributed to customers in bill inserts. Bill inserts always contain a water conservation section, but are not included as part of the Water Conservation Program budget.
b. Expenditures for the public education items in this table (with the exception of CCR – see footnote (a)), are funded by the Water Conservation Program account.
c. Water usage bill comparisons for future years assume an increase of 10 comparisons x 12 months for each year, similar to data from 2003-2005.
d. Assumes a continuation of current practices.

Methods to Improve Effectiveness:

Public information can be one of the best tools to conserve water. The City can continue to improve its public information program by including water conservation information on the City's website. A citizens' advisory committee could assist in developing new ways to communicate with the public and the media about water conservation and other resource issues. Filling the currently vacant Water Conservation Coordinator position could optimize the program by coordinating additional opportunities for community speakers and special events. In addition, as a member of CUWCC, the City could participate in regional public outreach programs, including paid advertising on television and radio.

5.1.8 DMM 8: School Education Programs

Implementation Description:

A Water Educational Program was introduced to Lodi elementary schools in 1986. This program supplements and enhances the City's total effort to conserve water, as well as other natural resources. In 1986, four pilot schools were introduced to the program. Presentations have been given in 10 schools within the Lodi City limits. (As of 1998, there had been 252 classroom presentations). The program includes water science demonstrations with the objective of instilling water awareness and providing information about Lodi's water system and water conservation techniques.

The education program is aimed at grades K through 6. It is felt to be most cost effective to develop water awareness and a sense for water conservation while children are most impressionable during their formative years. A more detailed discussion of the educational program is contained in **Appendix C.**

Methods to Evaluate Effectiveness:

The effectiveness of this program is determined by the number of students and schools that participate. The City, therefore, will track the number of presentations and tours given, curriculum materials provided, and students that participate. The City should also survey the institutions and educators that participate in the programs and obtain recommendations for improvement.

Conservation Savings:

CUWCC has not determined any methods to quantify the savings of this DMM, but the City believes that this program is beneficial to the community and important to the long-term success of the overall water conservation program.

Budget:

This program does not have its own budget, and is instead funded from the City's Water Conservation Program account.

Implementation Schedule:

Table 5-10: Implementation of DMM 8 (Guidebook Tables H1-H2)

Category	2000-01	2001-02	2002-03	2003-04	2004-05
Grades K–6th	55	64	0	0	0
City Expenditures, $	--[b]	--[b]	--[b]	--[b]	--[b]

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Table 5-10 (Continued)

Category	2005-06	2006-07	2007-08	2008-09	2009-10
Grades K–6th	24[a]	24[a]	24[a]	24[a]	24[a]
City Expenditures, $	--[b]	--[b]	--[b]	--[b]	--[b]

Footnotes:

a. Projections for this program represent the average number of classroom visits between 2000 and 2005. More firm projections may become available as the City refines its Water Conservation Program and the Water Conservation Coordinator position.
b. Expenditures for this program are funded by the Water Conservation Program account.

Methods to Improve Effectiveness:

Similar to a public information program, a school education program can also be one of the best tools to conserve water. The American Water Works Association (AWWA) and the Water Education Foundation (WEF) provided educational material for youth to explain both the water cycle and pollution, and to promote water conservation, including videos, bookmarks, games, and water experiments. The City can continue to improve its school education program by including additional material available from AWWA and WEF. Filling the currently vacant Water Conservation Coordinator position (or a similar position) will enhance the program by facilitating meetings with school principals and educators to promote classroom presentations. In addition, as a member of CUWCC, the City could receive additional education materials and information on ways to target the curriculum to specific age groups to effectively teach students.

According to discussions with City staff, setting up classroom presentations has become more difficult since 2002, due primarily to changes in curriculum and less freedom for educators to participate in programs such as this. For these reasons, an average of 24 classroom presentations per year is likely to remain normal for the foreseeable future.

5.1.9 DMM 9: Conservation Programs for Commercial, Industrial and Institutional Accounts

Implementation Description:

The City's water conservation program and ordinance applies to all customers. When considering the largest customers, most of them are covered under other conservation mechanisms; however, the City will evaluate implementing additional programs as staff constraints and budgetary considerations permit. The cost/benefit analysis presented below was based on a ULFT retrofit program for commercial, industrial, and institutional (CII) accounts. The City has a ULFT retrofit program that has been available to CII accounts since April 2001. While there has been some activity by CII accounts in utilizing the ULFT program, there has not been an effort to target these accounts with specific promotional materials. The City does not currently perform water use surveys for CII accounts.

Cost/Benefit Analysis:

The B/C analysis presented below reflects the following assumptions: an analyst survey (for commercial and institutional accounts) costs $680 and will reduce annual water usage by 0.83 AF/account, while a consultant survey (for industrial accounts) costs $1,680 and will reduce annual water usage by 2.1 AF/account; the lifespan of a water use survey for CII accounts is approximately 4 years; and, approximately 10 percent of CII accounts will be surveyed over an eight-year period. To complete the recommended number of surveys over eight years, it was assumed that the City would follow the implementation schedule provided by the CUWCC. This would result in a total of approximately 138 surveys.

Table 5-11: Cost-Benefit Analysis for DMM 9 (Guidebook Table I3)

Conservation Programs for Commercial, Industrial, and Institutional Accounts	
Total Costs	$79,847
Total Benefits	$179,032
Discount Rate	6.15%
B/C Ratio	2.2
Time Horizon (years)	11
Cost of Water (per AF)	$500
Average Water Savings (AFY)	44

The B/C ratio for this DMM is approximately 2.2. A B/C ratio above 1.0 is considered beneficial; therefore, the City should consider implementing this program.

Methods to Improve Effectiveness:

The City should gather information about coordination and cost-sharing with local energy utilities to provide surveys for CII customers. In addition, as a member of CUWCC, the City could participate in several programs aimed at water conservation for CII accounts. These programs could include developing a database of commercial and industrial water use and providing surveys for facilities to promote water conservation.

Non-Economic, Environmental, Social, Health, Technological, and Customer Impact Factors:

As the City becomes fully metered, this service may be requested by ratepayers. This factor will be taken into consideration

Legal Authority:

The City has the legal authority to implement this DMM.

5.1.10 DMM 10: Wholesale Agency Programs

This DMM applies to wholesale agencies only and is therefore not applicable to the City. The City's wholesale supplier is WID.

5.1.11 DMM 11: Conservation Pricing

Implementation Description:

Since the majority of the City's non-residential customers are metered, the single-block commodity rate for water encourages water conservation. The City's wastewater billing policies for some of these customers also reflect water use, which provides an additional incentive for conservation.

Methods to Evaluate Effectiveness:

Conservation pricing is often cited as a means to have market mechanisms provide incentives for conservation. Water consumption, however, has a relatively inelastic demand relative to price, meaning as unit prices go up, unit demand does not correspond in a 1:1 linear fashion. This is due to a variety of factors. Only a portion of water use for a residence can be considered discretionary, generally a portion of landscaping use and excess showering periods and the like. Most use is simply a basic function of existence. At the point discretionary use has been rung out of the system due to marginal costs of water, another rate tier is unlikely to reap much conservation savings. Further, such tiers can be considered discriminatory against larger families, which could have a low per-capita use but a large household consumption relative to another household. Additionally, California's Proposition 218 requires water rates to be developed on a cost of services bases. In other words, the top tier of the water rate must have a reasonable relationship to the avoided cost of service for marginal supply.

Conservation Savings:

Water savings due to conservation pricing are difficult to determine, since the City is currently in the process of developing a meter implementation plan. It is reasonable to assume, however, that certain additional savings could be realized based on the City's as yet undetermined commodity rate structure.

Budget:

The City does not currently budget for this DMM; however, the City is currently developing a metering implementation program that will address this DMM. See DMM 4 for budget information.

Implementation Schedule:

As the City finalizes its metering implementation program, further development of conservation pricing will be enabled. See DMM 4 for more information regarding the City's proposed metering implementation schedule.

Methods to Improve Effectiveness:

The City should consider developing tiered rates keyed to actual water consumption to encourage water conservation. They should start with the commercial and industrial users, as these customers are already being charged based on actual water use. In addition, the City should consider charging a sewer service rate for *all* commercial and industrial customers also based on volume.

5.1.12 DMM 12: Water Conservation Coordinator

Implementation Description:

Although the City's Water Conservation Coordinator position is currently unfilled, several of the City's employees work part-time to perform many of the same duties. The City intends to fill the Water Conservation Coordinator position, or a position similar to it, as early as possible. The program was started in 1989.

Methods to Evaluate Effectiveness:

The effectiveness of this DMM is determined by the work performed by the Water Conservation Coordinator. The City should set up performance standards and goals, and compare them with the results.

Conservation Savings:

CUWCC has not determined any methods to quantify the savings of this DMM, but the City believes that this program is beneficial to the community and important to the long-term success of the overall water conservation program.

Budget:

Annual expenditures for this program, which is funded by the City's Water Conservation Program account, are included in **Table 5-12** below.

Implementation Schedule:

Water Conservation Coordinator: On-going

Table 5-12: Implementation of DMM 12 (Guidebook Tables L1-L2)

Category	2000	2001	2002	2003	2004	2005
Number of full-time positions	1	1	1	0	0	1[a]
Number of part-time staff	7	7	7	4	3	5[a]
Number of part-time staff in full time equivalents	1.8	2.1	1.9	1.2	1.0	1.6[a]
City Expenditures [b], $	55,499	68,152	69,552	34,743	25,620	50,713[a]

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Table 5-12 (Continued)

Category	2006	2007	2008	2009	2010
Number of full-time positions	1[a]	1[a]	1[a]	1[a]	1[a]
Number of part-time staff	5[a]	5[a]	5[a]	5[a]	5[a]
Number of part-time staff in full time equivalents	1.6[a]	1.6[a]	1.6[a]	1.6[a]	1.6[a]
City Expenditures [b], $	50,713[a]	50,713[a]	50,713[a]	50,713[a]	50,713[a]

Footnotes:

a. Projections for this program represent the averaged data from fiscal years 2000-01 to 2004-05. More firm projections may become available as the City refines its Water Conservation Program and the Water Conservation Coordinator position.

b. Expenditures for this program represent the total full-time and part-time expenditures under "Personnel" in the Water Conservation Program budget. Expenditures are shown in 2005 dollars.

Methods to Improve Effectiveness:

As a member of CUWCC, the City's Water Conservation Coordinator could receive assistance as necessary to improve the City's conservation programs.

5.1.13 DMM 13: Water Waste Prohibitions

Implementation Description:

The City's existing Water Conservation Ordinance (Lodi Municipal Code, Chapter 13.08, Article III), defines water waste prohibitions for the City's customers. The Ordinance provides several definitions of "waste of water," outlines watering days and hours, describes the City's enforcement procedures, and discusses the processes of violations, infractions, and appeals. A copy of the City's Water Conservation Ordinance is included in **Appendix C.** This program was implemented in 1977.

Methods to Evaluate Effectiveness:

The effectiveness of this DMM can be determined by a decrease in violators. The number of citations and violations should continue to be reported annually. If an area is determined to have excessive violations, the City should implement a specific public outreach program informing the public about the specific ordinance.

Conservation Savings:

The CUWCC has not determined any methods to quantify the savings of this DMM but the City believes that this program is necessary to curtail flagrant water waste situations. Per capita water usage, as outlined in Table 4-2, has decreased in recent years. Although it is difficult to extract the savings associated with individual DMMs from this reduction, it is reasonable to assume that a significant portion of the reduction is attributable to the City's Water Conservation Ordinance.

Budget:

Annual expenditures for this program, which is funded by the City's Water Conservation Program account, are included in **Table 5-13** below.

Implementation Schedule:

Table 5-13: Implementation of DMM 13 (Guidebook Tables M1-M2)

Category	2000-01	2001-02	2002-03	2003-04	2004-05
Waste Ordinance in Effect	Yes	Yes	Yes	Yes	Yes
Number of On-site Visits	3,677	1,557	2,973	1,217	3,163
Water Softener Ordinance	No	No	No	No	No
City Expenditures [b], $	65,846	78,017	73,239	36,921	28,443

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Table 5-13 (Continued)

Category	2005-06	2006-07	2007-08	2008-09	2009-10
Waste Ordinance in Effect	Yes	Yes	Yes	Yes	Yes
Number of On-site Visits	2,517 [a]	2,517 [a]	2,517 [a]	2,517 [a]	2,517 [a]
Water Softener Ordinance	No	No	No	No	No
City Expenditures [b], $	56,493 [a]	56,493 [a]	56,493 [a]	56,493 [a]	56,493 [a]

Footnotes:

a. Projections for this program represent the averaged data from fiscal years 2000-01 to 2004-05. More firm projections may become available as the City refines its Water Conservation Program and the Water Conservation Coordinator position.
b. Total expenditures of "Water Conservation" in program account.

Methods to Improve Effectiveness:

The City should continue to monitor the effectiveness of this DMM. The filling of the currently vacant Water Conservation Coordinator position (DMM 12) would greatly aid in this effort.

5.1.14 DMM 14: Residential Ultra-Low Flush Toilet (ULFT) Replacement Programs

Implementation Description:

The City's Building Code requires that all new residential construction and major remodels or renovations of existing homes install low flow fixtures, including low flow toilets and showerheads.

Additionally, the City offers a rebate program for water saving devices, including ULFTs, low-flow showerheads, hose bib timers, and water heater blankets. Rebates for 50 percent of the cost of the device are given at the store at the time of purchase. The City later reimburses the stores the cost of the rebate. This program was implemented in 2001.

Methods to Evaluate Effectiveness:

The effectiveness of this program is based upon the number of rebates accepted for water conservation devices and the percentage of customers that install the equipment after purchasing the devices. The City currently tracks the number of rebates accepted. As the City becomes fully metered, the effectiveness of this DMM may be evaluated by comparing metered water use for customers before and after installation of water saving devices.

Conservation Savings:

Programs such as these have been shown to produce savings of approximately 1.9 gallons per flush over high-water-using toilets. Estimates for the City's water savings as a result of the rebate program are provided in the table below. Additional water savings could be realized if there was an increase in the number of customers accepting ULFT replacement rebates. Reduced wastewater treatment and disposal is an additional benefit of this program.

Budget:

The City's annual expenditures have been between $1,500 and $5,300 for the each of the last five years. The City's proposed expenditures for future years are shown in the table below.

Implementation Schedule:

Rebates for ULFT replacements: On-going

Table 5-14: Implementation of DMM 14 (Guidebook Tables N1-N4)

Category	2001	2002	2003	2004	2005
# of ULFT replacements [a]	155	46	92	74	71
Method of Replacement	Rebate	Rebate	Rebate	Rebate	Rebate
Water Savings, AFY	4.5	1.3	2.7	2.1	2.1
City Expenditures, $	5,270	1,564	3,128	2,516	2,414

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Table 5-14 (Continued)

Category	2006	2007	2008	2009	2010
# of ULFT replacements [a]	75	75	75	75	75
Method of Replacement	Rebate	Rebate	Rebate	Rebate	Rebate
Water Savings, AFY	2.2	2.2	2.2	2.2	2.2
City Expenditures, $	2,550	2,550	2,550	2,550	2,550

Footnotes:

a. Because rebates are offered at the store at the time of purchase, records for the rebate program cannot distinguish between rebates accepted by single family or multi family accounts.

Based on the assumptions listed above, the B/C ratio for this DMM is approximately 0.43. It should be noted, however, that this ratio is based on an assumption is difficult to verify until the City becomes fully metered.

Methods to Improve Effectiveness:

The City could realize more water savings if existing homes with high-water-using toilets were targeted with promotional material for the rebate program. To increase the number of retrofits for existing homes, the City should pursue any opportunities for grants. Membership in CUWCC could facilitate this.

5.1.15 Evaluation of DMMs Not Implemented

Table 5-15 provides a summary of the DMMs not currently being implemented by the City. The net present value (NPV) per AF associated with each DMM represents the total value, in 2005 dollars, of the lifetime water savings estimated for each DMM. For comparison, the DMMs with negative NPV/AF values in Table 5-15 correspond to the B/C ratios of less than one shown in Table 5-2, and vice-versa.

Table 5-15: Evaluation of DMMs Not Implemented

DMM No.	Description	NPV per AF
1	Water Survey Programs for Single-family Residential and Multi-family Residential Customers	- $ 56
5	Large Landscape Conservation Programs and Incentives	$ 276
6	High-efficiency Washing Machine Rebate Programs	- $ 73
9	Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts	$ 203

Chapter 6

Water Supply Reliability

Chapter 6 Water Supply Reliability

This section provides a description of the potential variability in the City's water supplies caused by environmental, legal, and climatic factors, as well as the steps being taken by the City to address these potential concerns.

6.1 Climate

In California, climate can significantly affect the reliability of water supplies in certain regions. This section analyzes the vulnerability of the City's water supplies to climatic effects.

6.1.1 Reliability and Vulnerability of Water Supply to Seasonal or Climatic Changes

Groundwater

Although the City's groundwater basin is replenished in part by the Mokelumne River, the annual quantity of groundwater available does not vary significantly due to seasonal or climatic changes. Additionally, seasonal or climatic changes are not expected to impair the City's ability to extract groundwater, as seven of the City's wells are equipped with emergency generators.

Surface Water

The reliability of the City's surface water supply may be affected by drought. The City's contract for surface water delivery from WID, which diverts water from the Mokelumne River, is subject to curtailments of up to fifty percent during dry years. WID is required by the contract to annually provide the City, on or about May 1, with a preliminary estimate of whether or not the City's deliveries will be curtailed in a given year. Final estimates of any curtailment in a given year must be provided to the City on or about July 1.

Recycled Water

The amount of recycled water available to the City comes primarily from indoor water use within the City's limits and is not expected to fluctuate significantly due to seasonal or climatic changes.

6.2 Projected Normal Water Year Supply

During normal water years, no curtailments or other reductions in supply are expected for any of the City's supplies. The projected normal water year supplies from 2010 to 2030 are shown in **Table 6-1**.

Table 6-1: Water Supply Reliability (Guidebook Table 8)[a]

Water Year Type	Supply Type	2010	2015	2020	2025	2030
Normal	Groundwater, AFY	15,000	15,000	15,000	15,000	15,000
	Surface Water, AFY	6,000	6,000	6,000	6,000	6,000
	Recycled Water [b], AFY	7,700	8,300	8,940	9,630	10,380
	Total [c], AFY	***28,700***	***29,300***	***29,900***	***30,600***	***31,400***

Footnotes:

a. The term "Guidebook X" refers to the table in the *Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan* by DWR.
b. Extrapolated from the amount of wastewater treated in 2004. Assumes that the permitted capacity of WSWPCF will be increased as necessary.
c. Rounded to the nearest hundred

6.3 Projected Single Dry Year Supply

During single dry water years, there may be up to a 10.5 percent reduction[3] in the City's normal combined water supplies, reflecting a 50 percent curtailment in the City's surface water supply by WID. No reductions are assumed for the City's recycled water or groundwater supplies. The projected single dry water year supplies from 2010 to 2030 are shown in **Table 6-2**.

6.4 Projected Multiple Dry Year Supply

Because the City's surface water supply is the only supply that is considered to be susceptible to dry water years, and because 50 percent is the maximum annual curtailment allowed under the City's contract with WID, supplies available during multiple dry water years are assumed to be no different than supplies available during single dry water years. The projected multiple dry water year supplies from 2010 to 2030 are shown in **Table 6-2**.

Table 6-2: Single Dry and Multiple Dry Water Year Supply Projections (Guidebook Table 8)

Water Year Type	Supply Type	2010	2015	2020	2025	2030
Single Dry	Groundwater, AFY	15,000	15,000	15,000	15,000	15,000
	Surface Water, AFY	3,000	3,000	3,000	3,000	3,000
	Recycled Water [a], AFY	7,700	8,300	8,940	9,630	10,380
	Total [c], AFY	***25,700***	***26,300***	***26,900***	***27,600***	***28,400***
Multiple Dry	Groundwater, AFY	15,000	15,000	15,000	15,000	15,000
	Surface Water, AFY	3,000	3,000	3,000	3,000	3,000
	Recycled Water [a], AFY	7,700	8,300	8,940	9,630	10,380
	Total [c], AFY	***25,700***	***26,300***	***26,900***	***27,600***	***28,400***
Summary	Single Dry Water Year, AFY	25,700	26,300	26,940	27,630	28,380
	% of Normal	**90%**	**90%**	**90%**	**90%**	**90%**
	Multiple Dry Water Year(s), AFY	25,700	26,300	26,940	27,630	28,380
	% of Normal	**90%**	**90%**	**90%**	**90%**	**90%**

Footnotes:

a. Extrapolated from the amount of wastewater treated in 2004. Assumes that the permitted capacity of WSWPCF will be increased as necessary.

b. Rounded to the nearest hundred

The future supply volumes presented in Sections 6.2 to 6.4 represent the water to which the City has the legal rights to use. This should not be confused with water that can readily be distributed to the Utility's customers, as additional infrastructure must be constructed before the total volumes presented in the tables above can be distributed to the City. In order to provide the City with surface water, for example, intake facilities, a surface water treatment plant, and additional distribution pipeline could be required.

6.4.1 Minimum Supply Volumes for the Next Three Years

Under agreements with the East Bay Municipal Utilities District (EBMUD), WID obtains water stored in Pardee and Comanche reservoirs. Since both of these reservoirs are currently full, supply volumes for the City of Lodi for the next three years are expected to be "normal." However, the minimum supply volumes for 2006 through 2008, or the supplies available if the City's contract with WID faced maximum curtailments, are presented in Table 6-3.

[3] Assuming that the amount of available recycled water increases over time, the maximum percent reduction projected will decrease from 10.5 percent in 2010 to 9.6 percent in 2030.

Table 6-3: Minimum Supply Volumes for 2006-2008 (Guidebook Table 24)

Supply Type	2006	2007	2008
Groundwater, AFY	15,000	15,000	15,000
Surface Water, AFY	3,000	3,000	3,000
Recycled Water, AFY	7,200	7,300	7,400
Total, AFY	**25,200**	**25,300**	**25,400**

Footnotes:

a. Reflects the total amount of wastewater available to the City for reclamation and reuse.

6.4.2 Basis for Normal, Single Dry and Multiple Dry Year Water Data

The data presented in Sections 6.2 through 6.4 were developed based on 1) the assumptions that the City's groundwater and recycled water supplies are not susceptible to short term drought conditions, and 2) the City's contract with WID. Since the City's contract with WID is relatively new, there have been no historical curtailments in the City's surface water supply upon which to base future dry water year projections. Hence, the maximum allowable curtailment has been assumed for these circumstances. The base year for all water year data is 2005.

Table 6-4: Basis of Water Year Data (Guidebook Table 9)

Water Year Type	Base Year
Normal	2005
Single Dry	2005
Multiple Dry	2005

6.5 Supply Inconsistencies

Water supply from the City's only wholesale supplier, WID, is susceptible primarily to drought conditions, when diversions from the Mokelumne River may be reduced by WID. Due to the infancy of this contract, there are no historical reductions upon which to base assumptions. Even in the most severe drought conditions, however, WID may only reduce the City's supply by 50 percent. Supply reliability projections for this source are presented in Table 3-7.

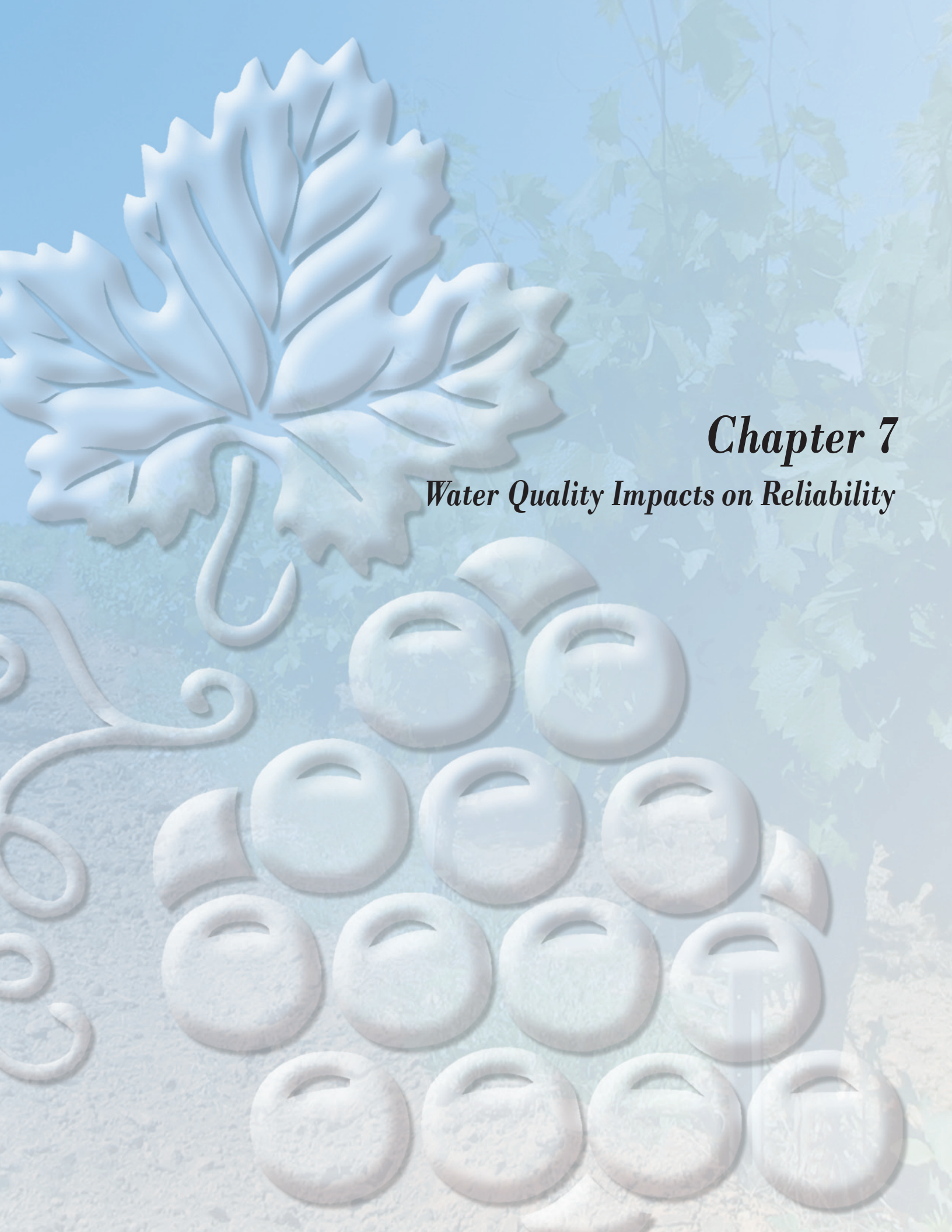
Water supply from the City's groundwater wells is considered to be very consistent. Historical fluctuations in groundwater levels due to changes in climatic conditions have been minor, and have not significantly impacted well production capacity. Additionally, six of the City's wells are equipped with granular activated carbon (GAC), and provide added insurance against inconsistencies caused by the presence of contaminants in the City's aquifer. Finally, the availability of seven emergency generators at various well locations ensures the City's ability to extract groundwater during extended power outages.

As discussed previously, the groundwater basin underlying the City is in overdraft, and groundwater levels are decreasing by approximately 0.39 ft/yr. From an extraction standpoint, however, this is a relatively slow process, and the City does not anticipate that overdrafting conditions will significantly impact its ability to extract groundwater in the short term. However, the City remains committed to eliminating the overdraft condition in the long term and has been an active participant in actions to accomplish this task. As a member of GBA, the City has participated in the development of regional groundwater recharge and conjunctive use programs intended to replenish Eastern San Joaquin County's

groundwater basin and promote sustainability for the future. A copy of the GBA Groundwater Management Plan is included in **Appendix F**.

Recycled water supply for the City is considered to be very consistent. Indoor water consumption by the City's customers, which does not significantly fluctuate with climatic conditions like outdoor water use, is the source of the City's recycled water supply. As such, the amount of recycled water available to the City is not expected to fluctuate in the future; indeed, as the number of water and sewer connections increase, so too will the City's recycled water supply.

As a result of the relative consistency of the City's water supplies, there are no plans at this time to *replace* any of the City's supply sources with alternative sources. The City is part of a group of Eastern San Joaquin County water users negotiating a conjunctive use project with EBMUD. Recently, however, negotiations surrounding this project have stagnated. Although this project bears the possibility of increasing the City's future water supplies, for the purposes of this UWMP this potential supply is not reflected in Table 3-5.



Chapter 7

Water Quality Impacts on Reliability

Chapter 7 Water Quality Impacts on Reliability

Water quality is an important factor in determining supply reliability; if adequate quality cannot be maintained, then the supply may be lost. In general, the City is well-equipped to handle a variety of constituents present in its supply sources that can affect water quality.

7.1 Water Quality Impacts

Pollutants from man-made sources have the potential to impact groundwater quality. Dibromochloropropane (DBCP), a commonly used fumigant and nematocide, has been identified as a potential groundwater contaminant in some of the Utility's wells. The presence of this compound, as well as other pollutants, can impact groundwater supply reliability by causing the forced shutdown of wells. The Utility has taken steps to treat affected groundwater at six wells with GAC treatment to remove DBCP. In addition, all wells are capable of providing as-needed chlorination for disinfection.

The recycled water produced by WSWPCF is considered safe for municipal irrigation by California EPA. Water quality in the Mokelumne River, the source of the City's surface water supply, is generally of very high quality.

Although the City's existing facilities are capable of producing a reliable and high quality source of water for its service area, catastrophic events such as earthquakes, major fire emergencies, water outages due to extended losses of power, localized flooding, surface water or groundwater contamination, and acts of sabotage could impact the City's ability to maintain high water quality. To prepare for such events, the City has prepared an Emergency Response Plan (ERP), which includes federal, state, and local contact directories, an emergency contractor directory, resource inventories, locations for emergency operations centers, response procedures, and the steps necessary to resume normal operations. An excerpt[4] from the plan is included in **Appendix E**.

The Utility has taken steps to address any potential water quality issues that could impact the reliability of its current and projected supply sources. There are no plans to replace or supplement these sources.

7.2 Constituents of Concern

DBCP

DBCP has been used by area farmers to kill nematodes in vineyards. DBCP was banned in California in 1977, but is still present in trace levels in some groundwater. In 2004, eleven of Lodi's wells had no detectable DBCP. Six wells are equipped with GAC to remove DBCP. The remaining wells meet State and Federal standards, but have trace amounts of DBCP. As a result, DBCP concentrations in the water served to the people of Lodi are within the level deemed safe by the U.S. EPA and the State of California.

In 1996 the City settled a lawsuit against DBCP manufacturers, who have already paid the City for a large portion of Lodi's costs related to DBCP treatment. DBCP manufacturers will continue to pay a large portion of the City's DBCP related costs for the settlement's 40-year life.

MTBE

MTBE (Methyl-Tert-Butyl-Ether) is a controversial additive to gasoline that can affect the odor and taste of drinking water. MTBE can potentially leak from service stations into the groundwater. Monitoring of City wells has not found any detected traces of MTBE to date. The City has a program of monitoring all

[4] Because the City's ERP contains sensitive information, the entire document has not been made available for public review. The document is kept on file by the City.

City wells for MTBE. Wells that are at greater risk (i.e., closer to gasoline stations) are monitored more frequently.

PCE and TCE

The City, working with regulatory agencies and potentially responsible parties in a cooperative manner, is pursuing a resolution to a groundwater contamination problem in the north and central Lodi area. None of the City's operating wells are currently out of compliance with any drinking water standards. PCE (Tetrachloroethylene) and TCE (Trichloroethylene) have been detected in samples taken in soils and groundwater. Cleanup work in portions of the area has commenced and the City expects additional areas to commence cleanup work in the near future.

Chapter 8

Wastewater and Recycled Water

Chapter 8 Wastewater and Recycled Water

8.1 Planning Requirements

Section 10633 of the California Water Code states that the plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. It also states that, to the extent available, preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

- **10633 (a)** A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.
- **10633 (b)** A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.
- **10633 (c)** A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.
- **10633 (d)** A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
- **10633 (e)** The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.
- **10633 (f)** A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.
- **10633 (g)** A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

8.2 Agency Coordination

The City has not developed a recycled water planning document at this time. The City is currently in the process of developing a Recycled Water Master Plan (RWMP) for the Utility's service area. It is possible that the development of the City's RWMP may include input from other agencies or stakeholders. The basis of the anticipated RWMP is described in further detail in the subsequent sections of this chapter.

8.3 Wastewater System Description

The City owns, operates, and maintains the wastewater system that serves the community. The sewer system consists of gravity sewers up to 48 inches in diameter, pumping stations, and force mains to collect wastewater from residential and commercial customers. The wastewater is collected and discharged to trunk sewers and interceptors and conveyed to the WSWPCF, located

6 miles outside of the water service area on North Thornton Road, for treatment. Industrial wastewater from a cannery and other users is collected and conveyed separately from the residential wastewater to WSWPCF for treatment or direct irrigation. WSWPCF is currently permitted for a capacity of 7.0 million gallons per day (mgd). The average daily flow at WSWPCF for 2004-2005 was approximately 6.4 mgd. **Table 8-1** presents past, current, and projected quantities of wastewater treated at WSWPCF, as well as the quantity meeting Title 22 recycled water standards.

Table 8-1: Wastewater Collected and Treated at WSWPCF (Guidebook Table 33)

Year	2000	2005	2010	2015	2020	2025	2030
Wastewater Collected & Treated in Service Area, AFY	7,400	7,200	7,700	8,300	8,940	9,630	10,380
Quantity of Treated Wastewater Meeting Recycled Water Standards [a], AFY	0	7,200	7,700	8,300	8,940	9,630	10,380

Footnotes:

a. Recycled water currently being used for agricultural irrigation is not treated to Title 22 standards, but is considered safe for reuse in land application. The remaining effluent from WSWPCF is treated to Title 22 standards. The agricultural water receives only secondary treatment by design; WSWPCF has adequate capacity to treat all wastewater to Title 22 standards.

8.4 Wastewater Treatment Process Description

The area serviced by WSWPCF includes the incorporated area of the City of Lodi. The wastewater receives primary, secondary, and tertiary treatment though the following processes:

- Influent flow measurement;
- Influent screening;
- Grinding;
- Grit removal;
- Primary clarification;
- Aeration/sludge activation;
- Secondary clarification;
- WAS thickening;
- Anaerobic digestion of solids;
- UV disinfection;
- Granular filtration;
- Effluent flow measurement; and,
- Effluent disposal or reuse.

Industrial process water from the cannery is stored in 45 acres of existing ponds.

8.5 Wastewater Disposal

Most of the treated effluent from WSWPCF is recycled during the summer months. Currently, an average annual volume of 2,500 AF is recycled. During the winter months, all treated effluent is

discharged to White Slough, which is part of the San Joaquin Delta. Adjacent to WSWPCF, the City owns in excess of 1,000 acres of land and leases approximately 650 acres to local farmers for the cultivation and harvesting of feed and fodder crops not intended for human consumption. WSWPCF has the flexibility to irrigate with domestic flow and/or cannery process water. All of the industrial process water influent is recycled for irrigation and ponding. If a process upset should occur, the domestic flow can be stored in holding ponds and further treated before discharging water to the Delta. In recent years, the City has also supplied recycled water from the domestic treatment process to produce steam for a 49-megawatt natural gas-powered generator, and to replenish mosquito fish-rearing ponds. In addition, the City has provided a "will serve" letter to the Northern California Power Agency (NCPA) for a potential power plant that will utilize an average of 1 mgd of treated wastewater. The remaining effluent is disposed of in the Delta. With the upcoming development of a RWMP, as well as additional recycled water infrastructure, the amount of treated wastewater discharged to the Delta will likely decrease as demand for recycled water increases.

Table 8-2 presents both current and projected annual volumes for various types of wastewater disposal. The values in this table reflect the breakdown of recycled water uses presented in the City's 2000 UWMP (Table 6-1).

Table 8-2: Current and Projected Wastewater Disposal (Guidebook Table 34)

Disposal Method	Treatment Level	Volume, AFY					
		2005	2010	2015	2020	2025	2030
To Delta	Tertiary	4,700	4,080	4,680	5,320	5,710	4,960
Land Application/ Agriculture Irrigation [a]	Secondary	2,350	2,350	2,350	2,350	2,350	2,350
Municipal Landscape Irrigation [a,c]	Tertiary	< 1	< 1	< 1	< 1	300	1,800
Industrial Use [b]	Tertiary	100	1,220	1,220	1,220	1,220	1,220
Fish Pond Replenishment [a]	Tertiary	50	50	50	50	50	50
	Total	**7,200**	**7,700**	**8,300**	**8,940**	**9,630**	**10,380**

Footnotes:

a. Reflects the continuation of current uses of recycled water in the vicinity of WSWPCF.

b. After 2005, 'Industrial Use' includes 1 mgd that has been promised in a "will serve" letter from the City to NCPA for a potential power plant. It should be noted, however, that this use is not yet confirmed and therefore does not appear in Table 4-5.

c. *Without* recycled water, the City's projected supply deficits in 2025 and 2030 would be 300 AFY and 1,800 AFY, respectively. Refer to Table 3-5 and Table 4-5.

By 2025, the City's projected demands will exceed combined groundwater and surface water supplies. Any subsequent deficit will likely be met by using a portion of the available recycled water for municipal landscape irrigation. Use of the City's recycled water supply for municipal purposes is likely to occur prior to 2025, but because the City is currently in the process of developing a RWMP, explicit projections for municipal use between 2005 and 2025 have not been made at this time. For the purposes of this UWMP, therefore, the projections for recycled water use in Table 8-2 and Table 8-3 do not increase from 2005 levels until 2025, and reflect a continuation of current practices.

8.6 Current and Projected Recycled Water Use

As described above, approximately 2,500 AFY of treated wastewater is currently recycled in the vicinity of WSWPCF. The City's upcoming RWMP will identify the future uses and markets of recycled water supplies. Although the projected use of recycled water, aside from the recycling already taking place, has not been explicitly defined at this time, it is anticipated that a portion of the City's future recycled water supplies will be used for agricultural and municipal purposes, primarily landscape irrigation. This assumption is reflected throughout this UWMP. **Table 8-3** presents the minimum recycled water uses projected for the City (i.e., does not include all *potential* uses, which are presented in Table 8-4).

Table 8-3: Current and Projected Recycled Water Use (Guidebook Tables 35a and 36)

Recycled Water Use	Treatment Level	2005	2010	2015	2020	2025	2030
Agriculture Irrigation [a], AFY	Secondary	2,350	2,350	2,350	2,350	2,350	2,350
Municipal Landscape Irrigation [a,c], AFY	Tertiary	< 1	< 1	< 1	< 1	300	1,800
Industrial Use [a], AFY	Tertiary	100	1,220	1,220	1,220	1,220	1,220
Fish Pond Replenishment [a], AFY	Tertiary	50	50	50	50	50	50
	Total	**2,500**	**3,620**	**3,620**	**3,620**	**3,920**	**5,420**

Footnotes:

a. Reflects the continuation of current uses of recycled water in the vicinity of WSWPCF.
b. After 2005, 'Industrial Use' includes 1 mgd that has been promised in a "will serve" letter from the City to NCPA for a potential power plant. It should be noted, however, that this use is not yet confirmed and therefore does not appear in Table 4-5.
c. *Without* recycled water, the City's projected supply deficits in 2025 and 2030 are 300 AFY and 1,800 AFY, respectively. Refer to Table 3-5 and Table 4-5.

8.7 Potential Uses of Recycled Water

No infrastructure exists at this time to support municipal recycled water use within the City (not including WSWPCF or the area in its vicinity). Based on the recommendations in the City's upcoming RWMP, however, potential uses of recycled water within the City are expected to include:

- Agricultural irrigation;
- Urban (park and streetscape) landscape irrigation;
- Residential irrigation;
- School landscape irrigation; and,
- Dual-plumbed business/commercial developments.

Table 8-4 presents estimated annual volumes for several potential uses for recycled water within the City.

Table 8-4: Potential Uses of Recycled Water (Guidebook Table 35b)

Recycled Water Use	Treatment Level	2010	2015	2020	2025	2030
Agriculture Irrigation [a], AFY	Secondary	2,350	2,350	2,350	2,350	2,350
Municipal Landscape Irrigation [b], AFY	Tertiary	905	1,341	1,806	2,308	2,843
Industrial Use [a], AFY	Tertiary	100	1,220	1,220	1,220	1,220
Fish Pond Replenishment [a], AFY	Tertiary	50	50	50	50	50
	Total	**3,405**	**4,961**	**5,426**	**5,928**	**6,463**

Footnotes:

a. Reflects the continuation of current uses of recycled water in the vicinity of WSWPCF. In addition, 1 mgd is included after 2005 for a potential NCPA power plant.

b. Assumes:
   - 25% of the total annual water demand for all new (post-2005) SFR connections can be met by recycled water for landscape irrigation.
   - 10% of the demand for new MFR connections can be met by recycled water for landscape irrigation.
   - All new commercial/institutional connections, as well as 50% of existing connections, can meet 10% of their total water demand with recycled water.
   - All new industrial connections, as well as 75% of existing connections, can meet 5% of their total water demand with recycled water.
   - All landscape connections can meet 90% of their demand with recycled water.

At the present time, the City has not made any commitment to pursue any of the above recycled water uses; however, recycled water is considered to be an important aspect of the City's future water supplies. The City's upcoming RWMP will address the technical and economic feasibility of serving the above potential uses.

8.8 Comparison of 2000 UWMP Projections to Current Use

The City's 2000 UWMP did not present explicit projections for the future use of recycled water by the City, as no plans existed at that time to construct the necessary infrastructure. The 2000 UWMP did, however, outline recent (1999) recycled water use at that time.

8.9 Encouraging Recycled Water Use

As recycled water planning takes shape in the City's RWMP, municipal recycled water projects may be identified and pursued by the City, provided that those projects are feasible and cost-effective, and that they will provide water supply benefits to the City. Financial incentives for recycled water use may be one action considered

If these conditions can be met, methods to encourage municipal recycled water use can be developed to maximize project benefits. However, because no specific recycled water projects

have been identified at this time, quantifying the amount of recycled water use that might result from such methods is not possible.

As for the types of recycled water use currently taking place, the City should promote dialogue with landowners in the vicinity of WSWPCF to gauge potential demands for additional recycled water. If additional City land is leased to local farmers, the City should actively promote recycled water use by those farmers. Encouraging recycled water use in this way could increase recycled water usage.

8.10 Recycled Water Use Optimization Plan

At the present time, no recycled water use optimization plan has been developed due to the lack of recycled water infrastructure. Such a plan will likely be incorporated in the City's upcoming RWMP.

Chapter 9

Supply and Demand Comparison

Chapter 9 Supply and Demand Comparison

9.1 Supply and Demand Comparisons

Section 10635 (a) of the California Water Code states that every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the population projections within the service area of the urban water supplier.

In order to satisfy the requirements set forth in the Water Code, additional supply and demand comparisons are presented in **Table 9-1** below.

Table 9-1: Supply and Demand Comparisons (Combination of Guidebook Tables 40-57)

Year	Water Year Scenario	Demand, AFY	Supply, AFY	Surplus, AFY	Surplus as Percent of Supply	Surplus as Percent of Demand	Supply as Percent of Normal [b]
2005	*Normal*	19,800	30,500	10,700	35%	54%	100%
	Single Dry	19,800	27,500	7,700	28%	39%	90%
	Multiple Dry Year Period Starting in 2006						
	2006	19,920	28,300	8,380	30%	42%	93%
	2007	20,040	28,400	8,360	29%	42%	93%
	2008	20,160	28,500	8,340	29%	41%	93%
	2009	20,280	28,600	8,320	29%	41%	94%
	2010	20,400	28,700	8,300	29%	41%	94%
2010	*Normal*	20,400	28,700	8,300	29%	41%	94%
	Single Dry	20,400	25,700	5,300	21%	26%	84%
	Multiple Dry Year Period Starting in 2011						
	2011	20,500	28,820	8,320	29%	41%	94%
	2012	20,600	28,940	8,340	29%	40%	95%
	2013	20,700	29,060	8,360	29%	40%	95%
	2014	20,800	29,180	8,380	29%	40%	96%
	2015	20,900	29,300	8,400	29%	40%	96%
2015	*Normal*	20,900	29,300	8,400	29%	40%	96%
	Single Dry	20,900	26,300	5,400	21%	26%	86%
	Multiple Dry Year Period Starting in 2016						
	2016	21,040	29,428	8,388	29%	40%	96%
	2017	21,180	29,556	8,376	28%	40%	97%
	2018	21,320	29,684	8,364	28%	39%	97%
	2019	21,460	29,812	8,352	28%	39%	98%
	2020	21,600	29,940	8,340	28%	39%	98%

Table 9-1 (Continued)

Year	Water Year Scenario	Demand, AFY	Supply, AFY	Surplus, AFY	Surplus as Percent of Supply	Surplus as Percent of Demand	Supply as Percent of Normal [b]
2020	*Normal*	21,600	29,940	8,340	28%	39%	98%
	Single Dry	21,600	26,940	5,340	20%	25%	88%
	Multiple Dry Year Period Starting in 2021						
	2021	21,740	30,078	8,338	28%	38%	99%
	2022	21,880	30,216	8,336	28%	38%	99%
	2023	22,020	30,354	8,334	27%	38%	100%
	2024	22,160	30,492	8,332	27%	38%	100%
	2025	22,300	30,630	8,330	27%	37%	100%
2025	*Normal*	22,300	30,630	8,330	27%	37%	100%
	Single Dry	22,300	27,630	5,330	19%	24%	91%
	Multiple Dry Year Period Starting in 2026						
	2026	22,600	30,780	8,180	27%	36%	101%
	2027	22,900	30,930	8,030	26%	35%	101%
	2028	23,200	31,080	7,880	25%	34%	102%
	2029	23,500	31,230	7,730	25%	33%	102%
	2030	23,800	31,380	7,580	24%	32%	103%
2030	*Normal*	23,800	31,380	7,580	24%	32%	103%
	Single Dry	23,800	28,380	4,580	16%	19%	93%
	Multiple Dry Year Period Starting in 2031						
	2031	24,100	31,530	7,430	24%	31%	103%
	2032	24,400	31,680	7,280	23%	30%	104%
	2033	24,700	31,830	7,130	22%	29%	104%
	2034	25,000	31,980	6,980	22%	28%	105%
	2035	25,300	32,130	6,830	21%	27%	105%

Footnotes:

a. The term "Guidebook X" refers to the table in the *Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan* by DWR.

b. "Normal" refers to the amount of water available during current (**FY 2005**), non-drought conditions.

9.2 Accounting for Water Production and Water Use

As the above analysis indicates, the City will have sufficient water supply to all meet existing and projected water demands. The City operates water meters at each of its 26 groundwater wells. Additionally, effluent at WSWPCF, which is expected to become a larger part of the City's future supply, is metered as it leaves the plant. Because the City has not yet begun to divert surface water from the Mokelumne River, no meters are in place to measure the amount of water diverted. However, with the possible future construction of a surface water treatment plant, additional flow metering devices could be constructed to help the City track the use of this supply. As the City becomes fully metered, water use by Utility customers will be metered for all service connection types.

Chapter 10

Water Shortage Contingency Plan

Chapter 10 Water Shortage Contingency Plan

10.1 Coordination with Other Suppliers

Section 10620 (d)(2) of the California Water Code requires that the City coordinate, to the extent practicable, preparation of its urban water shortage contingency plan with other urban water suppliers and public agencies in the area

10.2 Past, Current, and Projected Water Use (years applicable)

Section 10632 of the California Water code requires that the City address past, current, and projected water use and, to the extent records are available, breakdown of those uses on the basis of single family residential, multi-family residential, industrial, commercial, governmental, and agriculture use.

Past, current and projected water production for the City's water supply service area is described in **Chapter 4**.

10.3 Stages of Action

Section 10632 (a) of the California Water Code requires that the City develop stages of action to be undertaken in response to a water supply shortage, including up to a 50 percent reduction in water supply. The City must also identify specific water supply conditions which are applicable to each stage.

Section 10632 (f) requires that the City's urban water shortage contingency plan include penalties or charges for excessive use.

A five-stage rationing plan, including voluntary and mandatory stages, is described below. The stage determination and public declaration during a water supply shortage will be made by the Public Works Director. **Table 10-1** summarizes the triggering mechanisms for each water stage.

Stage I – Normal Conditions: The City is able to meet all immediate needs of its customers.

Stage II – Water Alert: A 5% or greater reduction in water usage is required for the City to meet the immediate needs of its customers.

Stage III – Water Warning: A 15% or greater reduction in water usage is required for the City to meet the immediate needs of its customers.

Stage IV – Water Crisis: A 30% or greater reduction in water usage is required for the City to meet the immediate needs of its customers.

Stage V – Water Emergency: A 50% or greater reduction in water usage is required for the City to meet the immediate needs of its customers.

Table 10-1: Triggering Mechanisms for Stages of Action

Stage	Water Supply Conditions	Triggering Mechanism
1	Normal conditions	No trigger; normal conditions
2	Minor shortage	Cutback in available water supply of 0 to 5%
3	Moderate shortage	Cutback in available water supply of 5 to 15%
4	Severe shortage	Cutback in available water supply of 15 to 30%
5	Critical shortage	Cutback in available water supply of 30 to 50%

The water stages are described in further detail in the sections below.

10.4 Mandatory Prohibitions, Consumption Reduction Methods, and Penalties

The prohibitions, consumption reduction methods, and penalties and charges for each of the five water supply stages are included in this section as required in California Water Code sections 10632 (d), 10632 (e), and 10632 (f), respectively.

Stage I. Normal Water Conditions

During Stage I there is no supply shortage, and no reduction in water usage is required.

All requirements of the City's Water Conservation Ordinance (see **Appendix C**), Lodi Municipal Code, Section 13.08.290, shall be in effect for Stage I as normal conditions. Lodi's water conservation program consists mainly of outdoor watering restrictions enforced by water conservation patrol staff, public education through local fairs, bill inserts, and newspaper articles, and an in-school education program. The waste of water is prohibited and defined in the Water Conservation Ordinance as:

- Failure to repair a controllable leak of water.
- Watering of lawns, flowerbeds, parking areas, tennis courts, patios, streets, or other exterior paved areas on days or times other than those outlined in Section 13.08.240 of the Water Conservation Ordinance as:

  A. Watering Days:
     1. Premises having odd numbered street addresses on Wednesday, Friday, and Sunday.
     2. Premises having even numbered street addresses on Tuesday, Thursday, and Saturday.

  B. Watering Hours: Any hour except that between May 1 and September 30 (inclusive) of each year watering between the hours of 10 a.m. and 6 p.m. is prohibited.
- Washing of sidewalks, driveways, parking areas, tennis courts, patios, streets, or other exterior paved areas or buildings except when required to remove any spillage of substances that may be a danger to public health or safety.
- Washing with water any motor vehicles, trailers, or movable equipment other than with a bucket and rinsing the vehicle or equipment by use of a hose for not more than three minutes.
- Use of a hose without a positive shut off nozzle.

- The excess watering of any area so that water flows into a gutter or any drainage area for a period exceeding three minutes.
- The unnecessary running of water in any residential, commercial, or industrial establishment onto the floor, pavement, ground or into any drain or drainage area, with any equipment or in any way for more than three minutes.
- Overwatering of lawns or landscapes from November 1 through February 28, or during or immediately following a rain.

Enforcement procedures and penalties for water wasting as defined in Section 13.08.250 of Lodi's Water Conservation Ordinance include:

- First Water Waste: Notification of water waste to the person at the premises of water waste by delivering an Information Sheet (included in Appendix C of Lodi's 2000 Urban Water Management Plan).
- Second Water Waste: In the event of a second waste of water within a 12 month period within 12 months of a first, the City will send a written notice to the person who receives the utility bill at the premises of water waste.
- Third Water Waste: In the event of a third waste of water within 12 months of a previous waste of water, the City will send a written notice and a $35 charge to the person who receives the utility bill for the premise of water waste.
- Fourth Water Waste: In the event of a fourth waste of water within 12 months of a previous waste of water, the City will send a written notice and a $75 charge to the person who receives the utility bill for the premises of the water waste.
- Fifth Water Waste: In the event of a fifth waste of water within 12 months of a previous waste of water, the City will send a written notice and a $150 charge to the person who receives the utility bill for the premise of the water waste. The City may also require a water meter and/or a flow restrictor to be installed at the waster's expense.

In addition to the enforcement procedures above, any person who wastes water, may also be charged with an infraction as per Sections 13.08.250 and 13.08.280 of the Water Conservation Ordinance.

Stage II. Water Alert

During Stage II of a water supply shortage, the shortage is minor, and a 5% or greater reduction in water usage is required for the City to meet the immediate needs of its customers. Water alert conditions are declared and voluntary conservation encouraged. The water shortage situation is explained to the public and voluntary water conservation is requested. The City also explains other stages and forecasts future actions.

All mandatory requirements of Stage I shall remain in effect. Existing on-going water conservation measures are continued and emphasized as necessary to alert the public of the nature of the water supply shortage. The City maintains an ongoing public information campaign consisting of distribution of literature, speaking engagements, bill inserts, and conversation messages printed in local newspapers. Educational programs in area schools are ongoing and utilized as necessary.

Enforcement procedures and penalties for water wasting will continue as described in the Lodi Water Conservation Ordinance Sections 13.08.250 and 13.08.280.

Stage III. Water Warning

During Stage III, the water supply shortage is moderate. The City aggressively continues its public information and education programs. Consumers are asked for a 15 % or greater voluntary or mandatory water use reduction.

All mandatory requirements of Stages I and II shall remain in effect. Additional requirements may include:

- Landscape irrigation restrictions shall be implemented to limit the allowable frequency of irrigation to a maximum of TWO days per week and based on the following schedule:
  1. Premises having odd numbered street addresses irrigate only on Wednesday and Sunday.
  2. Premises having even numbered street addresses irrigate only on Tuesday and Saturday.
- Businesses are not to serve water unless requested.

Enforcement procedures and penalties for water wasting will continue as described in the Lodi Water Conservation Ordinance Sections 13.08.250 and 13.08.280.

Stage IV. Water Crisis

During Stage IV of a water supply shortage, the shortage is severe, and a 30% or greater reduction in water usage is required for the City to meet the immediate needs of its customers.

All mandatory requirements of Stages I, II, and III shall remain in effect. Additional requirements may include:

- Landscape irrigation restrictions shall be implemented to limit the allowable frequency of irrigation to a maximum of ONE day per week and based on the following schedule:
  1. Premises having odd numbered street addresses irrigate only on Sunday.
  2. Premises having even numbered street addresses irrigate only on Saturday.
- No potable water from the City's system shall be used to fill or refill new swimming pools, artificial lakes, ponds, or streams until the water crisis is declared over.
- Water use for ornamental ponds and fountains is prohibited.
- Washing of automobiles and equipment shall be done on the lawn or at a commercial establishment that uses recycled or reclaimed water.
- Flushing of sewers or fire hydrants is permitted only in cases of emergency and essential operations.

A permanent water meter on existing non-metered services and/or flow restrictors on existing metered services shall be installed by the City on the service at customer's expense upon receipt of the second violation.

Stage V. Water Emergency

During Stage V of a water supply shortage, the shortage is critical, and a 50% or greater reduction in water usage is required for the City to meet the immediate needs of its customers.

All mandatory requirements of Stages I, II, III, and IV shall remain in effect. Additional requirements may include:

- Landscape irrigation shall not be allowed.
- Washing of automobiles and equipment shall be done at a commercial establishment that uses recycled or reclaimed water.
- No potable water from the City's system shall be used for construction purposes such as dust control, compaction, or trench jetting.
- Large industrial users, for example canneries and other food manufacturers, be required to reduce or cease all water use.

10.5 Minimum Supply for the Next Three Years

Section 10631 (e)(2) of the California Water Code requires that the City estimate the minimum water supply available at the end of the 12, 24, and 36 months, assuming the worst case water supply shortage.

Refer to **Table 6-3** in Section 6.4.1 for this information.

Worst Case Supply Shortage

California Water Code section 10632 (b) requires an estimate of the minimum annual water supply availability during each of the next three water years based on the driest three-year historic sequence for the agency's water supply. The City of Lodi's water supply is currently 100% groundwater. Although regional groundwater levels have been dropping, no short-term water supply problems are anticipated in the next three years.

The water supply currently available to the City[5] is 35,210 gpm, or 50.7 mgd, of groundwater from the City's wells. The annual average well production for 2004 was 15.2 mgd. Loss of water supply capacity could occur due to mechanical problems with wells, pumps, motors, etc. Preventative maintenance programs aid in minimizing the occurrence of mechanical failures. In addition, a water supply capacity loss may be caused by a change in water quality due to well contamination. Worst case water supply projections are not included in this section because distribution system mechanical failures and well contamination events are not expected and the capacity loss associated with each problem is difficult to quantify.

10.6 Catastrophic Supply Interruption Plan

The Water Code section 10632 (c) requires actions to be undertaken by the water supplier to prepare for, and implement during a catastrophic interruption of water supplies. A catastrophic event that constitutes a proclamation of a water shortage would be any event, either natural or manmade, that causes a severe shortage of water, synonymous with or with greater severity than the Stage III or Stage IV water supply shortage conditions. In response to these possibilities, the City has developed an Emergency Response Plan, which includes appropriate personnel listings, resource inventories, locations for emergency operations centers, response procedures, and the steps necessary to resume normal operations. Because the City's ERP contains sensitive information, only a portion of the document has been included in **Appendix E**.

[5] Does not include surface water or recycled water supplies, as the infrastructure necessary to delivery these supplies to City customers are not currently in place.

The City maintains a sound preventative maintenance program for its distribution system. Auxiliary generators are available and improvements to water facilities are made to minimize loss of these facilities during an earthquake or any disaster causing an electric power outage. Lodi is considered to be in a low-probability area for earthquakes.

Additional action items that may be pursued in preparing for and responding to a catastrophic water supply interruption could include:

- Increase existing water storage;
- Obtain additional water supplies; and,
- Determine where funding for additional water supplies will come from.

10.6.1 Consumption Limits

Section 10632 (e) of the California Water Code requires that the City develop appropriate consumption limits that would apply in the most restrictive water shortage emergency. Examples of potential consumption limits include percentage reductions in water allotments, per capita allocations, an increasing block rate schedule for high usage of water, and restrictions on specific uses.

Consumption limits for the City have been laid out in the Water Conservation Ordinance, and are also discussed in Section 10.4 above.

10.7 Analysis of Revenue Impacts of Reduced Sales during Shortages

Section 10632 (g) of the California Water Code requires an analysis of the impacts of each of the actions taken for conservation and water restriction on the revenues and expenditures of the water supplier. Approximately 92% of the City's water was supplied to non-metered customers in 2004. Because the City of Lodi currently charges a flat rate to all of its residential customers and unmetered non-residential customers, revenue impacts of decreasing supply and consumer use will be minimal.

The majority of the City's water customers are charged with a flat rate. A reduction in the use of water may have a corresponding reduction in the expenditures by the City for the treatment and distribution of the water supply. Any of the aforementioned reductions in expenditures could be offset by increased costs for personnel time during the emergency, notification actions, increased meter reading, emergency equipment rental or purchase, emergency generator usage, etc.

Because no substantial financial impacts are anticipated on the revenues and expenditures of the City, no measures to overcome impacts have been developed, including financial reserves and/or rate adjustments.

10.8 Draft Ordinance and Use Monitoring

Section 10632 (h) of the California Water Code requires the inclusion of a draft water shortage contingency resolution. In the event of a water shortage emergency, the following is a draft water shortage contingency resolution to be passed by the Lodi City Council. The draft below gives the City Council's support to the Public Works Director in taking emergency actions as currently authorized in Lodi Municipal Code, Chapter 13.08, Article III, Section 13.08.290, "Emergency Water Conservation".

10.8.1 Draft Water Shortage Contingency Ordinance (Enacted as Needed)

DRAFT

City of Lodi

Resolution No._____

WHEREAS, Lodi Municipal Code, Chapter 13.08, Article III, Section 13.08.290, Emergency Water Conservation allows the Public Works Director to determine the degree of emergency and determine what additional restrictions of water use or other appropriate actions must be taken to protect the water system and the citizens of Lodi; and

WHEREAS, the City of Lodi is experiencing water shortages, therefore;

BE IT RESOLVED by the City Council of the City of Lodi that full support is given to the Public Works Director to make the appropriate recommendations which may include increased restrictions on watering days and hours, restrictions on washing vehicles, etc., restrictions on large water users, restrictions on flushing of water lines, restrictions on the filling of swimming pools, and increases in the current penalties for not complying with water conservation restrictions for the duration of the emergency, and urge full support and cooperation from the citizens of Lodi.

[Affix Official Seal Here]

Signature:_____

Name:_____

Title:_____

Clerk of City of Lodi

10.8.2 Mechanism for Determining Actual Reductions in Water Use

Section 10632 (h,i) of the California Water Code requires that the Urban Water Shortage Contingency Plan include a mechanism for determining actual reductions in water use.

For metered accounts, reductions in water use for each user can be determined based on meter readings. For unmetered accounts and the service area as a whole, reductions in water use must be determined by measuring water production at the City's well sites. In the event of a water shortage, the City will monitor its production meters more frequently. Table 10-2 summarizes this information.

Table 10-2: Water Use Monitoring Mechanisms (Guidebook Table 31)[a]

Mechanism for Determining Actual Reductions	Type and Quality of Data Expected
Increased meter reading	Changes in the volumes of 1) water produced at the City's wells, surface water treatment plant[b], or WSWPCF, and 2) water delivered to individual metered service connections (in MG, mgd, etc.).

Footnotes:

a. The term "Guidebook X" refers to the table in the *Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan* by DWR.

b. The City may decide to construct a surface water treatment plant in the future.

Chapter 11

Adoption and Implementation of the Urban Water Management Plan

Chapter 11 Adoption and Implementation of the UWMP

11.1 Provision of Water Supply Reliability Section to Service Area Customers

The City of Lodi does not supply water to cities or agencies other than its own customers. Therefore, the UWMP will not be distributed to other agencies except as described in Chapter 1.

11.2 Public Participation and Plan Adoption

The adoption resolution for the UWMP is found in **Appendix A**. The Draft UWMP was made available for public review between February 15 and March 1, 2006. Notices were placed on the City's website to encourage involvement from all social, cultural and economic groups. A public hearing was conducted for the Draft UWMP to allow public review and comment. Proof of the public hearing, as well as an overview of the comments received, is located in **Appendix B**.

11.3 Review of 2000 UWMP

The City has continued to implement the management programs and recommendations discussed in the 2000 UWMP. The main provisions in the 2001 UWMP were 1) to develop a conjunctive use program to reduce the City's overall pumping of groundwater, 2) to reassess the feasibility of partially meeting water demands through use of recycled water, 3) to continue with current conservation efforts and to consider implementation of additional cost effective measures, 4) to track development of new drinking water standards as they pertain to the City's water supplies, 5) to maintain groundwater supply capacity, and 6) to establish a process to assess the effectiveness of conservation measures.

11.4 Provision of 2005 UWMP to Local Government

Water Code Section 10644 requires that the City provide a copy of this UWMP to all cities and counties within which the City provides water. Therefore, this UWMP will be sent to San Joaquin County as described in **Section 1.4**.

11.5 Public Review

This document was made available for public review as described in **Section 1.5**.

References

1. California Department of Water Resources, "Bulletin 118 Update 2003," 2005.
2. California Department of Water Resources, "Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan," January, 2005.
3. California Department of Finance, 2005 City of Lodi Population, 2005.
4. California Irrigation Management Information System, City of Lodi Monthly Average ET_o, 2005.
5. California Spatial Information Library, Lodi & Vicinity GIS Maps, August, 2005.
6. California Urban Water Conservation Council, Technical Resources, 2005.
7. City of Lodi, Annual Water Quality Report, 2004.
8. City of Lodi, "Emergency Response Plan," June, 2004.
9. City of Lodi, "City of Lodi DRAFT Water Meter Policy," October, 2005.
10. City of Lodi, "City of Lodi General Plan," December, 1989.
11. City of Lodi, "City of Lodi Urban Water Management Plan," March, 2001.
12. City of Lodi, "City of Lodi Water Master Plan," September, 1990.
13. City of Lodi, "City of Lodi Wastewater Master Plan," January, 2001.
14. City of Lodi, City Website, September, 2005.
15. City of Lodi, "Water Conservation Ordinance."
16. City of Lodi & Woodbridge Irrigation District, "Agreement for Purchase of Water form the Woodbridge Irrigation District by the City of Lodi," May, 2003.
17. Geomatrix Consultants Inc., "DRAFT Technical Memorandum: Phase I Remedial Investigation Lodi Northern Plume Area." January, 2006.
18. Northeastern San Joaquin County Groundwater Banking Authority, "Eastern San Joaquin Groundwater Basin Groundwater Management Plan," June, 2004.
19. Northeastern San Joaquin County Groundwater Banking Authority, "System Plan Components Inventory," April, 2002.
20. Schlumberger Water Services, "Surface Water Supply Options," September, 2004.
21. Schlumberger Water Services, "Water Availability Assessment, Lodi Southwest Gateway Annexation," April, 2005.
22. Schlumberger Water Services, "Water Availability Assessment, Lodi Westside Annexation," August, 2005.
23. Western Regional Climate Center, City of Lodi Climate Data, October 2005.
24. West Yost & Associates, "Full Surface Water Implementation Study Technical Memorandum," May, 2005.

Appendices

Appendix A - Adoption Resolution

RESOLUTION NO. 2006-42

A RESOLUTION OF THE LODI CITY COUNCIL
ADOPTING THE CITY'S 2005 URBAN WATER
MANAGEMENT PLAN UPDATE

==========

WHEREAS, several years ago the California Legislature enacted Assembly Bill 797, and as subsequently amended, created Water Code Section 10610, et seq., known as the Urban Water Management Planning Act; and

WHEREAS, this Act requires the City of Lodi to review and update the Urban Water Management Plan every five years. The current update was performed with the assistance of RMC Water and Environment, and is the fourth update of Lodi's Urban Water Management Plan. The adoption process requires a public hearing and adoption by Council; and

WHEREAS, since publication of the Draft Urban Water Management Plan, the State Department of Water Resources has provided minor preliminary comments. The comments, along with the proposed responses, are reflected in Exhibit A and will be incorporated into the Urban Water Management Plan submitted to the Department of Water Resources; and

WHEREAS, the Plan outlines Lodi's historical and projected population and water use, water rates, water metering program status, and Woodbridge Irrigation District surface water as a source of supply. There are substantial changes from the 2000 Urban Water Management Plan, as much more attention is given to the groundwater supply and to conservation measures, including metering; and

WHEREAS, the Plan addresses supply and demand and does not specify how the City's WID water will be utilized, i.e., groundwater recharge or treatment plant, as this will be addressed separately; and

WHEREAS, by maintaining an updated Urban Water Management Plan in accordance with State requirements, the City of Lodi will remain eligible for Proposition 50 grant funding. The City is currently applying for a $75,000 Proposition 50 grant to supplement funding for a Recycled Water Master Plan (RWMP). The City is also applying for a Proposition 50 grant to offset 50% of the estimated $1.4 million dollar costs associated with a portion of the PCE remediation.

NOW, THEREFORE, BE IT RESOLVED that the Lodi City Council does hereby adopt the City of Lodi's 2005 Urban Water Management Plan Update on file in the Public Works Department.

Dated: March 15, 2006

==========

I hereby certify that Resolution No. 2006-42 was passed and adopted by the Lodi City Council in a regular meeting held March 15, 2006, by the following vote:

AYES: COUNCIL MEMBERS – Beckman, Hansen, Johnson, and Mounce

NOES: COUNCIL MEMBERS – None

ABSENT: COUNCIL MEMBERS – Mayor Hitchcock

ABSTAIN: COUNCIL MEMBERS – None

Susan J. Blackston

SUSAN J. BLACKSTON
City Clerk

The foregoing document is certified to be a correct copy of the original on file in the City Clerk's Office.

Jacqueline L. Taylor
Deputy City Clerk, City of Lodi

By: Jacqueline L. Taylor
Dated: March 16, 2006

Exhibit A

DRAFT Response to Comments

RMC Water and Environment

City of Lodi - 2005 Urban Water Management Plan

Subject: **Response to DWR Comments on Draft UWMP**

Prepared For: Charlie Swimley

Prepared by: Andy Smith

Reviewed by: Glenn Hermanson

Date: March 2, 2006

Reference: 0140-01.02

Commenter	Comment	Page/Section Number	Response
Kim Rosmaier (DWR)	If WID expects no change in deliverable volume for the hydrologic scenarios, state this in Section 3.5	Section 3.5 pg 3-9	A footnote has been added to Table 3-7: "b. Reliability of WID supply is indicated in the City's contract with WID in Appendix D." A paragraph following Table 3-7 has also been added: "Wholesale supply reliability is presented in Chapter 6. Although changes in deliverable volumes of water for future hydrologic scenarios have not been formally predicted at this time, Chapter 6 presents the most restrictive possible cases for the future."
Kim Rosmaier (DWR)	Table 4-3, addition errors	Section 4.1.2 pgs 4-4 and 4-5	After speaking with Kim, it turns out that she hadn't noticed a footnote (footnote b) that states that totals for each year are rounded to the nearest hundred. Rounding in this way is acceptable, and there are no addition errors.
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Kim Rosmaier (DWR)	DWR requires a reduction measuring method. I assume the production meters would be monitored more frequently. Suggest you include a statement indicating this.	Section 10.8.2 pg 10-8	Agree. The following sentence was added: "In the event of a water shortage, the City will monitor its production meters more frequently."

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Kim Rosmaier (DWR)	Implementation paragraph states "The city performs water audits upon request". This DMM refers to a system-wide water audit to determine unaccounted-for water volume. If the water audits noted above are for individual homes or businesses, this statement is incorrect. Water audits for homes are included in DMM 1 and water audits for businesses are included in DMM 9.	Section 5.1.3 pg 5-8	The sentence in question has been removed to avoid confusion. The first sentence of section 5.1.3 now reads "The City has implemented a capital improvement program to replace water lines, with an ultimate goal of replacing 1 percent of the system annually."
Kim Rosmaier (DWR)	Be sure to send a copy [of the Final UWMP] to the State Library and note same in this section.	Section 1.7 pg 1-3	Agree. A bullet item for the CA State Library was added to this section.
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Kim Rosmaier (DWR)	Typo, third paragraph, second line third word: *buy* should be *but* and third line fourth word: *form* should be *from*	Section 3.1.1 pg 3-1	Agree. Edits have been made.

Appendix B - Public Participation Information

CITY OF LODI

PUBLIC WORKS DEPARTMENT
CITY HALL, 221 WEST PINE STREET / P.O. BOX 3006
LODI, CALIFORNIA 95241-1910
TELEPHONE (209) 333-6706 / FAX (209) 333-6710
EMAIL pwdept@lodi.gov
http://www.lodi.gov

February 16, 2006

San Joaquin County
Attn: Dr. C. Mel Lytle
1810 E. Hazelton Avenue
Stockton, CA 95201

SUBJECT: 2005 Urban Water Management Plan (REVISED)

Enclosed is the City of Lodi's draft 2005 Urban Water Management Plan (UWMP). The State of California Water Code Section 10644 requires that the City provide a copy of this UWMP to all cities and counties within which the City provides water. If you have any comments on this draft UWMP, please send them to my attention.

This revised letter extends the public review period to March 15th. Therefore, the revised public review period is from February 15th to March 15th. The Plan will be brought to the City of Lodi City Council for adoption on March 15, 2006.

If you have any questions, please contact me at (209) 333-6800, extension 2593.

Sincerely,

Charlie Swimley
Senior Civil Engineer

CES/pmf

Enclosure

cc: Richard Prima, Public Works Director
Northeastern San Joaquin County Groundwater Banking Authority
Woodbridge Irrigation District
State of California Department of Water Resources Central District

J:\Water\LSJCounty_UWMPDraft_Revised.doc

Summary of Public Participation for the 2005 UWMP:

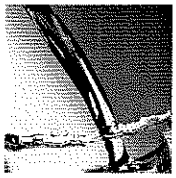
Public participation in the City of Lodi's 2005 Urban Water Management Plan took place between February 15 and March 15, 2006, during the public review period for the Draft UWMP. At a public hearing on March 15, 2006, a presentation was given to attendees that described the purpose of the City's 2005 UWMP, the process by which it was prepared, and any pertinent clarifications or text edits. Copies of the Microsoft Powerpoint slides that were presented during the public hearing are included in this appendix.

During the public hearing, public comment was minimal. One member of the public commented that the UWMP did not adequately state who was most responsible for the average annual drawdown of the aquifer underlying the City – the City itself or the agriculture surrounding it. Her concern was that as long as this 'responsibility' remains unknown or unstated, it did not seem feasible to move forward with any new growth in Lodi. The response to this comment was that the UWMP is not meant to address the issue of groundwater overdraft in this level of detail, but rather to present a given agency's plans for its water demands and supplies.

City of Lodi

2005 Urban Water Management Plan

March 15, 2005



Presenter:
Glenn Hermanson

Background

- Urban Water Management Plans (UWMP) are required by the Urban Water Management Planning Act (AB 797). Originally passed in 1983 and since then amended 18 times.
- As an urban water supplier providing more than 3,000 acre-feet per year (AFY), Lodi must prepare and submit an UWMP to the Dept. of Water Resources (DWR) every five years.
- UWMPs are meant to assist and encourage integrated regional water planning, and are a prerequisite for State water grant funding.

Background

- The UWMP may be used as a foundation for Water Supply Assessments (SB 610) and Written Verifications of Water Supply (SB 221), which are required for new development.
- DWR is responsible for deeming UWMPs "complete," and has distributed a guidebook to assist water suppliers that are preparing them.

Primary Goals of Lodi's 2005 UWMP

- Create a functional document for Lodi's long-term water planning
- Adequately address all DWR requirements

Table of Contents

Chapter 1: Introduction

Coordination with Other Agencies

- Coordination with appropriate agencies is required by DWR and prudent for regional planning:
  - Northeastern San Joaquin County Groundwater Banking Authority
  - San Joaquin County
  - California Department of Health Services

Chapter 1: Introduction

Public Participation

- Public participation is required by DWR and encouraged by Lodi:
  - Public hearing (scheduled for February 15, 2006)
  - Four week public review period, starting the day of the public hearing

Chapter 1: Introduction

Section 1.5: Public Participation

The City encouraged public participation in the development of the 2005 UWMP and provided opportunities for public review and comment. On February 15, 2006, the City placed a Notice of Intention to Adopt on its website stating that its UWMP was being updated and that a public review period would be provided to address comments and concerns from members of the community. The notice stated that the public review period would be scheduled from February 15 through ***March 15, 2006***. A copy of this Notice of Intention to Adopt is included in Appendix B. The notice, as well as the Draft 2005 UWMP, was made available for public inspection on the City's website. On ***March 15, 2006***, the City conducted a public hearing to hear comments from the public regarding the UWMP. This hearing provided an opportunity for the City's customers/residents and employees in the area to learn about the water supply situation and the plans for providing a reliable, safe, high-quality water supply for the future. Information regarding the public hearing and the public review period is included in Appendix B. This UWMP was finalized after the public review period and was placed on the City's website.

Section 1.6: Plan Adoption

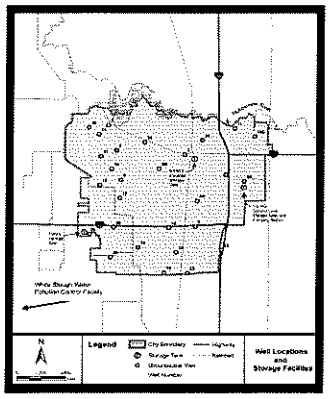
The City prepared this 2005 UWMP Update during the fall and winter of 2005. The plan was adopted by its City Council on ***March 15, 2006*** and was submitted to the California Department of Water Resources within 30 days of the council approval. See Appendix A for a copy of the resolution. The UWMP was also sent to the California State Library.

Table of Contents

Chapter 2: Supplier Service Area

Description of Service Area

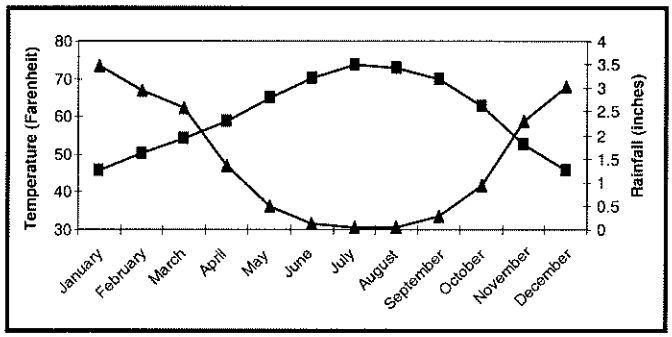
- Current population is approximately 62,500
- Service area covers about twelve square miles
- White Slough Water Pollution Control Facility (WSWPCF) located 6 miles to the southwest



Chapter 2: Supplier Service Area

Climate

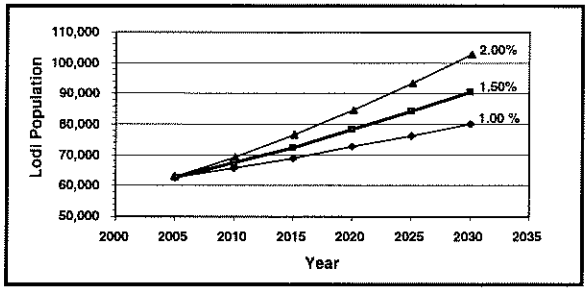
- High temperatures and dry weather mean that Lodi's peak demands occur during the summer
-



Chapter 2: Supplier Service Area

Population

- A population growth rate of 1.5% was assumed for the UWMP (rates of 1.0% and 2.0% are shown for comparison)



- Lodi's 1991 General Plan used a growth rate of 2.0 %, resulting in a projection for 2007 that was significantly higher than what will likely be achieved.

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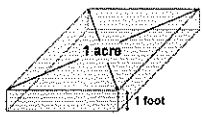
Chapter 3: Water Supply

Current Water Supply - **Groundwater**

- Groundwater is currently the sole supply source used in Lodi In 2005, Lodi used approximately 17,300 acre-feet (AF) of groundwater.
- 

1 AF per year (AFY) is roughly the amount of water used by a household of 3.5 people.
- Groundwater levels in Lodi are decreasing at a rate of about 5 inches per year.

Chapter 3: Water Supply

Current Water Supply – **Surface Water**

- Lodi recently signed a contract with Woodbridge Irrigation District (WID) to purchase 6,000 AFY from the Mokelumne River for 40 years.
- This supply has yet to be utilized. Lodi is in the process of determining when, where, and what kind of infrastructure will be required to utilize this new supply.

Chapter 3: Water Supply

Current Water Supply – **Recycled Water**

- The source of Lodi's recycled water is the treated effluent from WSWPCF.
- Approximately 2,500 AFY is currently recycled near WSWPCF. The remaining effluent is discharged to the Delta.
- Substantial infrastructure will be required to utilize additional recycled water supply.

Chapter 3: Water Supply

Future Water Supply – **Groundwater**

- Based on recent investigations, Lodi's sustainable yield is 15,000 AFY.

Future Water Supply – **Surface Water**

- 6,000 AFY will be available during the remainder of Lodi's 40-year contract with WID.

Future Water Supply – **Recycled Water**

- Available recycled water will grow from 7,200 AFY in 2005 to approximately 10,380 AFY in 2030.

*The groundwater safe yield value (15,000 AFY) will increase as the boundary of the City increases in area. However, the analysis required to project this increase over time is beyond the scope of the UWMP. A conservative approach to predicting Lodi's future groundwater supply is to assume the safe yield value remains constant. The safe yield will be revisited and adjusted accordingly in the 2010 UWMP Update.

Chapter 3: Water Supply

Section 3.2.2: Future Groundwater Supply

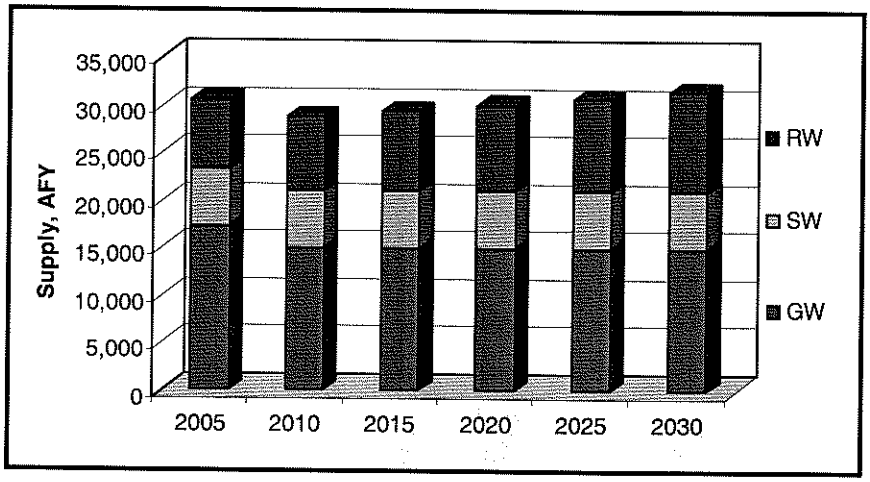
The continuing decline of groundwater levels in the aquifer underlying the City means that the sustainable annual groundwater supply available to the City is something less than what is currently extracted. As a member agency of GBA, the City is participating in the development of policies and programs, including groundwater recharge and conjunctive use programs, intended to help eliminate the eastern San Joaquin County groundwater basin overdraft condition. Additionally, the City plans to reduce its overall groundwater pumping in the future. A safe yield of approximately 15,000 AFY (Treadwell and Rollo, 2005) has been estimated for the aquifer serving Lodi based on water balance calculations (see Appendix G) performed using data primarily from the Eastern San Joaquin Groundwater Management Plan (Appendix F). This safe yield estimate reflects an acreage-based relationship. ***Therefore, as the City's land area increases, the estimated safe yield of the underlying aquifer will likely increase. The safe yield estimate will be revisited in the 2010 UWMP update.*** For the purposes of this UWMP, 15,000 AFY has been assumed as the amount of groundwater available during all future (post-2005) years. Although rigorous scientific analyses have not been performed, the City projects that some recharge of the groundwater basin will occur as the amount of groundwater pumped annually decreases. This result, however, is contingent on the cooperative efforts of all groundwater users within the basin, including other cities, agriculture, and private well owners, to reduce groundwater extraction. The City does not expect development of cones of depression, significant changes in direction or amount of groundwater flow, changes in the movement or levels of contaminants, or changes in salinity and/or total dissolved solids (TDS) concentrations. The amount of groundwater that is projected to be pumped over the next twenty-five years is presented in Table 3-4.

Chapter 3: Water Supply

Section 3.2.3: Future Surface Water Supply

As discussed in Section 3.1.4, in May 2003 the City entered into a 40-year agreement with WID for 6,000 AFY of surface water from the Mokelumne River. The diversion point has not yet been determined. ***The City is considering options for implementing this source before 2010.*** Therefore, 6,000 AFY of treated surface water is included in the supply projections presented in Table 3-5 below. The City is also considering the possibility of obtaining additional surface water supplies from WID; these supplies are not included in Table 3-5, however, as they are not yet considered "firm" supplies.

Chapter 3: Water Supply



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Chapter 3: Water Supply

Why is treated wastewater considered a recycled water supply?

- Wastewater is "real" water .
- Lodi's WSWPCF provides filtration and advanced disinfection. Effluent of this quality meets all State and federal regulations for recycling.
- Lodi's Recycled Water Master Plan will clearly define the distribution and application of recycled water in the future.

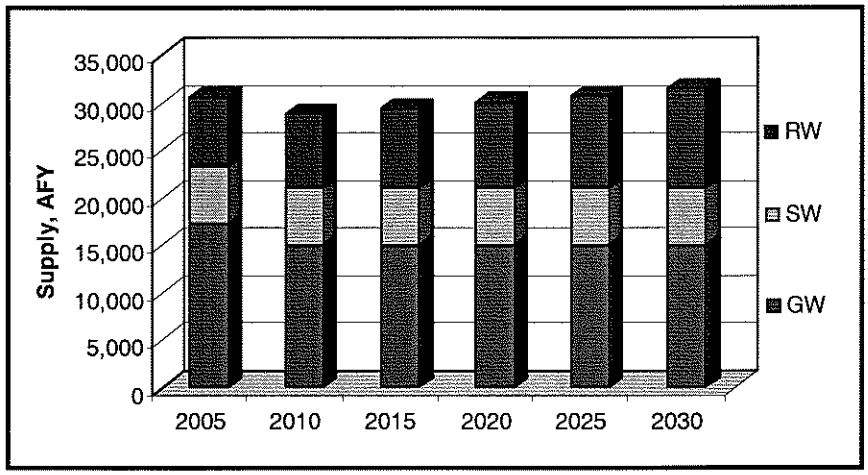
Chapter 3: Water Supply

Differences between UWMP Supplies and 'Reality'

- Although the supplies shown in the UWMP are "real," Lodi lacks the infrastructure to distribute surface water and recycled water to its customers.
- If the additional infrastructure is not constructed, Lodi's supply picture looks much different…

Chapter 3: Water Supply

If additional infrastructure is not constructed…



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Chapter 3: Water Supply

From Chapter 6, Water Supply Reliability:

The future supply volumes presented in Sections 6.2 to 6.4 represent the water to which the City has the legal rights to use. This should not be confused with water that can readily be distributed to the Utility's customers, as additional infrastructure must be constructed before the total volumes presented in the tables [in Sections 6.2 to 6.4] can be distributed to the City. In order to provide the City with surface water, for example, intake facilities, a surface water treatment plant, and additional distribution pipeline ***could*** be required.

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Chapter 4: Water Demand

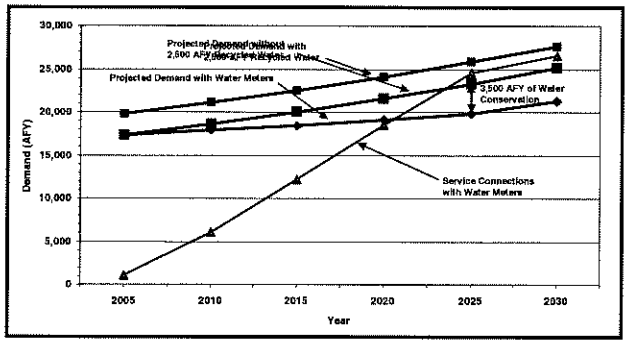
Current Water Demand

- Municipal demand for 2005 was 17,300 AF. The majority of this water is used for irrigation during the summer months.
- A recycled water demand of 2,500 AFY is included in the UWMP. This demand effectively reduces the amount of recycled water available to Lodi for municipal purposes, and is therefore considered a demand by DWR.

Chapter 4: Water Demand

Future Water Demand

- Lodi will begin metering residential connections in the near future, and expects to realize a 15% reduction in demand



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Chapter 5: Demand Management Measures

- DWR requires that 14 Demand Management Measures (DMMs) are addressed in the UWMP.
- For each DMM that Lodi currently implements, a description of Lodi's current practices is provided, including costs and estimated water savings.
- For each DMM that Lodi does not currently implement, a cost effectiveness summary has been provided.

Chapter 5: Demand Management Measures

Summary of Lodi's DMMs:

DMM	Description	Implemented
1	Water Survey Programs for Single Family and Multi-Family Residential Customers	No; B/C Ratio = 0.9
2	Residential Plumbing Retrofit	Yes
3	System Water Audits, Leak Detection and Repair	Yes
4	Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections	In Process
5	Large Landscape Conservation Programs and Incentives	No; B/C Ratio = 5.6
6	High Efficiency-Washing Machine Rebate Programs	No; B/C Ratio = 0.7
7	Public Information Programs	Yes
8	School Education Programs	Yes
9	Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts	No; B/C Ratio = 2.2
10	Wholesale Agency Programs	*Not applicable*
11	Conservation Pricing	In Process
12	Water Conservation Coordinator	Yes
13	Water Waste Prohibitions	Yes
14	Residential Ultra-Low Flush Toilet Replacement Program	Yes

*B/C = Benefit-to-Cost Ratio

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Chapter 6: Water Supply Reliability

- Of Lodi's ground, surface, and recycled water supplies, only the 6,000 AFY of surface water is considered susceptible to climatic conditions.
- WID can legally reduce Lodi's deliveries by 50% during dry years, but no further.
- Although groundwater levels are declining in general, fluctuations due to drought are typically insignificant.
- Recycled water is derived primarily from indoor water usage, which does not vary significantly during dry weather.

Table of Contents

Chapter 7: Water Quality Impacts on Reliability

Groundwater

- Lodi's wells are equipped to provide emergency disinfection. Several locations provide filtration to remove DBCP.

Surface Water

- Water from the Mokelumne River is generally of very high quality.

Recycled Water

- Recycled water from WSWPCF meets stringent State and federal regulations for municipal reuse.

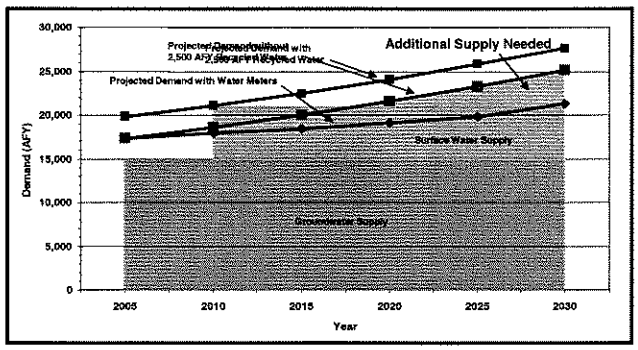
Table of Contents

Chapter 8: Wastewater & Recycled Water

- WSWPCF currently treats about 7,200 AFY of municipal and industrial wastewater. The treatment process includes filtration and disinfection, making the treated effluent suitable for industrial and municipal reuse.
- Approximately 2,500 AFY of water is currently recycled near WSWPCF. This demand is expected continue in the future.

Chapter 8: Wastewater & Recycled Water

- It is estimated that by 2025, water demand will exceed current ground and surface water supplies. Lodi may need to rely on a portion of its recycled water supplies to meet the additional demands.



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Chapter 8: Wastewater & Recycled Water

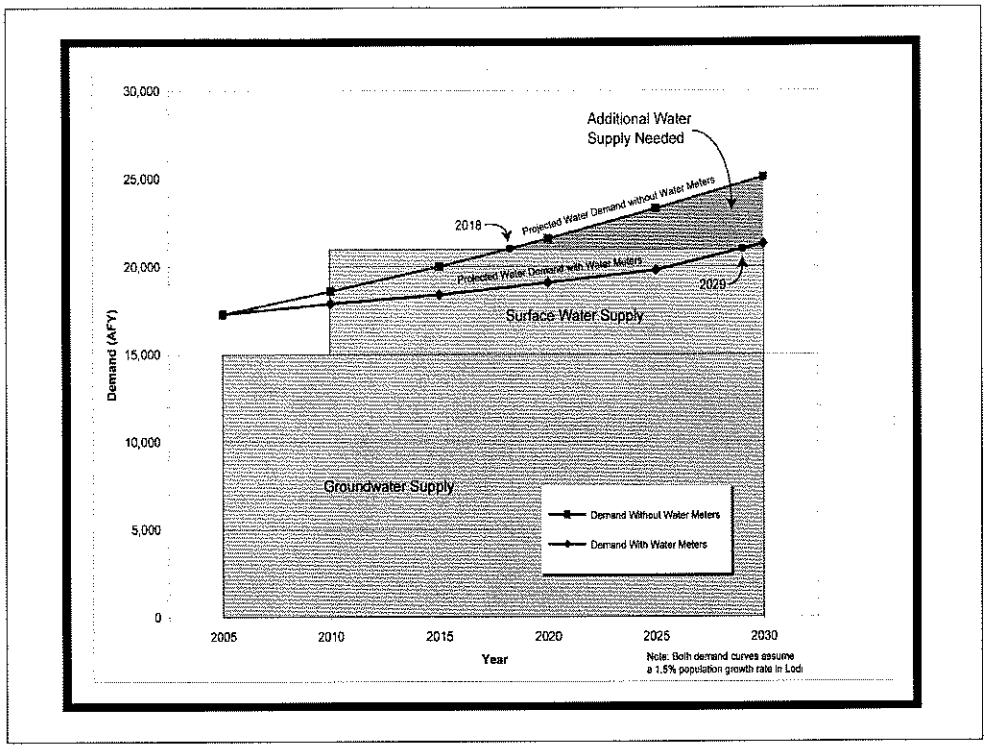
- The UWMP identifies potential recycled water uses within the City of Lodi. Lodi's upcoming Recycled Water Master Plan will provide a detailed analysis of these potential demands.

- Lodi fully intends to utilize recycled water prior to 2025.

Table of Contents

Chapter 9: Supply & Demand Comparison

- The UWMP compares projected supplies during normal, single dry and multiple dry years with projected demands over a 25-year horizon.
- Based on current projections, and with the use of recycled water supplies, Lodi will have sufficient water to meet all existing and future demands.



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Chapter 10: Water Shortage Contingency Plan

- Lodi's Water Shortage Contingency Plan was developed to prepare for and respond to possible future water shortages. The Plan consists of five stages of action:

Stage I	Normal Conditions
Stage II	Water Alert
Stage III	Water Warning
Stage IV	Water Crisis
Stage V	Water Emergency

- Possible catastrophic interruptions to supplies are addressed in Lodi's Emergency Response Plan.

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Chapter 11: Adoption & Implementation of the UWMP

- Lodi's UWMP will be finalized following a two week public review period, currently scheduled from February 15 to March 1, 2006.

- Upon completion, the UWMP will be furnished to San Joaquin County, Northeastern San Joaquin County Groundwater Banking Authority, and the California Dept. of Health Services.

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Appendices

The following appendices are provided with the UWMP:

- Adoption Resolution
- Public Participation Information
- Conservation & Education Information
- WID Contract
- Excerpt from the Emergency Response Plan
- SJ County Groundwater Management Plan
- Water Balance Calculations for Lodi's Safe Yield Estimation

Responses to DWR's Comments

Comments made by DWR on the Draft UWMP have been addressed:

Commenter	Comment	Page/Section Number	Response
Kim Rosmaier (DWR)	If WID expects no change in deliverable volume for the hydrologic scenarios, state this in Section 3.5	Section 3.5 pg 3-9	A footnote has been added to Table 3-7: "b. Reliability of WID supply is indicated in the City's contract with WID in Appendix D." A paragraph following Table 3-7 has also been added: "Wholesale supply reliability is presented in Chapter 6. Although changes in deliverable volumes of water for future hydrologic scenarios have not been formally predicted at this time, Chapter 6 presents the most restrictive possible cases for the future."
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Kim Rosmaier (DWR)	Typo, third paragraph, second line third word: *buy* should be *but* and third line fourth word: *form* should be *from*	Section 3.1.1 pg 3-1	Agree. Edits have been made.

Questions?

Appendix C - Conservation & Education Information

PUBLIC WORKS DEPARTMENT
WATER CONSERVATION OFFICE
(209) 333-6829

INFORMATION SHEET

Requirements of the City of Lodi Water Conservation Ordinance

****

Ordinance Requirements - Water waste includes but is not limited to:

1. Allowing a controllable leak of water to go unrepaired.
2. Watering lawns, flower beds, landscaping, ornamental plants or gardens except on watering days as follows: **Odd**-numbered addresses on Wednesday, Friday and Sunday; **Even**-numbered addresses on Tuesday, Thursday, and Saturday. (WATERING IS NOT ALLOWED ON MONDAYS)
3. Watering lawns, flower beds, landscaping, ornamental plants and gardens between **10 a.m. and 6 p.m. from May 1 through September 30** each year. (WATERING BETWEEN THOSE HOURS IS NOT ALLOWED)
4. Washing down sidewalks, driveways, parking areas, tennis courts, patios, other paved areas or buildings.
5. Washing any motor vehicle, trailer, boat, moveable equipment except with a bucket. A hose shall be used for rinsing only and for not more than three (3) minutes.
6. Use of a hose without a positive shut off nozzle. (NO OPEN HOSES)
7. Allowing excess water to flow into a gutter or any drainage area for longer than three (3) minutes.
8. Overwatering lawns/landscapes, specially from November 1 through February 28, or during and immediately after a rain.

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Water Wasting Rates and Enforcement - Education and cooperation is our first goal, but the following enforcement procedures and charges will be followed for water wasting.

-1st Water Waste - City will leave an information sheet describing the waste so that it may be corrected.

-2nd Water Waste*- City will give written notice requiring corrective action. * Within 12 months of a 1st Water Waste

-3rd Water Waste*- City will give written notice, and a $35 charge will be added to the next utility bill. * Within 12 months of a 2nd Water Waste

-4th Water Waste*- City will give written notice, and a $75 charge will be added to the next utility bill. * Within 12 months of a 3rd Water Waste

-5th and Subsequent Water Wastes*- City will give written notice, and a $150 charge will be added to the next utility bill **AND** the City may require a water meter and/or flow restrictor to be installed at the waster's expense.
* Within 12 months of the previous Water Waste

****

Water saving tips and other Water Conservation Program information:

1. **Before washing down paved areas for public health or safety** (see #4 above) or for any special circumstances **call** the Water Conservation Office at 333-6829 for prior approval.
2. If you need **extra watering due to fertilizer application or for new turf/seeding**, please **first notify the Water Conservation Office** at 333-6829.
3. For lawns with a run-off problem, apply water for a short period of time and then allow enough time for it to soak in before turning the water back on, for example; 5 minutes on, 20 minutes off, 5 minutes on. This will increase the amount of water being absorbed and decrease the amount of water running into the gutter. Consult landscapers/gardeners/nurseries for improving your lawns water absorbing capacity and for other ideas.
4. During and following rain it is not necessary to water lawns and landscaping, and normally from November 1 through February 28, one watering per week or less is more than enough.
5. Regularly replace your back-up batteries in your automatic sprinkler controls to prevent excess watering due to power failures or interruptions.

****

If you have any questions, need to discuss any violations, would like further information concerning water conservation, or to report water waste, please call the Water Conservation Office at 333-6829.

This is Not a Citation. However, if you have received any previous notice within the last 12 months, a written notice may follow.

See reverse for full Water Conservation Ordinance.

Revised 3/00

DEPARTAMENTO DE OBRAS PÚBLICASDE
OFICINA DE CONSERVACIÓN DE AGUA OFIC
(209) 333-6829

HOJA DE INFORMACIÓNDE

Requisitos del Reglamento de Conservación del Agua de la Ciudad de Lodi

****

REQUISITOS DEL REGLAMENTO DE CONSERVACIÓN DEL AGUA - EL DESPERDICIO DEL AGUA INCLUYE PERO NO ESTÁ LIMITADO A LO SIGUIENTE:

1. El permitir que una gotera de agua que puede ser controlada siga sin ser reparada.
2. El regar céspedes, jardines y plantas de ornamentación excepto en los días designados por la Ciudad. Domicilios que terminan en números nones: Miércoles, Viernes y Domingos. Domicilios que terminan en números pares: Martes, Jueves y Sábados.
   (NO ES PERMITIDO REGAR LOS LUNES)
3. El regar céspedes, jardínes, y plantas de ornamentación entre las horas de las 10 de la mañana a las 6 de la tarde a partir del 1ro de Mayo hasta el 30 de Septiembre de cada año. (REGAR ENTRE ESAS HORAS NO ES PERMITIDO)
4. El lavar aceras, áreas de estacionamiento, canchas de tenis, edificios, entradas residenciales, patios y otras áreas pavimentadas.
5. El lavar vehículos de motor, equipo movible, lanchas y remolques excepto con un balde. Se debe usar una manguera solamente para enjuagar y no por más de tres (3) minutos.
6. EL usar una manguera sin un boquerel positivo de cortar el agua.
7. El dejar que el exceso de agua siga corriendo a la cuneta o a una área de drenaje por más de tres (3) minutos.
8. El regar demasiado los céspedes, jardines y plantas de ornamentación a partir del 1ro de Noviembre al 28 de Febrero, durante y después de llover.

****

EJECUCIÓN Y RECARGOS POR EL DESPERDICIO DEL AGUA - La educación y cooperación es nuestra primera meta. Las siguientes formas de ejecución y recargos serán aplicados por el desperdicio del agua:

Primer desperdicio de agua - La Ciudad le dará una hoja de información describiendo el desperdicio del agua para que este corregido.

Segundo desperdicio de agua* - La Ciudad le enviará una nota requiriendo acción correctiva.

Tercer desperdicio de agua* - La Ciudad le enviará una nota y un recargo de $35.00 será agregado a la siguiente cuenta de utilidades.

Cuarto desperdicio de agua* - La Ciudad le enviará una nota y un recargo de $75.00 será agregado a la siguiente cuenta de utilidades.

Quinto y subsiguientes desperdicios de agua* - La Ciudad le enviará una nota y un recargo de $150.00 será agregado a la siguiente cuenta de utilidades. La Ciudad podrá requerir un contador y una llave para controlar el flujo de agua, que será pagado por el usuario. (*Dentro de los mismos 12 meses).

****

RECOMENDACIONES PARA EL USO EFICIENTE DE AGUA:

1. Antes de lavar áreas pavimentadas por razones de salud o segurida pública (vea #4 arriba) o por alguna razón especial, llamar a la Oficina de Conservación del Agua al 339-9026 para autorizacion.
2. Los céspedes con problemas de drenaje, deben ser regados por un período corto, y esperar que el agua se consuma antes de volver a regar por ejemplo: regar por 5 minutes, no regar por 20 minutes; regar por 5 minutos, no regar por 20 minutes. Regando de esta manera el cesped absorvera más y se disminuirá la desperdicio del agua.
3. Durante y después de llover no es necesario regar los céspedes. A partir del 1ro de Noviembre hasta el 28 de Febrero solamente regar una vez por semana.

****

SI UD TIENE ALGUNA PREGUNTA, NECESITA HABLAR CON ALGUNA PERSONA ACERCA DE UNA INFRACCIÓN, SI NECESITA MAS INFORMACIÓN ACERCA DE LA CONSERVACIÓN DEL AGUA, O NECESITA INFORMARSE ACERCA DEL DESPERDICIO DEL AGUA, POR FAVOR LLAMAR A LA OFICINA DE CONSERVACIÓN DEL AGUA AL TELEFONO 333-6829.

ESTO NO ES UNA CITACIÓN. PERO SI UD HA RECIBIDO ALGUN OTRO AVISO DENTRO DE LOS ÚLTIMOS 12 MESES, UN AVISO POR ESCRITO LE SERÁ ENVIADO.

(Revised 8/99)

REGLAMENTO PARA CONSERVACIÓN DE AGUA
CÓDIGO MUNICIPAL DE LA CIUDAD DE LODI, CAPÍTULO 13.08, ARTÍCULO III

****

DESPERDICIO (MALGASTO). (Sección 13.08.220)
El desperdicio de agua es prohibido y cualquier desperdicio pondrá a la persona bajo las condiciónes de este artículo.

DEFINICIÓN. (Sección 13.08.230)

"El desperdicio de agua" incluye, pero no está limitado a lo siguiente:

A. El no reparar una gotera de agua que puede ser controlada;

B. El regar céspedes, jardines, plantas de ornamentación, los días y horas fuera de las permitidas en la Sección 13.08.240 de este artículo.

C. El lavar aceras, áreas de estacionamiento, canchas de tenis, calles, edicifios, entradas residenciales y otras áreas pavimentadas, excepto cuando sea necesario lavar un derrame de alguna substancia que pueda ser peligrosa para la salud y la seguridad pública.

D. El lavar vehículos, remolques o equipo movible a no ser con un balde y enjuagar el vehículo o equipo, usando una manguera no por más de tres minutos.

E. El usar una manguera sin un boquerel positivo para cortar agua.

F. El regar demasiado una área haciendo que el agua corra a una cuneta o área de drenaje por más de tres minutos.

G. El dejar correr el agua sin necesidad en un domicilio, establecimiento comercial o industrial, en el pavimento, desagues o áreas de drenaje, con algún equipo o de cualquier otro modo por más de tres minutos.

H. El regar demasiado los céspedes, jardines y plantas de ornamentacion a partir del 1º de Noviembre al 28 de Febrero, durante y después de llover.

DÍAS Y HORAS DE RIEGO. (Sección 13.08.240)
A. Días. El riego de céspedes, jardines y plantas de ornamentación durante el año será permitido como sigue:
1. Propiedades que terminan en números nones (1,3,5,7,9): Miércoles, Viernes y Domingos.
2. Propiedades que terminan en números pares (2,4,6,8,0): Martes, Jueves y Sábados.

B. Horas. El riego de céspedes, jardines y plantas de ornamentación se permite a cualquier hora, excepto a partir del 1º de Mayo hasta el 30 de Septiembre entre las horas de las 10 de la mañana a las 6 de la tarde.

PROCEDIMIENTOS PARA LA EJECUCIÓN. (Sección 13.08.250)
A. Cuando la Ciudad se entere del primer desperdicio de agua, la Municipalidad le dará una hoja con información que contiene en detalle el Articulo III, en el cual se le dará a conocer el tipo de desperdicio ocurrido para que éste sea corregido, remediado o disminuido inmediatamente o dentro de un período especificado, que la Ciudad crea conveniente. La hoja de información también puede ser entregada a cualquier otra persona conocida por la Ciudad que sea responsable por el desperdicio del agua, o también puede ser enviada por correo al domicilio donde tuvo lugar el desperdicio. En caso de que continuen los desperdicios de agua, nuevas notificacions serán enviadas al mismo domicilio.

B. En el caso de un segundo desperdicio de agua durante los mismos 12 meses, la Municipalidad enviará a la persona que regularmente recibe la cuenta de utilidades una nota enumerando fechas y tipos de desperdicios ocurridos.

C. En el caso de un tercer desperdicio de agua dentro de los mismos 12 meses, otra nota será eviada por correo notificándole de un recargo de $35.00 dólares que serán agregados a la cuenta de utilidades del siguiente mes.

D. En el caso de un cuarto desperdicio de agua dentro de los mismos 12 meses, otra nota será enviada por correo notificándole nuevamente de un recargo de $75.00 dólares que serán agregados a la cuenta de utilidades del siguiente mes.

E. En el caso de un quinto o más desperdicios de agua dentro de los mismos 12 meses, otra nota será enviada notificándole de un recargo de $150.00 dólares que serán agregados a la cuenta de utilidades del siguiente mes. La Ciudad también puede requerir que el dueño o el usuario pague el costo de instalar un contador como pre-requesito para continuar el servicio de agua. La Ciudad también podrá instalar una llave para regular el flujo del agua y requerir que el dueño o el usuario pague el costo de instalar o de remover el contador o la llave .

APLICACIÓN ESTRICTA. (Sección 13.08.260)
Si el Director de Obras Públicas o un representante designado determina que la aplicación estricta del artículo III, pueda causar daños a la salud y la seguridad pública, u otra condición especial exista, la aplicación estricta puede ser suspendida temporalmente. Las circunstancias especiales incluirán: pero estarán limitadas a áreas recién sembradas, a lavar después de encementar y de lavar a presión un edificio antes de ser pintado. La decisión del Director de Obras Públicas puede ser apelada al Concilio de la Ciudad como se describe en la sección 13.08.265 de este artículo.

APELACIÓNES. (Sección 13.08.270)
Si la decisión hecha por el Director de Obras Públicas no es satisfactoria a la persona que apelo por la reconsideración, esta persona tiene veinte (20) días después de ser notificado de la decisión del Director, para apelar por escrito al Concilio de la Ciudad. La apelación será revisada por el Concilio dentro de veinte (20) días después la la fecha de registro. El Concilio hará la decisión final de la apelación dentro de veinte (20) días después de la revisión. La acción, decisión o determinación del Director de Obras Públicas, permanecerá en efecto durante el período de reconsideración. Los recargos acumulados serán suspendidos temporalmente hasta que el Concilio de la Ciudad haga su decisión final.

VIOLACIÓN - INFRACCIÓN. (Sección 13.08.280)
Además de los procedimientos para la ejecución y recargos dados a conocer en este artículo, cualquier persona que desperdicie agua, como se define en este artículo, puede también ser acusada de una infracción.

PROPÓSITO DE EMERGENCIA PARA LA CONSERVACIÓN DEL AGUA. (Sección 13.08.290)
El propósito, de emergencia para la conservación del agua es ayudar a mantener la presión del agua y suplir demandas. Cuando el sistema de agua no puede o no es adecuado esto puede causar daños al sistema de agua y poner en peligro la salud y seguridad del público. El Director de Obras Públicas o un representante designado determinará el grado de emergencia y designará cuales restricciónes adicionales serán necesarias para el uso del agua y que acciónes apropiadas deberán ser tomadas para proteger el sistema del agua y a los habitantes de Lodi.

Notice of Violation of Lodi Municipal Code Section 13.8 Article III – Water Conservation

Issued to: ***Copy to:***

Location of Violation:
LODI, CALIFORNIA

First Water Waste – Information Sheet left at location of violation.

_____ *Second Water Waste*[a] *First mailed notice (warning) requiring corrective action.*
(a) Within 12 months of a first waste of water.

_____ *Third Water Waste*[b] *A $35 charge to be added to next utility bill.*
(b) Within 12 months of a second waste of water.

_____ *Fourth Water Waste*[c] *A $75 charge will be added to next utility bill.*
(c) Within 12 months of a third waste of water.

_____ *Fifth Water Waste*[d] *A $150 charge will be added to next utility bill.*
(d) Within 12 months of the previous waste of water. City may also require installation of a water meter and/or water restrictor at the user's expense.

Type(s) of Violations: (includes all **Violations** listed below, current and previous)

_____ 1) *Failure to control a controllable leak*
(If you need help locating the leak, please call the Water Conservation Coordinator at 333-6829.)
_____ 2) *Watering on an unassigned day*
_____ 3) *Watering between 10:00 A.M. & 6:00 P.M. from May 1 thru September 30*
_____ 4) *Washing down sidewalks, paved areas, buildings, etc.*
_____ 5) *Use of a hose without a positive shut off nozzle*
_____ 6) *Flooding gutter or drainage area over three (3) minutes*
_____ 7) *Overwatering, specially from Nov. 1 thru Feb. 28, or during or after rain*
_____ 8) *Other* _____

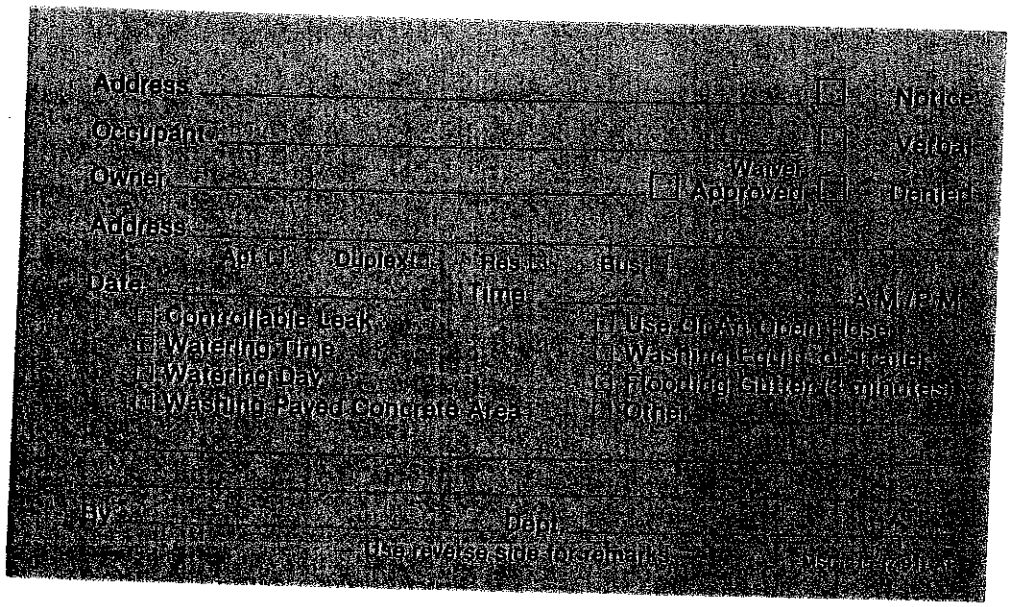
	Violations		
	Dates	**Time**	**Type(s)**
Current:			
Previous:			

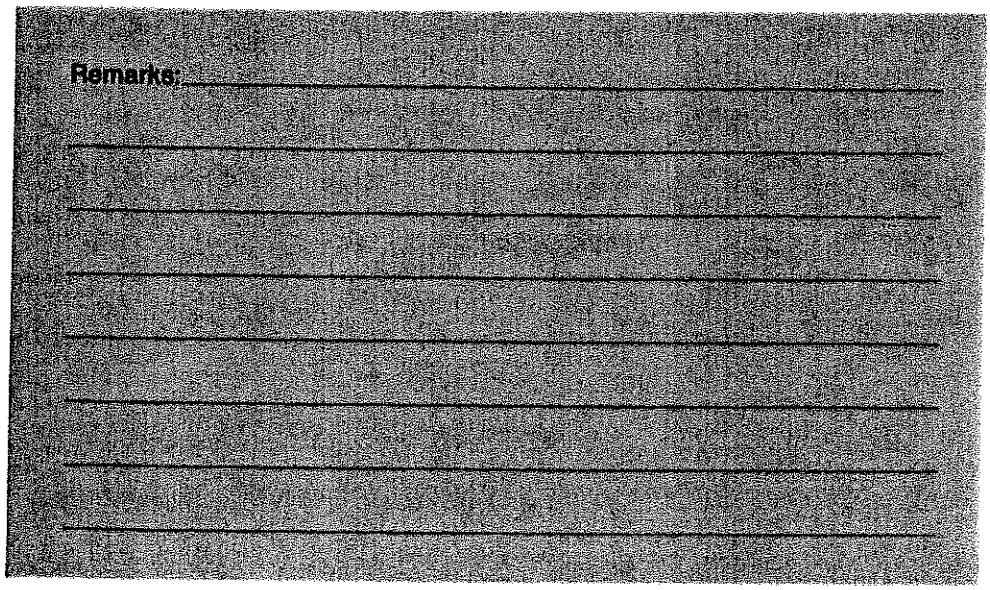
Richard C. Prima, Jr.
Public Works Director

By: _____ Date:
Frank Beeler
Assistant Water/Wastewater Superintendent

Questions? Call the Water Conservation Coordinator at (209) 333-6829
See reverse for more information

WATER CONSERVATION VIOLATION CARD





City of Lodi, Public Works Department
Water/Wastewater Division - Water Conservation

Water Conservation Report Annual Summary
Through 2005 Season

The following is the annual summary of water conservation activities for the City of Lodi.

Year (Apr. - Oct.)	Million Gallons *	Population	Gal. Per Capita Per Day**	Inches Rain	Water Conservation Notices Recorded ***	Patrol Miles	Deputy Hours
1997	4,022.4	54,700	285	1.40	3,965	27,489	3,449
1998	3,578.0	55,681	249	6.84	2,625	23,583	3,309
1999	4,164.7	56,926	284	1.50	4,306	25,463	3,503
2000	4,171.6	57,935	279	4.43	3,198	29,051	3,527
2001	4,331.6	58,600	287	3.27	3,677	23,516	4,577
2002	4,159.6	59,431	271	0.88	1,557	23,429	4,205
2003	4,016.8	60,521	257	3.25	2,973	28,341	3,787
2004	4,271.9	60,769	273	4.52	1,217	24,721	2,484
2005	4,027.6	62,467	250	3.46	3,163	15,876	1,962

* Total water produced for all uses.

** Total gallons minus 17% for industrial/commercial uses, divided by the population and number of days.

*** Does not include the numerous phone calls and undocumented contacts with the citizens of Lodi.

	1998				1999				2000				2001			
	Water Production		Rainfall		Water Production		Rainfall		Water Production		Rainfall		Water Production		Rainfall	
Month	Total MG/ month	% +/- from prev. year	Inches Rain/ month	Change from prev. year	Total MG/ month	% +/- from prev. year	Inches Rain/ month	Change from prev. year	Total MG/ month	% +/- from prev. year	Inches Rain/ month	Change from prev. year	Total MG/ month	% +/- from prev. year	Inches Rain/ month	Change from prev. year
Apr	285	-36 %	1.67	+1.37	353	+24 %	0.91	-0.76	437	+24 %	1.18	+0.27	361	-17 %	1.77	+0.59
May	314	-42 %	3.67	+3.36	541	+72 %	0.29	-3.38	483	-11 %	0.94	+0.65	585	+21 %	0.00	-0.94
Jun	452	-26 %	0.19	+0.00	589	+30 %	0.00	-0.19	658	+12 %	0.04	+0.04	656	-0 %	0.67	+0.63
Jul	710	-1 %	0.00	+0.00	695	-2 %	0.00	+0.00	738	+6 %	0.03	+0.03	749	+1 %	0.00	-0.03
Aug	745	+5 %	0.00	-0.09	783	+5 %	0.00	+0.00	791	+0.9 %	0.08	+0.08	807	+2 %	0.00	-0.08
Sep	661	+15 %	0.08	+0.08	689	+4 %	0.08	+0.00	688	-0.2 %	0.00	-0.08	663	-4 %	0.30	+0.30
Oct	410	-2 %	1.23	+0.72	514	+25 %	0.22	-1.01	377	-27 %	2.16	+1.94	511	+36 %	0.53	-1.63
TOT.	3578	-11%	6.84	+5.44	4165	+16 %	1.50	-78%	4172	0.2%	4.43	+95%	4332	3.8%	3.27	-126%

	2002				2003				2004				2005			
	Water Production		Rainfall		Water Production		Rainfall		Water Production		Rainfall		Water Production		Rainfall	
Month	Total MG/ month	% +/- from prev. year	Inches Rain/ month	Change from prev. year	Total MG/ month	% +/- from prev. year	Inches Rain/ month	Change from prev. year	Total MG/ month	% +/- from prev. year	Inches Rain/ month	Change from prev. year	Total MG/ month	% +/- from prev. year	Inches Rain/ month	Change from prev. year
Apr	404	+12 %	0.16	-1.61	297	-26 %	2.66	+2.50	464	+56 %	0.63	-2.03	338	-27 %	2.06	+1.43
May	528	-10 %	0.72	+0.72	470	-11 %	0.55	-0.17	603	+28 %	0.13	-0.42	472	-22 %	0.84	+0.71
Jun	657	+0 %	0.00	-0.67	656	-0 %	0.00	+0.00	683	+4 %	0.00	+0.00	608	-11 %	0.49	+0.49
Jul	733	-2 %	0.00	+0.00	763	+4 %	0.00	+0.00	759	-1 %	0.00	+0.00	764	+1 %	0.00	+0.00
Aug	725	-10 %	0.00	+0.00	705	-3 %	0.00	+0.00	737	+4 %	0.00	+0.00	749	+2 %	0.00	+0.00
Sep	604	-9 %	0.00	-0.30	607	+0 %	0.00	+0.00	605	-0 %	0.40	+0.40	594	-2 %	0.04	-0.36
Oct	509	-0 %	0.00	-0.53	518	+2 %	0.04	+0.04	421	-19 %	3.36	+3.32	504	+20 %	0.03	-3.33
TOT.	4160	-4.0%	0.88	-173%	4017	-3.4%	3.25	+169%	4272	6.4%	4.52	-61%	4028	-5.7%	3.46	-123%

City of Lodi, Public Works Department

Water/Wastewater Division - Water Conservation

Water Conservation Report Annual Summary

April 1, 2000 through October 31, 2000

The following is the annual summary of water conservation activities for the City of Lodi.

Year (Apr. - Oct.)	Million Gallons *	Population	Gal. Per Capita Per Day**	% change from previous year	Inches Rain	Water Conservation Notices Recorded ***	Patrol Miles	Deputy Hours
1997	4022.4	54,700	285	+5.2 %	1.40	3965	27,489	3449
1998	3578.0	55,681	249	-12.6%	6.84	2625	23,583	3309
1999	4164.7	56,926	284	+13.9 %	1.50	4306	25,463	3503
2000	4171.6	57,935	279	-1.6%	4.43	3198	29,051	3527

* Total water produced for all uses.

** Total gallons minus 17% for industrial/commercial uses, divided by the population and number of days.

*** Does not include the numerous phone calls and undocumented contacts with the citizens of Lodi.

	1997		1998				1999				2000			
	Water Production		Water Production		Rainfall		Water Production		Rainfall		Water Production		Rainfall	
Month	Pro-duction MG/ month	Inches Rain/ month	Total MG/ month	% +/- from prev. year	Inches Rain/ month	Chang e from prev. year	Total MG/ month	% +/- from prev. year	Inches Rain/ month	Chang e from prev. year	Total MG/ month	% +/- from prev. year	Inches Rain/ month	Chang e from prev. year
Apr	446	0.30	285	-36 %	1.67	+1.37	353	+24 %	0.91	-0.76	437	+24 %	1.18	+0.27
May	546	0.31	314	-42 %	3.67	+3.36	541	+72 %	0.29	-3.38	483	-11 %	0.94	+0.65
Jun	613	0.19	452	-26 %	0.19	+0.00	589	+30 %	0.00	-0.19	658	+12 %	0.04	+0.04
Jul	715	0.00	710	-1 %	0.00	+0.00	695	-2 %	0.00	+0.00	738	+6 %	0.03	+0.03
Aug	711	0.09	745	+5 %	0.00	-0.09	783	+5 %	0.00	+0.00	791	+0.9 %	0.08	+0.08
Sep	574	0.00	661	+15 %	0.08	+0.08	689	+4 %	0.08	+0.00	688	-0.2 %	0.00	-0.08
Oct	417	0.51	410	-2 %	1.23	+0.72	514	+25 %	0.22	-1.01	377	-27 %	2.16	+1.94
TOT.	4022	1.40	3578	-11%	6.84	+80%	4165	+16 %	1.50	-78%	4172	0.2%	4.43	+95%

Water Contact Categories	Notice Only	Both Notice & Verbal
Controllable Leak	1131	596
Watering Day	92	51
Watering Time	379	384
Washing Paved Areas	22	111
Use of Open Hose	70	119
Gutter Flooding	136	89
Other	5	0
Overwatering	0	13
Subtotals	1835	1363
Total	3198	

Water Conservation Notices Mailed	Number of Notices	Assessment per Notice	Total Assessments*
2nd Notices	301	none	na
3rd Notices	10	$ 35.00	$ 350.00
4th Notices	1	$ 75.00	$ 75.00
5th Notices	0	$ 150.00	$ 0.00
Totals	312		$ 425.00

*Total amount assessed through notices, not total amount collected.

Total Mailed Notices for Previous Years:	2000	1999	1998	1997
	312	192	109	294

Water Conservation Education Activities:

Due to illness and sudden passing of Orson Laam the Water Conservation Coordinator, no education activities were conducted in this period of time.

CITY OF LODI, PUBLIC WORKS DEPARTMENT
Water/Wastewater Division
Municipal Service Center
1331 South Ham Lane, Lodi, CA 95242
(209) 333-6740

Water Conservation Education Program
Prepared by: George Sande, Water Conservation Officer
Frank Beeler, Assistant Water/Wastewater Superintendent

THE CLASSROOM

Philosophy

Using a gut-level hands-on approach that is stimulating to the class is a prerequisite to accomplishing the objectives to teaching "Water Science" in the classroom. It must be pertinent and challenge their imagination.

My previous teaching experience has been at the secondary level. I believe the elementary level is far more cost effective when considering lifetime attitudes, values and habits being molded and established in the most formative period of their lives.

Objective

Instill water awareness and interest particularly among students in grade levels K thru 6, and the application of this awareness be utilized in all aspects of water conservation. This is accomplished by short lectures with students participating and with several "magic" water shows/experiments that they are challenged to guess results and to do at home.

Procedure

The preparation of materials necessary for the particular grade level must first be selected and organized for presentation. The materials for the water experiments can be very simple in that nearly all the ingredients may be found in the kitchen and most of the materials can be collected from garbage cans.

This equipment is organized and put into a cardboard box. A two-wheeled cart is a convenience for wheeling from class to class.

An overhead projector is a must if a transparency is being used. It is also important when showing water in a medicine dropper, objects floating on water (seen through a glass plate).

Always arrange to be in the classroom at least five or ten minutes early to set up and make observations. It is important to observe student displays on bulletin boards in the classroom and even in the hallways because often their ideas and current projects on display can be worked into the water presentation.

Also, if you can initially impress them with your observations of their activities they are better conditioned to be receptive to your demonstrations.

The initial introduction for a presentation usually includes distribution of book markers and an OUR WATER brochure. The book marker has an anti-drug message on one side and a water conservation message on the other. This presents an opportunity to reiterate the anti-drug message and present the City of Lodi message concerning WATER IS LIFE, DON'T WASTE IT. Then the brochure is briefly discussed. The students are asked to identify familiar objects and landmarks shown on the front page. Then they are asked to take the brochure home and maybe play the same game with their parents, brothers, sisters, or even friends. It is suggested they encourage their parents to read the information on the other three pages.

The teacher is given a yard/meter stick for class use. The water conservation logos imprinted on this ruler is briefly discussed.

Teaching

My presentation always varies in some way, but basically I think it is best to establish enthusiasm by indicating I play the part of a magician in performing water tricks. At the same time, they are informed that there will be no charge for the performance and all the secrets will be revealed. At this point they are encouraged to perform at least one of the tricks for their parents, brother, sister or friend.

Since enthusiasm is so vital for group participation, I constantly ask questions to see if they can predict the outcome of each experiment explaining that no one is "wrong" until after they can see the conclusive proof before their eyes.

One of my favorite lessons is to teach OSMOSIS by using an egg, potato or fish. If it is a fourth grade class, I use all three. (These lessons are enclosed)

The message I try to convey is that the water conservation program is THEIR program. This is where the gut-level approach is emphasized. By a raise of hands, I have found that about 90% of elementary students have pets. A simple reminder that if we didn't have water, all their pets would be dead--is a sobering thought for all. Another example: By displaying a cross section of a tree and showing them the tree rings which indicates the age of a tree as well as dry and wet years is a documentation of drought periods. Such documentation has shown on very old trees that from the year 1620 to 1671 there was a fifty year period of consecutive drought years. They listen when you suggest the possibility of this happening in their life time.

Of course such dramatic facts and methods will vary with the level of the class I am teaching.

Teachers are invariably receptive and interested in the presentations and nearly always do follow-up on some aspect of what I did in their particular class. Many use the experience as a language arts assignment and I have received literally hundreds of letters from students or packets of students' art work along with their letters. The letters are particularly revealing to me in that they indicate their perceptions, interests, and understanding.

Even though I feel well prepared and organized when presenting a lesson, I have found there is always room for spontaneity and adapting to unique differences in classes. I think this philosophy is important because a fresh approach will always help prevent one from giving a stale presentation.

SETTING UP THE PROGRAM

Most of my organizational methods were learned by trial and error. Due to constant changes occurring in some schools, I feel the following approach is the best way. You will also find each school is unique in itself.

Normally, I meet with one of the principals (depending which one decides to be in charge). I then discuss the basics of our whole water conservation program. At this time I also arrange to meet with all the teachers at the next Principal-Teacher meeting. At this meeting I explain what I do in the classroom and briefly outline the objectives of our educational program. This meeting also gives them a chance to ask questions.

Initially I introduce my calendar. It is enlarged so that each teacher can sign up for a class by indicating their name, grade level, time and room number in the chosen open date block. This calendar is then posted in the teachers lounge room for continued scheduling in advance.

It is best to have the teachers sign up at the meeting when the calendar is being passed around during the time I am talking to them--about 10 or 15 minutes. It also insures their understanding of the sign up procedure.

Periodically, I check all calendars which have been posted even if there have been no classes in the school. New sign-ups are logged in my master calendar appointment book. At this time I leave a City Action Slip notice in the teacher's mailbox confirming the requested class. My business card is attached to the calendars so that the teachers can phone me in case of cancellation or changing schedule.

When checking calendars it is beneficial if you can arrange to do so during a time when several teachers are in the lounge room. Invariably, teachers tend to sign up when they see me in the lounge room or somewhere on the campus. Calendars are checked

when I give a demonstration at that particular school, but it is important to check each school at least once a week.

EXTRACURRICULAR ACTIVITIES

In order to enhance, expand and further support the educational aspects other innovations come into play such as:

1. Evening classes for Boy Scout/Girl Scout troops.

2. Speaking to the Rotary, Kiwanis, Business Mens' Club and ATT employees, etc.

3. The city co-sponsored a water conservation workshop held at UOP in Stockton. Eighty eight teachers attended this workshop.

4. Newspaper stories.

5. As a Docent, I have conducted tours in the Wilderness Area surrounding Lodi Lake. Class discussion is held at the outdoor amphitheater.

6. Posters: I send letters to all teachers who have participated in a classroom demonstration with an invitation to submit a class poster. The poster, 28" X 44", is provided by the city. The California Department of Water Resources has declared the month of May as Water Awareness Month and we have been able to cooperate with their efforts in this way. This year I picked up 46 posters from classrooms which were distributed to banks, hospitals, City Hall, restaurants, and other business establishments. Teachers were informed of the location of their class poster so that parents and students might see the exhibit. All participating officials receiving the poster were very receptive to the idea.

7. Fair Booth: The most beneficial factor with having a Fair Booth at our local festival is for drawing the attention of teachers who may sign up for a class. They need only designate the month they want a class. I call them later for confirmation of specific day and time.

We are all very interested in anyone planning a similar water conservation program and the City of Lodi will assist in any way possible to initiate and establish this vital program that should no longer be ignored.

MATERIALS

1.	AIMS Newsletter-AIMS Education Foundation P.O. Box 7766 Fresno, CA 93747	See enclosed samples.
2.	California Department of Water Resources (DWR) Office of Public Information and Communication Room 1104-1, Resources Bldg 1416 Ninth Street Sacramento, CA 95814 Telephone: ATSS 8-473-5839	Water conservation ideas and tips. Listings of their publications, techniques DWR NEWS.
3.	American Water Works Association (AWWA) Information Service 6666 West Quincy Avenue Denver, Colorado 80235 (303) 794-7711	Water conservation info. charts, articles on tours, drought, award campaigns (water awareness month promotion).
4.	ADCO Specialties Catalog 1924 Pacific Avenue Stockton, CA 95204 (209) 467-0433	Pens, calendars, rulers, flags, bookmarkers, slogans, emblems, keys, novelties, badges, pictorial illustrations
5.	Walter W. Cribbins Company 562 Mission Street San Francisco, CA 94105 (415) 543-4153	Conservation Materials, Slogans, pictures
6.	Discovery Toys Kathy Bell Educational Consultant 335 Louie Avenue Lodi, CA 95240 (209) 369-7708	Educational toys for K-6, clay, paints, blocks, gifts, creative units, puzzles, jig saw, magnets, mirrors, fish, simple experiments.

MATERIAL SUPPLIERS (CONT.)

7.	East Bay Municipal Utilities Department (EBMUD) Public Information P.O. Box 24055 Oakland, CA 94623 (415) 891-0609	Field trips, charts, maps, requested local information, fishery, reservoirs, brochure on water-health, pamphlets.
8.	Stockton Blue Reprographics Supplies 1421 North El Dorado Stockton, CA 95202 (209) 464-6012	Custom designing prints, vellum, copies. Our slogan and illustration was reproduced (enlarged) by them.
9.	Informational Booklets Channing L. Bete Company Inc. 200 State Road South Deerfield, MA 01373	Booklets pertaining to all aspects of conservation; water treatment, etc.

Appendix D - WID Contract

AGREEMENT FOR PURCHASE OF WATER FROM THE WOODBRIDGE IRRIGATION DISTRICT BY THE CITY OF LODI

This Agreement is made and entered into between Woodbridge Irrigation District and the City of Lodi, adjoining entities located within the County of San Joaquin, State of California, this 13th day of May, 2003.

Background Recitals.

a. The City of Lodi obtains its municipal water supply from wells located within the City, extracting the water from the underground aquifer, which is replenished in part by flows of the Mokelumne River. Lodi desires to acquire a supplemental surface water supply to avoid being wholly dependent upon the wells and the possible impacts of eventual overdraft of the groundwater supply.

b. Woodbridge Irrigation District (District or WID) is an irrigation district that is organized and existing under Division 11 of the California Water Code (Sections 20,500 et seq). The District is located immediately west of the City of Lodi and immediately north of the City of Stockton. The District diverts water from the Mokelumne River at Woodbridge Dam, located in the NE 1/4 of the SE 1/4 of Section 34, Township 4 N, Range 6 E, MDBM, for irrigation of a net area of 19,370.3 acres within a gross area of 40,441.77 acres and located within Townships 2 N, 3 N, 4 N and 5 N, Ranges 5 E, 6 E and 7 E, MDBM.

c. The District diverts its water supply from the Mokelumne River under pre-1914 appropriative rights for the diversion of water up to 300 cubic feet per second (cfs). The District's pre-1914 rights are overlapped by the District License No. 5945 for the appropriation of 300 cfs per annum from February 1 to October 31 for irrigation use, supplemented by License No. 8214 for the diversion of an additional 114.4 cfs from May 1 to August 31 of each year and from November 1 of each year to January 31 of the succeeding year. The combined rights under the two Licenses together with the District's pre-1914 rights are limited to a maximum diversion of 414.4 cfs.

d. The District, following the East Bay Municipal Utility District's (EBMUD) building of the Pardee and Camanche Reservoirs on the Upper Mokelumne River, entered into Agreements with EBMUD in 1938 after Pardee's completion and again in 1965 after the completion of Camanche, which acknowledged the priority of some of the District rights to the EBMUD rights, and under which agreements EBMUD releases a Regulated Base Supply of water each year from Camanche Reservoir for diversion by the District at Woodbridge Dam for irrigation use.

e. The District's demand for water from the Mokelumne River under its water rights has begun to diminish by reason of the District's water conservation programs, including the conversion of field furrow and flood irrigation methods of application to water applied by drip irrigation and micro-sprinklers, which reduce the amount of applied water for crops. There has also been a reduction in the delivery of irrigation water by reason of the number of irrigated acres being reduced as a result of urbanization of District lands.

f. By reason of the anticipated reductions in water usage within the District, the District has determined that it will have surplus water in certain amounts available under its water entitlements from the Mokelumne River, and the water that would be delivered to the City by this Agreement is surplus to the current needs of the landowners and water users within the District as required by Section 22259 of the Water Code. The District's South Main Canal traverses the westerly portion of the City of Lodi, and the District could deliver water diverted from the Mokelumne River under its water rights to Lodi at a mutually agreeable location along the District Canal System.

g. The water is diverted by the District at Woodbridge Dam, with diversions being facilitated during the irrigation season by the installation of flashboards in the Dam. The flashboards are removed after the end of the irrigation season for Dam maintenance and Dam safety. When the flashboards are in place, water backs up into Lodi Lake and the City's Lodi Park Lake. The Lake is used for fishing, boating and recreational purposes by inhabitants of the City, and its presence during the summer months is an enhancement to the City's Lodi Park Lake. During the periods that the flashboards are not in the Dam, the Lake level is lowered and its utility for fishing, recreation and boating is reduced.

h. Because of its age, it is necessary for the District to replace the existing Woodbridge Diversion Dam in order to provide greater security and protection against dam failure. In doing so, and in reliance on this Agreement, the District intends, subject to any requirements of the Division of Safety of Dams, that the replacement dam structure will be designed and constructed so that water can be impounded behind the dam year round. The estimated cost for replacement of the Dam and appurtenances is approximately $20,000,000.

i. The City of Lodi desires to contract with the District for the purchase of water from the District for use within the City service area, for which the City will pay on the basis and pursuant to the conditions hereinafter set forth.

NOW, THERFORE, WOODBRIDGE IRRIGATION DISTRICT (DISTRICT) AND THE CITY OF LODI (CITY) AGREE AS FOLLOWS:

May 2003
Jan 1, 2004

1. Water to be Made Available to City, and Payment. Beginning in the calendar year which first follows the entry of a final judgment confirming the validity of this Agreement pursuant to Chapter 9 (commencing with Section 860) of Title 10 of Part 2 of the Code of Civil Procedure, and continuing through the term of this Agreement, the District shall make available to the City out of its Regulated Base Supply under its Agreement with EBMUD, 6,000 acre feet per annum under the terms and conditions herein set forth. In consideration thereof, the City will pay the District annually the sum of ONE MILLION TWO HUNDRED THOUSAND DOLLARS ($1,200,000.) Payments thereon of $300,000 quarterly are due and payable in advance beginning on the first day of each calendar quarter, commencing on the first day of the calendar year which follows said entry of a final judgment confirming the validity of this Agreement. Said payments shall be made irrespective of whether the City takes the water made available to it under this Agreement and irrespective of whether the District has water available for delivery to the City, provided that the District shall make its best efforts to provide to the City the amounts of water provided for in this Agreement.

October 2003 ?

Prior to the commencement of the first full calendar year following the entry of said final judgment, i.e., in the year in which the entry of the final judgment occurs, the City shall make quarterly payments to the District of $300,000 on the first day of each calendar quarter in that year which follows the entry of the final judgment by more than thirty days, in consideration for which one-fourth of 6,000 acre feet of water shall be made available to the City in the that initial year for each calendar quarter for which such payment is made. Any of such water which is not taken by City in that initial year shall be included as a part of the 18,000 acre feet of carryover water which the City may take at a later date as provided for in paragraph 6.a. hereof.

2 Construction of New Dam by Woodbridge. The District has secured the required permits from the Federal and State agencies and the necessary environmental clearances for the construction of a new Woodbridge Dam to replace the existing Dam together with appurtenant facilities, and the District will proceed with construction as soon as is feasible utilizing the revenues to be paid under this Agreement to finance a portion of the costs of the project.

3. Point of Delivery and Time of Delivery. The District agrees to deliver the water to the City at a point or points on the District's Canal at a mutually agreeable location or locations, to be determined at a later date. The water will be delivered during the period from March 1 through October 15. The City shall construct at its sole cost and expense the facilities needed to measure and take delivery of water from the District Canal, and the design, construction and operation thereof shall be approved by the District. The City will be responsible for all costs of operation, repair, maintenance and replacement of such facilities. The measurement facilities shall be recalibrated annually at the City's

expense as requested by the District and the District shall have a continuing right to test the accuracy of such facilities.

a. The City shall provide the District, by January 1 of each year, an estimate of the maximum amount of water anticipated to be needed by the City during each month of that year from March 1 through October 15, which scheduling will be subject to the District's approval. The District will supply such water on said approved monthly schedule pursuant to and as limited by the terms, conditions and limitations of this Agreement; provided that the City shall to the extent that its operations will permit, schedule the taking of as much of its entitlement to water from the District that year prior to July 1 as is feasible, but in any event not less than 3,000 acre feet.

b. At such times as it is possible for the District to deliver water during the remaining months of the year, or to deliver water in excess of 6,000 acre feet during the period from March 1 through October 15, then by mutual agreement of the parties, delivery of such water to the City may be made by the District. The City shall pay the District $100 per acre foot for any such additional water delivered to the City.

c. The water furnished by the District under this Agreement shall be used or furnished by the City only for domestic, municipal, industrial, irrigation and other beneficial uses.

d. The District further agrees that it will, during the term of this Agreement at the City's request, divert from the Mokelumne River at the District's Woodbridge Dam and wheel and convey through the District's canal system to the City's delivery point(s), any non-District water acquired by or available to the City, subject to the District having available capacity for that purpose and subject to the City paying a per-acre-foot charge in an amount which the District determines to be its costs for such service. The District's cost for such service in year 2003 would be $20 per acre-foot.

e. Commencing on January 1 of the seventh year following the year in which execution of this Agreement occurs, the amounts payable to the District under paragraph 1, and the amounts payable to the District under subparagraphs 2.b. and 2.d., shall be increased by two percent per year above the amounts payable during the preceding calendar year. In the event that the annual change in the Consumer Price Index (CPI-W, unadjusted U.S. average) published in December of each year by the United States Bureau of Labor Statistics, commencing in December in the year preceding such seventh year, has increased more than two (2) percent above the December Index of the prior year, the increases in the amounts payable in the ensuing year shall be in the percentage of that increase; provided that any such annual increase shall not exceed five percent (5%).

f. The payments by the City to the District under this Agreement shall be deemed to include the payment during the term of the Agreement of all District groundwater recharge fees on parcels within the City of Lodi which are also located within the boundary of the District.

4. Term of Agreement. (a) This Agreement shall be effective from the date of execution hereof, and shall remain in effect for a term of forty (40) years from said date.

(b) Upon receipt by the District of written notice and request for renewal from the City at least two years in advance of the termination of the Agreement, the District agrees to negotiate with the City for a renewal of this Agreement for an additional forty (40) year term, on terms and conditions that are reasonable and equitable and which are satisfactory to the District.

(c) The District agrees that it will not enter into any agreement during the initial term of this Agreement to provide water to others outside of the District except upon terms which provide that such supply shall be subordinate to the City's rights to be furnished water under this Agreement (except as the City may otherwise specifically agree to). The parties may contract for the delivery of additional amounts of water that may become available upon terms mutually agreeable to the parties. The City shall have a first right of refusal to purchase any water which the District agrees during the initial term of this Agreement to provide to any other purchaser, upon the same terms and conditions provided in such other proposed sale of water.

5. City Payments to be Made from City's Water System Revenues. The City shall make payments under this Agreement solely from the Revenues of, and as an operating expense of, the Lodi Municipal Water System. The City hereby pledges the Revenues to the payments required hereunder. Nothing herein shall be construed as prohibiting the City from using any other funds and revenues for purposes of satisfying any provisions of this Agreement. So long as the City is in compliance with all of its obligations hereunder, such pledge shall not prevent its application of Revenues to other operating expenses of the Lodi Municipal Water System or, subject to the payment of such operating expenses, to other lawful purposes, or impair the rights of any recipient of Revenues lawfully so applied.

"Revenues" means "all gross income and revenue received or receivable by the City from the ownership and operation of the Lodi Municipal Water System, which gross income and revenue shall be calculated in accordance with generally accepted accounting principles, including all rates, fees, and charges received by the City for water service and connection and hook-up fees and all other income and revenue howsoever derived by the City from the ownership and operation of or arising from the Lodi Municipal Water System, but excluding in all cases any proceeds or taxes and any refundable deposits made to establish credit,

federal or state grants, or advances or contributions in aid of construction".

"Lodi Municipal Water System" means "the municipal water system of the City existing on the effective date of this Agreement and all additions, betterments, extensions and improvements thereto hereafter acquired or constructed".

6. City Cooperation in District's Funding of Reconstruction of Woodbridge Dam. The City agrees to cooperate with District in connection with any financing undertaken by District in connection with the reconstruction of the Woodbridge Diversion Dam and to provide to District such certificates, statements and information as District shall reasonably require in connection with such financing, including, without limitation, information relating to the Lodi Municipal Water System and the Revenues, and to provide such information as may be reasonably required in connection with the continuing disclosure undertaking to be entered into by the City pursuant to Rule 15c2-12(b)(5) of the Securities Exchange Commission in connection with the District financing.

7. No Permanent Water Right, and Dry Year Curtailments. The District has determined that the water to be made available annually for delivery to the District pursuant to this Agreement will be surplus to the needs of the District during the term of this Agreement. The parties further agree that no permanent right to the water supplied by the District shall accrue to the City except pursuant to and as limited by the terms of this Agreement.

a. The District agrees that it will deliver up to 6,000 acre feet per annum to the City under this Agreement except to the extent that the District's Regulated Base Supply of 60,000 acre feet under its Agreements with East Bay Municipal Utility District is reduced in dry years by thirty-five (35) percent. In the event of such a reduction, the District may reduce the amount of water to be provided under this Agreement by up to fifty percent (50%). District shall on or about May 1 of each year make a preliminary estimate of whether the City's deliveries may be curtailed that year, and will provide a final estimate of any curtailment on or about July 1. In such event, the City shall only be obligated to take 50% of its estimated delivery before July 1 in that year. There shall be no reduction in the amount of the City's annual payment to the District in such years under paragraph 1.

b. Except for noncompliance with the foregoing provisions of this paragraph, the City shall have no claim for damages or breach arising from the unavailability of surplus water from the District for any cause or condition.

8. Carryover of Entitlements. Unused water may not be carried over by the City

from year to year except that the right to receive water may be "banked," as follows:

a. If during the first three years in which the water is available to the City under this Agreement, the City does not take the water or takes less than the amounts which are available, then the City may carry over and have credit for the water not taken, not to exceed a total of 18,000 acre feet, for later delivery during the initial 40-year term of this Agreement, at such times as the District has extra water available as determined solely by the District. There will be no additional charge for the delivery of such banked water.

b. If after said initial three years delivery of water to the City is curtailed under paragraph 7.a. by reason of a dry year condition or by District's maintenance or other District activities, then the City may carry over and have credit for the amount of such curtailment for later delivery at such time(s) as the District has extra water available as determined by the District. Any City credits for curtailed segments of carryover water shall expire at the end of eight (8) years from the end of the period in which the curtailment for that segment of curtailed water occurred. Such credits for the delivery of curtailed carryover water within said eight-year period may extend beyond the termination of this Agreement. There will be no additional charge for the delivery of such banked water.

c. Except as provided in subparagraph a, no credits shall accrue for water that is available to but is unused by the City.

9. Water Quality, Temporary Interruptions, and Responsibility for the Water Beyond Point of Delivery.

a. The water being supplied to the City is raw water diverted from the Mokelumne River, and the character or quality of the water furnished hereunder may vary from time to time. District does not guarantee in any respect the character or quality of the water furnished pursuant to this Agreement, provided that the District shall not apply or use any chemicals within the Canal section used to deliver water to the City that the City determines to be deleterious to the quality of the water for the uses made by the City of such water.

b. It is agreed that there may be, in addition to shortages of water, temporary discontinuance or reduction of water to be furnished for the City as herein provided, for purposes of investigation, inspection, maintenance, repair or replacement as may be necessary of any of the facilities used by the District for furnishing water to the City. The District agrees to provide the City notice of such temporary discontinuance or reduction of water as soon as such information is available to the District.

c. The City shall hold the District harmless from and defend the District from all claims or expenses on account of damage or claim of damage of any nature whatsoever from which there is legal responsibility, including property damage, personal injury or death, arising out of or connected with the delivery, control, carriage, handling, use, or disposal or distribution of water furnished hereunder beyond the point of delivery of water into the City's system from the District's Canal.

10. Right of Termination for Unacceptable Conditions in Validation Judgment. In the event that the court in the validation action enters a judgment validating the Agreement but upon conditions or restrictions which impose upon either party costs, requirements, obligations, or limitations in their performance of the agreement or upon their operations or property interests which in that party's judgment are unacceptable or otherwise not in the best interests of that party, that party shall have the right to terminate this Agreement, and in that event neither party shall have any further liability or obligation to the other party hereunder.

11. Arrearage in Payments. No water shall be furnished to the City during any period in which the City may be in arrears in payment of charges accruing hereunder after the determination on the amount thereof as above provided. Interest on arrearage in payment shall be charged at a rate of 1-1/2% per month and compounded monthly, commencing 45 days after the due date of the payment.

12. Assignment. The provisions of this contract shall apply to and bind the successors and assigns of the respective parties hereto; but no assignment or transfer of this contract or any part thereof or interest therein by the City shall be valid unless and until approved in writing by the District; and no assignment of the obligation to provide or deliver the water shall be assignable by the District without the consent of the City.

13. Fees and Costs. Any fees, costs or expenses, including attorney fees, administrative costs, and consultant fees, incurred by the District to effect the sale of water to the City, together with CEQA and any other regulatory approval, shall be paid by District and City on a 50/50 basis. The City shall not be required to contribute to any fees or costs incurred by District relating to other issues or disputes that may arise in any of said proceedings not directly relating to City's use of District water. District shall provide to City invoices and accountings of said fees and expenses on a regular basis.

14. City Use of District Rights of Way. The District agrees to cooperate with City and to agree to the City's use of any District right of way along the District's Main Canal needed by the City for the conveyance or distribution of water it obtains from the District.

15. CEQA. The parties agree that the District will be Lead Agency for purposes of

compliance with any requirements of the California Environmental Quality Act pertaining to the execution of this Agreement by each party.

16. Entire Agreement. This Agreement contains the full and entire Agreement of the parties and there are no other conditions, either explicit or implied, nor any warranties or promises other than those contained within the written terms of this Agreement.

17. Time of the Essence. Time is of the essence in the performance of this Agreement.

18. Nonwaiver. The failure of either party to enforce or abide by a term or condition of this Agreement shall not constitute a waiver of that term or condition unless a written Agreement is prepared specifically providing for the waiver or forgiveness of that term and such Agreement is executed by each party hereto.

19. Date of Execution. The date of execution of this Agreement is the date of execution by the party last signing the Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this instrument on the 13th day of May, 2003.

WOODBRIDGE IRRIGATION DISTRICT

By _____

Attest: _____

CITY OF LODI, A MUNICIPAL CORPORATION

By _____
Susan Hitchcock, Mayor

Attest: _____
Susan J. Blackston, City Clerk

APPROVED AS TO FORM: _____
Randall A. Hays, City Attorney

4/16/03

Appendix E - Excerpt from Emergency Response Plan

CITY OF LODI

PUBLIC WORKS DEPARTMENT

WATER SYSTEMS DIVISION

E M E R G E N C Y

R E S P O N S E

P L A N

Set No. ____

TABLE OF CONTENTS

PURPOSE

The mission of the City of Lodi Water Systems Division is to provide:

- Public Safety
- Water at appropriate quantities and pressures
- Water that meets Federal, State and Local drinking water standards
- Public confidence that the above criteria are met consistently and reliably, currently and in the future

During an emergency, the City of Lodi Water Systems Division must insure that our mission is met and/or restored as quickly as possible following Standardized Emergency Management System (SEMS) Guidelines.

This Emergency Response Plan (ERP) describes the emergency response procedures, available resources, and primary emergency task assignments for the Water Systems Division should an emergency occur. The emergencies addressed in this document include; flood, fire, terrorist threat, civil disturbance, malicious mischief, severe weather, earthquake, and nuclear accident. This ERP is unique to the Water Systems Division, and is intended to be used in both accordance and in conjunction with the existing City of Lodi Emergency Plan (December 1999) This ERP has been designed and organized in accordance with the statewide SEMS. As required, emergency actions taken pursuant to this plan will be conducted using the principles of SEMS, of the California Office of Emergency Services (California Government Code, Section 8607).

This plan is also intended to be used with the Water Systems Division Emergency Call-Out Directory (Attachment A) and the Federal, State, and Local Agency Assistance Directory (Attachment B) as a guide for directing division responses to emergencies.

RESPONSIBILITIES

Public Works Director (PWD)

The PWD is responsible for the management of all field actions which directly apply to returning the Water Systems Utilities to normal operation. The PWD activates various elements of the action plan and coordinates its execution. The PWD directs subordinate unit operational plans, requests and releases resources, makes expedient alterations to the action plan as required, and reports to the City Emergency Operations Center (EOC).

A. Obtain briefing from the EOC
B. Develop Water Systems Action Plan
C. Brief and assign Water Systems personnel according to the plan
D. Supervise Water Systems emergency operations
E. Determine need and request additional resources
F. Initiate recommendations for release of resources
G. Assemble and disassemble Water Systems crews
H. Report information about special activities, events, and occurrences to the EOC

At the direction of the City Manager, the Water/Wastewater Superintendent and/or Assistant Water/Wastewater Superintendent may take on all, part or alternate these duties with the Public Works Director in his absence.

Water/Wastewater Superintendent - Assistant Water/Wastewater Superintendent (AWWS)

The AWWS is responsible for assisting the PWD in the management of all field actions which directly apply to returning the operations of Water Systems Utilities to normal. The AWWS activates various elements of the action plan as directed by the PWD and coordinates its execution. The AWWS assists the PWD in developing and directing subordinate unit operational plans, requests and releases resources, assists in making expedient alterations to the action plan as required, and helps reporting such to the EOC.

A. Obtain briefing from the EOC
B. Develop Water Systems Action Plan
C. Brief and assign Water Systems personnel according to the action plan
D. Supervise Water Systems emergency operations
E. Determine need and request additional resources
F. Initiate recommendations for release of resources
G. Assemble and disassemble Water Systems crews
H. Report information about special activities, events, and occurrences to the EOC

The Water/Wastewater Supervisors may assume any responsibilities of the Water/Wastewater Superintendent - Assistant Water/Wastewater Superintendent in his absence.

Water/Wastewater Supervisors (WWS)

The Supervisors report to the PWD or the AWWS and are the top level of field operations. They are responsible for the implementation of the assigned portion of the action plan, assignment of manpower and other resources within their section, and reporting on progress of field operations and status of resources within their section.

A. Implement Action Plan
B. Provide action plan to subordinate employees
C. Identify critical elements assigned to section
D. Review section requirements with subordinates and assign tasks
E. Coordinate activities within adjacent sections
F. Determine need for assistance on assigned tasks
G. Submit situation and resource status information to PWD or AWWS
H. Resolve logistic problems within section
I. Suggest needed changes in the action plan to superiors

Water Systems Employees

The employees are responsible for performing assigned tasks as required. They also report work in progress, resource status, and other important information to the WWS.

A. Implement assigned tasks
B. Review assignments and tasks with subordinates
C. Monitor work progress and suggest changes to superiors
D. Coordinate activities with adjacent employees
E. Submit situation and resource status information to WWS

The remainder of other City personnel may be assigned WWS or Water System Employee tasks as designated at the time of the incident by the PWD and/or AWWS.

REPORTING LOCATIONS

PWD and AWWS report to the Emergency Operations Center (EOC) established by the City Manager.

All crewmembers report to control points, unless directed otherwise:

Water

Primary:	Municipal Service Center 1331 South Ham Lane
Secondary:	City Hall 221 West Pine Street

In the event of major flooding due to a dike or dam break, the above control points may be inaccessible and alternate locations will be established.

EMERGENCY CALL LIST

Refer to City of Lodi Water Systems Division Emergency Call Out Directory (Attachment A) and the Federal, State, and Local Agency Assistance Directory (Attachment B) as a guide for directing division responses to emergencies. The employees on the Call Out Directory are contacted by the City's Utility Control Center.

Appendix F - Eastern San Joaquin Groundwater Basin Groundwater Management Plan

The Eastern San Joaquin Groundwater Basin Groundwater Management Plan, prepared by the Northeastern San Joaquin County Groundwater Banking Authority, is included in the CD located on the back cover of this report.

Appendix G - Water Balance Calculation for Estimated Safe Yield

Treadwell&Rollo

13 January 2006
Project 3923.17

Mr. Charles Swimley
Department of Public Works
City of Lodi
221 West Pine Street
Lodi, California 95240

Subject: Evaluation of Safe Yield
City of Lodi

Dear Mr. Swimley:

As part of our ongoing work, Treadwell & Rollo, Inc. evaluated the potential safe yield of the aquifers used by the City of Lodi (Figure 1). Safe yield is defined as that amount of groundwater that the City of Lodi may extract without a further decline in groundwater elevations. The estimate of safe yield will be used in the City's urban water management plan, which is currently being revised.

CONCEPTUAL MODEL

The City of Lodi lies in the San Joaquin County groundwater basin (Basin) adjacent to the Mokelumne River (Figure 1). Recharge to the Basin occurs from surface water recharge, stream recharge principally from the Mokelumne River, and lateral groundwater flow. Prior to development in the county, groundwater flowed from east to west as shown on Figure 1 (USGS, 1989, *Regional Aquifer-System Analysis – Groundwater Flow in the Central Valley, California,* Professional Paper 1401D). Groundwater has been pumped from the Basin throughout the 1900s for agriculture and municipal/commercial uses. The pumping has resulted in a wide decrease of the groundwater elevations; the deepest portion of these decreases occurs south and east of the Lodi (Figure 1).

Camp Dresser McKee prepared a groundwater-surface water model as part of the *San Joaquin Water Management Plan* dated October 2001. As part of the model, CDM estimated the amount of water that enters and leaves the Basin. The difference between the inflow and outflow is overdraft or mined aquifer storage. The amount of overdraft for the Basin was estimated to be 107,228 acre-feet per year (ac-ft/yr) as shown in the table below. The annual balance of water in and out of the Basin for current conditions was estimated to be the following:

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555 Montgomery Street, Suite 1300, San Francisco, CA 94111
Telephone (415) 955-9040 Facsimile (415) 955-9041

	In *ac-ft/yr*	Out *ac-ft/yr*	Balance *ac-ft/yr*	Notes
Surface	608,400		608,400	Net recharge from rainfall and other
Streams	198,170	-108,898	89,272	Stream recharge and discharge
Groundwater Flow	98,000	-35,300	62,700	Subsurface groundwater flow
Pumping		-867,600	-867,600	Lodi's pumping 17,000 ac-ft/yr
TOTALS	904,570	-1,011,798		
			-107,228	Mined aquifer storage

References: Table 3-3, Simplified Groundwater Balance for Current Conditions, CDM October 2001, *San Joaquin County Water Management Plan – Phase 1 Planning, Analysis and Strategy*, v. 2; City of Lodi, 2005 pumping records. (Saline intrusion from Stockton area lateral inflow was estimated to be 42,000 ac-ft/yr but was not included in overdraft calculations due to its local effect.)

APPROACH AND CALCULATIONS

Based on discussions with the City, Treadwell & Rollo used two approaches to estimate Lodi's potential portion of the overdraft and safe yield in the Basin. One approach was based on the proportion of mined aquifer storage relative to total inflow into the Basin. The other approach was based on the difference between pre-development and current water elevations.

In the first approach, Treadwell & Rollo estimated that the safe yield will be Lodi's current usage minus its portion of the Basin overdraft. This assumes that Lodi's overdraft is the same as the average overdraft for the Basin. To estimate the portion of Basin overdraft, Treadwell & Rollo calculated the volume of mined aquifer storage divided by the net inflow (or water available to replenish the Basin). This ratio is the following:

= Mined aquifer storage/(net recharge from rainfall and other + net stream recharge + net subsurface groundwater flow)

Using the estimates in the table above, this overdraft portion would be the following:

= 107,228 / (608,400 + 89,272 + 62,700) or 14%

Since Lodi uses 17,000 ac-ft/yr, then Lodi's portion would 14% of 17,000 or 2,400 ac-ft/yr. So, Lodi's safe yield amount would be 17,000 – 2,400 or 14,600 ac-ft/yr.

In the second approach, Treadwell & Rollo again estimated that the safe yield would be Lodi's current use minus Lodi's portion of Basin overdraft. Lodi's portion of the overdraft was estimated to be the volume defined by the difference between predevelopment and current water elevations within the City limits (V_{Lodi}), divided by the volume between pre-development and current water elevations for the entire Basin (V_{Total}).

In this approach, the pre-development water elevations represent base-line conditions, and current water elevations represent overdraft. The difference between the two surfaces represents the volume of overdraft or mined aquifer storage. This approach is portrayed conceptually in Figure 2, where the four cross sections are displayed in a block diagram. The vertical dimensions of the block diagram are shown on Figure 2, where the average height of the overdraft block for the Basin is 55 feet, and the average height of the overdraft block for the City is 40 feet.

The area of the City of Lodi is 6,466 acres or approximately 10.1 square miles according to City records. So using these dimensions, $V_{Lodi} = 1.1 \times 10^{10}$ ft^3. The area of the Basin is approximately 20 miles (105,600 feet) wide and 33 miles (174,240 feet) long. So $V_{Total} = 1 \times 10^{12}$ ft^3, and $V_{Lodi} / V_{Total} =$ 1.1%. Lodi's portion of overdraft is then, 107,228 x 0.011 = 1,200 ac-ft/ yr, and Lodi's safe yield would be 17,000 – 1,200 = 15,800 ac-ft/yr.

DISCUSSION

Based on these two approaches, the City of Lodi safe yield could range from approximately 14,600 to 15,800 ac-ft/yr. These results are sensitive to calculation assumptions such as the area of the City of Lodi or estimates of mined aquifer storage and should be considered preliminary in recognition of these limitations.

The concept of safe yield is subject to considerable interpretation. This is based on the challenge of accounting for the significant water uses such as streams, springs, wetlands, and groundwater-dependent ecosystems and providing estimates of the actual amounts needed for each use.

Treadwell & Rollo appreciates the opportunity to provide continued services to the City of Lodi. If you have questions regarding this safe yield estimate, please call either of us.

Sincerely,
TREADWELL & ROLLO, INC.

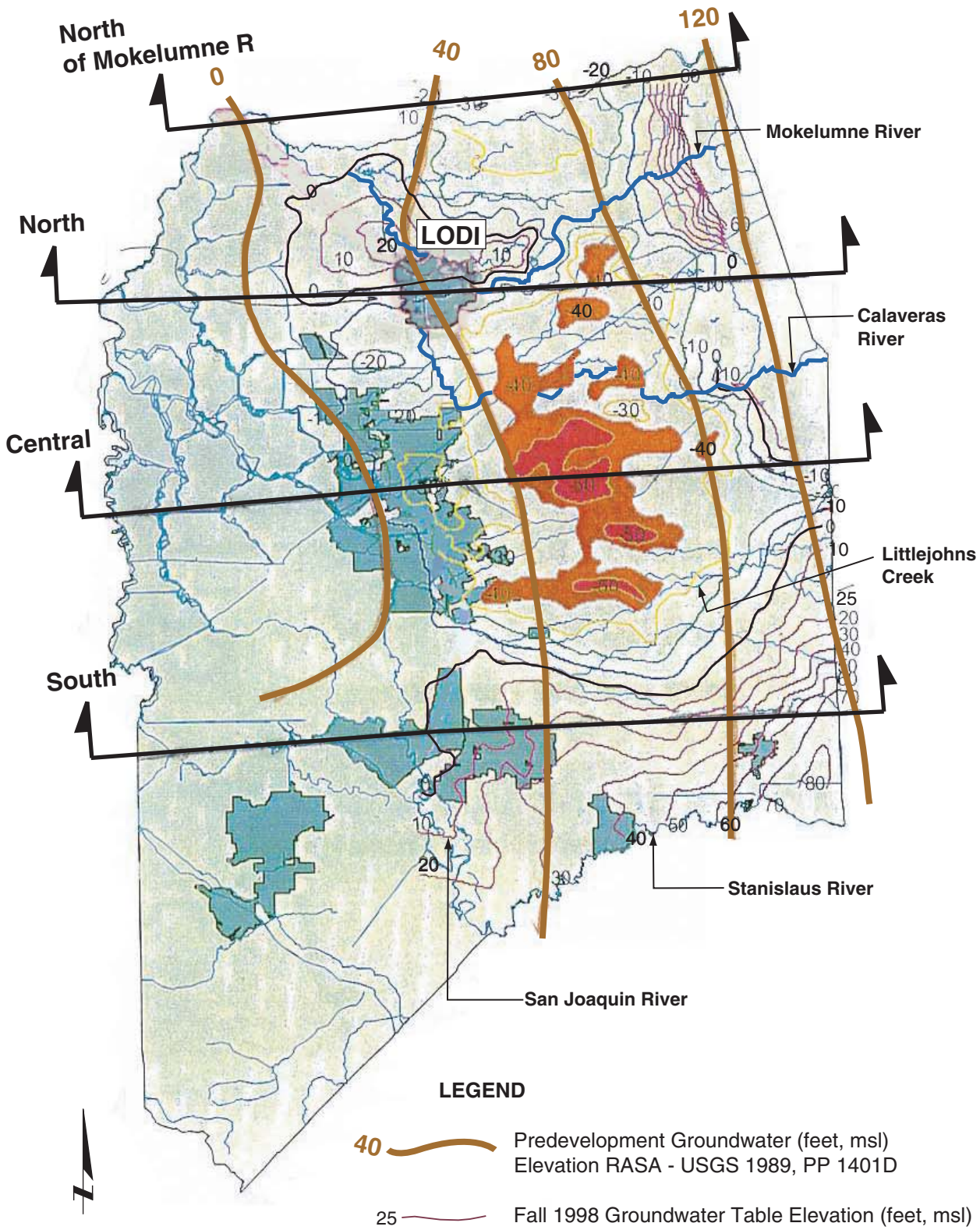
Philip G. Smith, CPGS
Vice President

Patrick B. Hubbard, PG
Senior Associate Geologist

39231702.PBH

Attachments: Figure 1 – Groundwater Contours and Cross Sections
Figure 2 – Cross Sections and Conceptual Block Diagram

FIGURES



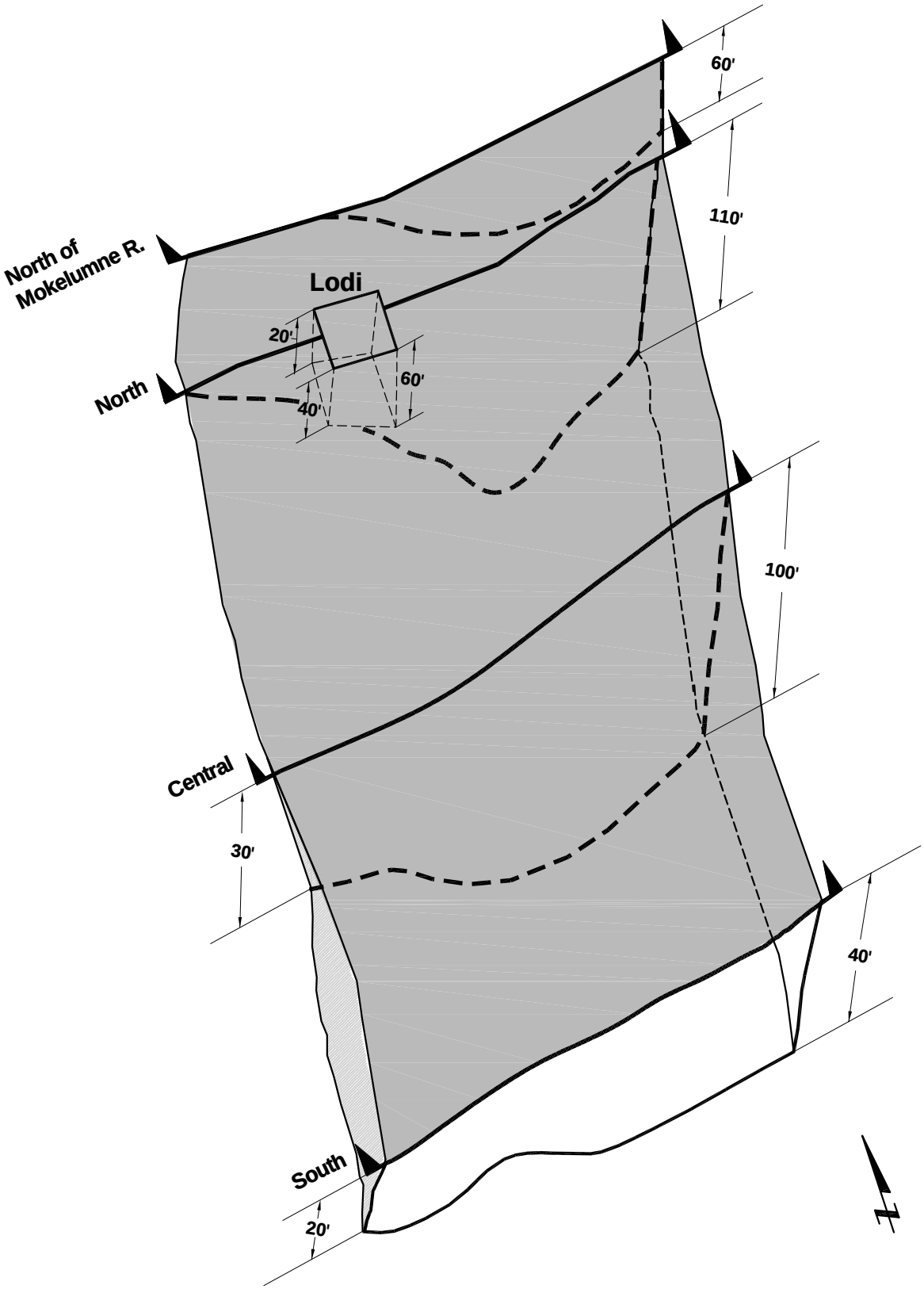
Base map: Camp Dresser & McKee Inc., East San Joaquin County Groundwater Depression and Extent of Saline Intrusion, undated.

LODI SAFE YIELD ESTIMATE
Lodi, California

Treadwell&Rollo

GROUNDWATER CONTOURS AND CROSS SECTIONS

Date 01/19/06	Project No. 3923.17	Figure 1



References: USGS, 1989, PP 1401D; CDM, 2001

LODI SAFE YIELD ESTIMATE
Lodi, California

CROSS SECTIONS AND CONCEPTUAL BLOCK DIAGRAM

Treadwell&Rollo

Date 01/04/06	Project No. 3923.17	Figure 2

3923.17 Cross Section.dwg