California Water Service Company

2007 Urban Water Management Plan

Livermore District

Adopted

December 21, 2007

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California Water Service Company
2007 Urban Water Management Plan
Contact Sheet

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1 Introduction

California Water Service Company (Cal Water) is an investor-owned public utility supplying water service to 1.7 million Californians through 435,000 connections. Its 25 separate water systems serve 63 communities from Chico in the North to the Palos Verdes Peninsula in Southern California. In 2000, Cal Water merged with the Dominguez Services Corporation incorporating several northern and southern California water systems. California Water Service Group, Cal Water's parent company, is also serving communities in Washington, New Mexico, and Hawaii. Rates and operations for districts located in California are regulated by the California Public Utilities Commission (CPUC) and are set separately for each of the systems. Cal Water incorporated in 1926 and has provided water service to the Livermore community since 1927.

1.1 Purpose

California Water Code §10644(a) requires urban water suppliers to file with the Department of Water Resources, the California State Library, and any city or county within which the supplier provides water supplies, a copy of its Urban Water Management Plan, no later than 30 days after adoption. All urban water suppliers as defined in Section 10617 (including wholesalers), either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet annually are required to prepare an Urban Water Management Plan.

California Water Service Company will follow the California Water Code and file an Urban Water Management Plan at least once every five years on or before December 31, in years ending in five and zero. However, since California Water Service Company operates 25 Districts, updating and submitting all 25 Urban Water Management Plans in a single year is unfeasible. Therefore, the Districts have been divided into three sets that will follow an established three-year schedule. The Plan for Livermore is part of the 2007 grouping and was last submitted in 2004. The next update for this District will be in 2010.

This UWMP is a foundation document and source of information for a Water Supply Assessment and a Written Verification of Water Supply. An UWMP also serves as:

- A long-range planning document for water supply,
- Source data for development of a regional water plan, and
- A source document for cities and counties as they prepare their General Plans.
- A key component to Integrated Regional Water Management Plans.

1.2 Public Review

California Water Service Company completed a draft of the Urban Water Management Plan for the District on July 1, 2007. The draft was sent to the Cities and County listed in Table 1.2-1 for review and comment. Copies of the draft plan are available at the California Water Service Company San Jose corporate, and district office for public review and comment.

California Water Service Company conducted a formal public meeting to present information on its general rate case request to the CPUC. Presentation of the Urban Water Management Plan is included in the proceedings and serves as a public review of the Urban Water Management Plan. A public hearing was held on November 9, 2007, at 7:00 p.m. at the following location:

Livermore City Council Chambers
3575 Pacific Avenue
Livermore, California

Proof of the public hearing is presented in Appendix A

Table 1.2-1: Coordination with Appropriate Agencies (Table 1)

	Commented on the draft	Was sent a copy of the draft plan	Was sent a notice of intention to adopt
City of Livermore		✓	✓
Zone 7 Water Agency		✓	✓

1.3 Plan Adoption

No additional comments were received by December 14, 2007. The final plan was adopted by the Vice President of Engineering & Water Quality on December 21, 2007 and was submitted to California Department of Water Resources within 30 days of approval. Appendix A presents a copy of the signed Resolution of Plan Adoption.

The agencies listed in Table 1.2-1 above will also be sent a copy of the final version of this report, as well as a copy to the California State Library.

In addition to the resolution, Appendix A also contains the following:

- Any comments received during the public review of this plan.
- Minutes from the public hearing.
- The review sheet check list from Department of Water Resources.

1.4 Water Management Tools

California Water Service Company uses the following water management tools to maximize water resources for the district:

- Hydraulic analysis will be used to identify limitations in the water distribution network and provide recommendations if main replacement is required.
- SCADA/Water measurement provides information as to how the district is operating and gives a historical record of the district, including water levels. California Water Service Company maintains detailed records including the water sales and the customer service connections by sector and used this information for future projections.

- Geographical Information Systems (GIS) will be used to combine several sources of information and allow land usage management tools to provide insight into the growth of the district.
- Water quality data analysis provides a detailed compositional analysis of the water and provides information on potential supply shortfalls that can result from mineral intrusion or contamination.
- Water Supply and Facilities Master Plan provided details into the district from a global perspective and evaluates the major equipment and facilities replacement schedule, and identifies long-term projects. The Water Supply and Facilities Master Plan will be prepared in 2007.

1.5 Plan Organization

This plan is organized as described in the following outline. The corresponding provisions of the California Urban Water Management Planning Act are included as references. Tables in this plan have cross-references to the tables as listed in the "Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan" prepared by the California Department of Water Resources.

Table 1.5-1: Plan Organization

Section	Executive Summary	Act Provision
Contact Sheet	List of Contact Persons	-
Chapter 1	Introduction This chapter describes the requirement and the purpose of the Urban Water Management Planning Act, plan adoption, schedule, and management tools.	§10620 (d, f) §10621(a -b) §10635(b) §10642 §10643 §10644 (a) §10645
Chapter 2	Service Area Information This chapter describes the district service area and includes area information, population estimate, and climate description.	§10631 (a)
Chapter 3	Water Sources This section includes a detailed discussion of the water supply sources including a section on the water quality.	§10620 (d)(1)(2) §10631 §10633 §10634
Chapter 4	Water Shortage Contingency Plan This chapter describes the District's plans during water shortages, drought, and emergency situations.	§10631 (d) §10632
Chapter 5	Water Use Provisions This chapter describes the water supply projection methodology used to estimate water demand and supply requirements to 2030 in five-year increments.	§10631

Table 1.5-1: Plan Organization		
Section	**Executive Summary**	**Act Provision**
Chapter 6	Supply And Demand Comparison This discussed the water supply outlook for the district under different hydrologic conditions in accordance with DWR guidelines. Specifically, supply and demand comparisons in five-year increments to 2030 under normal, dry-year, and multiple dry-year conditions are presented in this section.	§10635 (a)
Chapter 7	Water Demand Management Demand management measures used to benchmark conservation methods are described in this chapter.	§10631
References	References The sources of the information used in this plan are listed in this section.	-
Appendix A	Resolution To Adopt The Urban Water Management Plan This section includes the following: 1) Resolution 2) Letters to and comments from various agencies 3) Minutes from the public hearing 4) DWR Checklist	§10621 (b) §10642 §10644 (a)
Appendix B	Service Area Map This appendix includes the service area map of the district as filed with the Public Utilities Commission.	-
Appendix C	Water Supply, Demand, And Projection Worksheets This section includes the spreadsheet used to estimate the water demand for the district.	-
Appendix D	California's Groundwater Bulletin 118 Sections from the Department of Water Resources Bulletin 118 are included as a reference and details of the basin for the district.	§10631 (b)(1-4)
Appendix E	Tariff Rule 14.1 Water Conservation And Rationing Plan This section contains the tariff rule for reference.	-
Appendix F	Water Efficient Landscape Guidelines and Joint Water Conservation Recommendations For Regulated Water Companies This appendix contains two items. The first item is the Guideline for Water Efficient Landscape that California Water Service Company uses at its properties, including renovations. The second item are Water Conservation Recommendations supported by Cal Water and other Regulated Water Companies.	-
Appendix G	CUWCC Annual Reports This sections contains the reports filed with the California Urban Water Conservation Council.	§10631 (j)
Appendix H	BMP Economic Analysis Assumptions Worksheets for each BMP are presented in this section.	-
Appendix I	Livermore-Amador Valley Groundwater Management Plan This section contains the Management Plan	§10631 (b)(1-4)
Appendix J	Purchase Agreement This section contains the purchase agreement between Cal Water and Zone 7	-
Appendix K	Zone 7 Urban Water Management Plan This section contains the Management Plan	-

1.6 Implementation of Previous UWMP

California Water Service Company has 25 separate water service districts and maintains separate plans for each district. The plans have been divided into 3 groups, with each group being updated on a 3-year cycle, as approved by the Public Utilities Commission.

The last Urban Water Management Plan for the District was published in 2004 as part of the general rate case. The BMP programs outlined in that plan and the status of each program as of last year is discussed in Section 7.6

2 Service Area Information

2.1 General Information

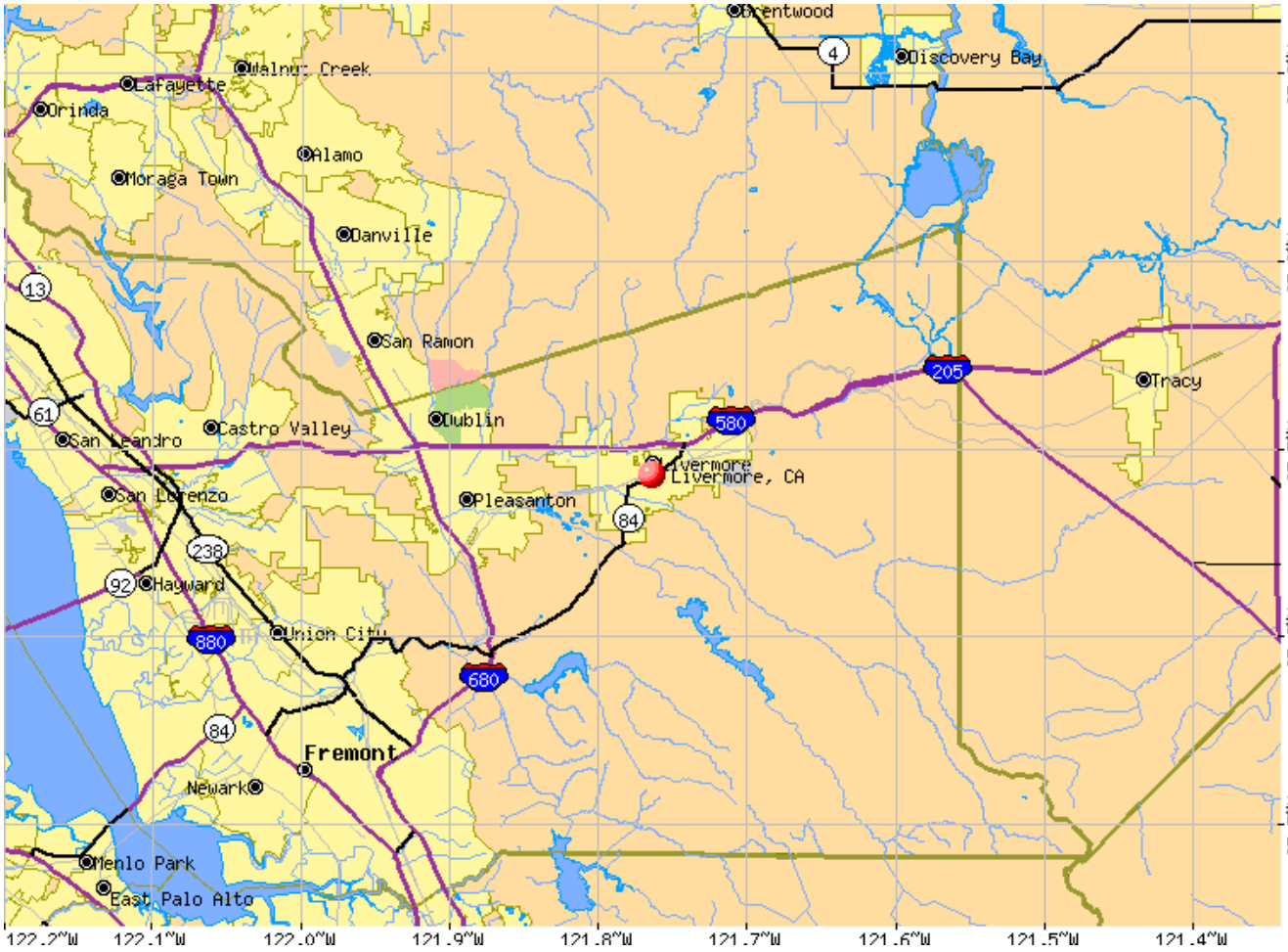
The Livermore District is located in eastern Alameda County, approximately thirty miles from downtown Oakland. Figure 2.1-1 shows a general location map of the district. The service area is built upon the alluvium of the Arroyo Del Valle, Arroyo Mocho and Arroyo Las Positas, which are tributaries to Alameda Creek. The District is in the Livermore-Amador Valley, which is part of the Livermore sub-area of the San Francisco Bay Hydrologic Region. The area's climate is mild with an average temperature of 59.4° F and 30-year normalized rainfall of 14.5".

The service area encompasses approximately 85 percent of the area incorporated by the City of Livermore, as seen in Figure 2.1-2. The City of Livermore provides retail water service to the remainder of the city. The City of Pleasanton is located to the west and is served by that city's water department. The City of Dublin lies north of Pleasanton and is served by the Dublin San Ramon Services District (DSRSD). The Service Area Map for the District is included in Appendix B

Major transportation links for the District include Interstate 580 and State Highway 84. The Union Pacific Rail Road provides rail service to the region.

Major geologic features of the region include the Calaveras Fault Zone, the Hayward Fault and Clayton-Marsh Creek-Greenville Fault, shown in Figure 2.1-3. The San Andreas Fault system lies forty miles to the west of the District. This fault system can produce an earthquake of magnitude 8.0 on the Richter Scale, the Hayward Fault, which is located just fifteen miles to the west of Livermore presents one of the greatest earthquake hazards in California. A major earthquake on this fault could disrupt imported water deliveries leaving the Livermore District to rely on groundwater pumping.

Figure 2.1-1: General Location of Livermore District – Alameda County



Source: http://www.city-data.com/city/Livermore-California.html

Figure 2.1-2: General Service Area

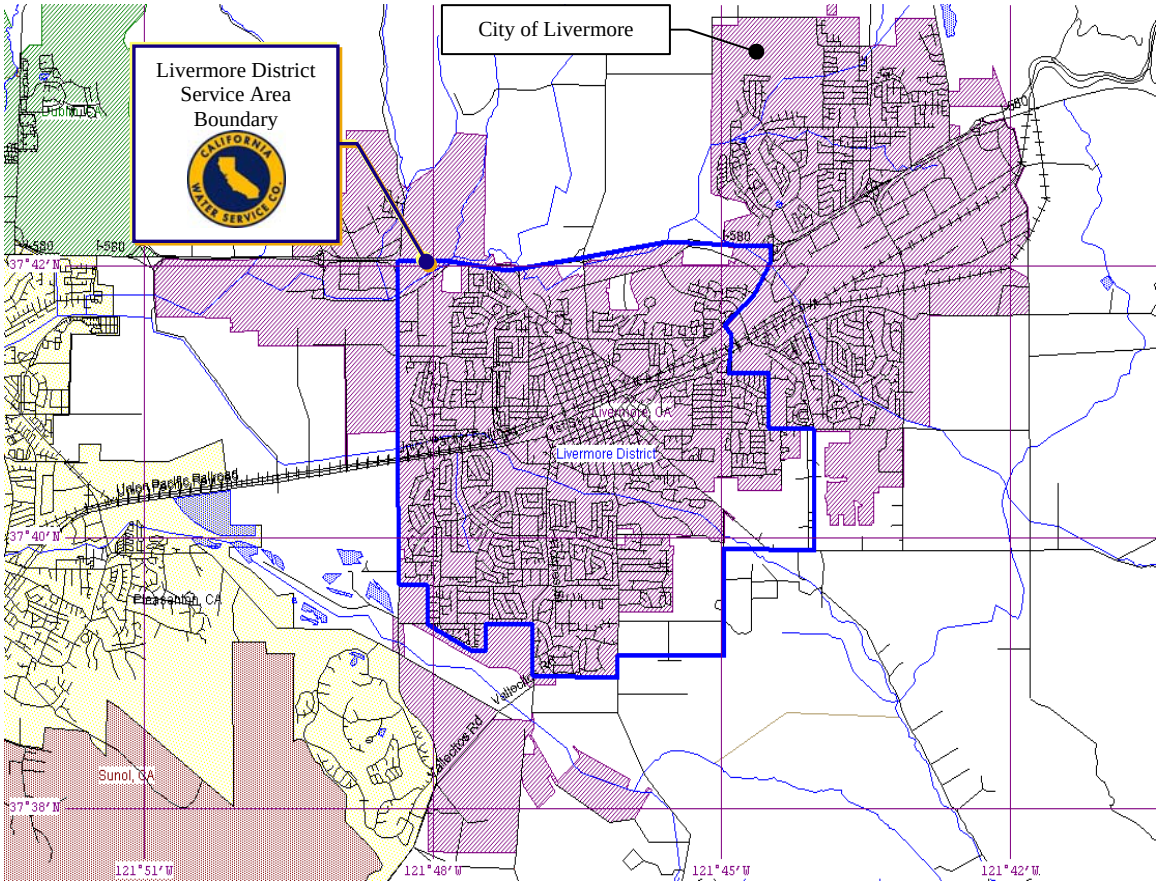
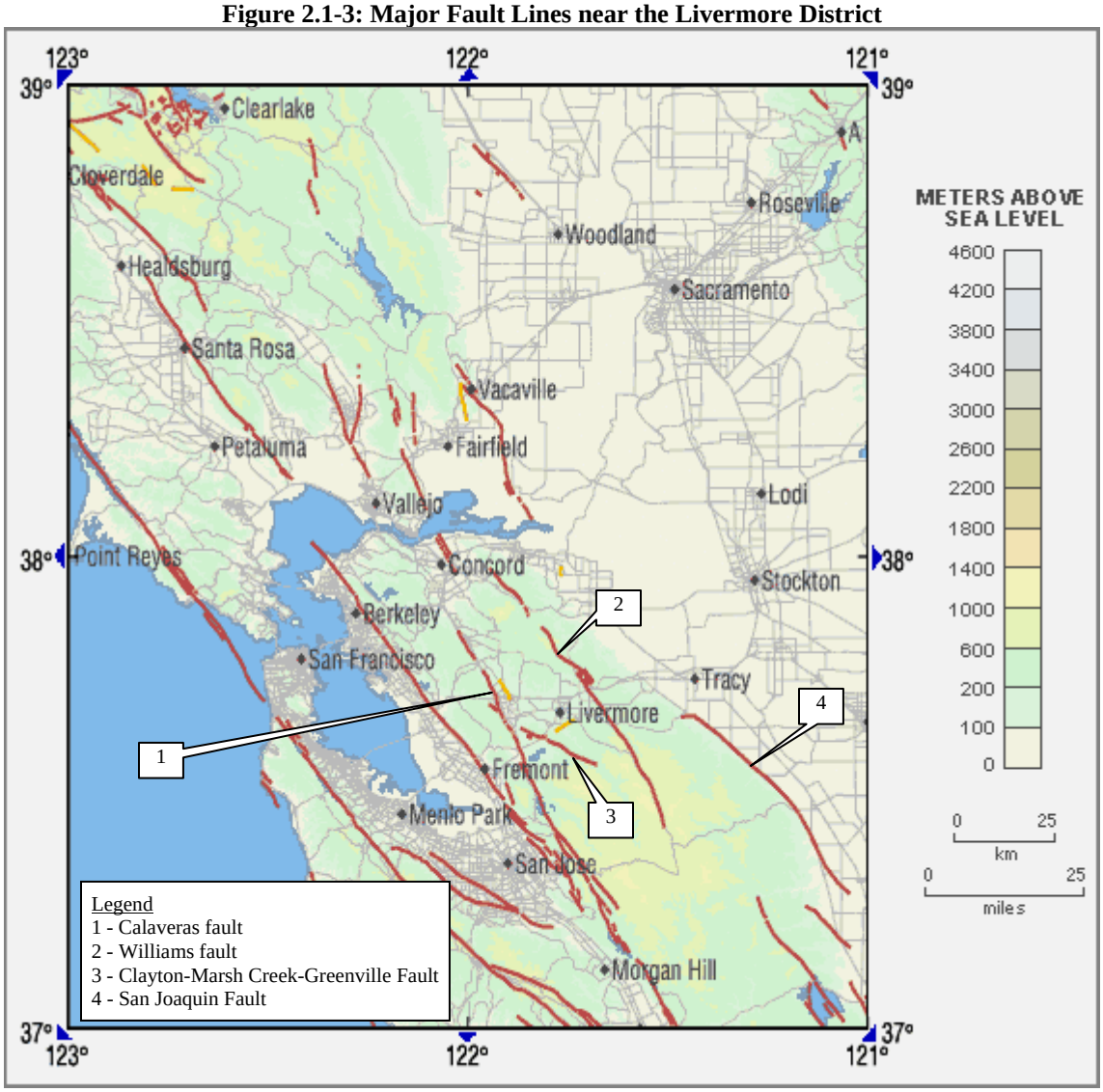


Figure 2.1-3: Major Fault Lines near the Livermore District



Source: USGS, http://quake.wr.usgs.gov/info/faultmaps/122-38.html

2.2 Service Area Population

Cal Water's Livermore District is growing at a rate of 1.4% based on growth in total services over the past five years. This rate of growth is expected to slow considerably as Cal Water's service area becomes built out. The Livermore District is bounded on the northeast and northwest by the City of Livermore and on the southwest by the City of Pleasanton. Growth to the south is restricted by the recently voter approved Measure D, which preserves much of this area as open space. Therefore, future growth will be limited to the southeast portion of the service district, and to infill areas.

Based on 2000 U.S. Census data, considering actual service connection growth and assuming that density has remained unchanged since the census was conducted, Cal Water estimates that as of December 2006, the district's population is approximately 54,740. A density of 2.88 persons per residential service (single family services plus multifamily units) was used for this estimate.

Estimate of the population serviced by Cal Water is based on overlaying the U.S. Census 2000 Block data with the service area map (SAM), as shown in Figure 2.2-1. A summary of the census data for the Year 2000 is shown in Table 2.2-1. LandView 5 and MARPLOT ® software were used to generate the data[1].

Cal Water estimates the service area's population could reach 72,944 by 2030. Table 2.2-2 lists the population growth in 5 year increments.

Table 2.2-1: Summary of Census 2000 Data

	Census Blocks	Population	Housing Units
Livermore Service Area	575	50,622	18,518

Figure 2.2-1: Approximated SAM with US Census 2000 Tract Map

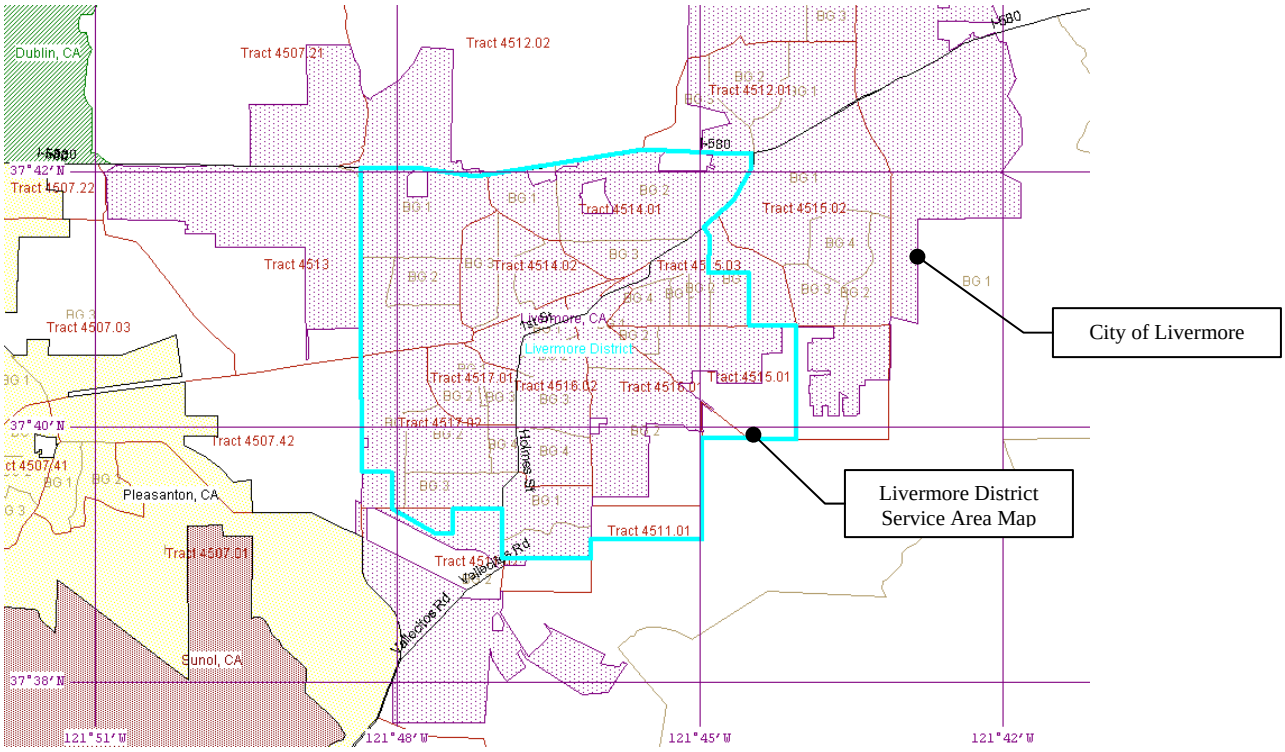
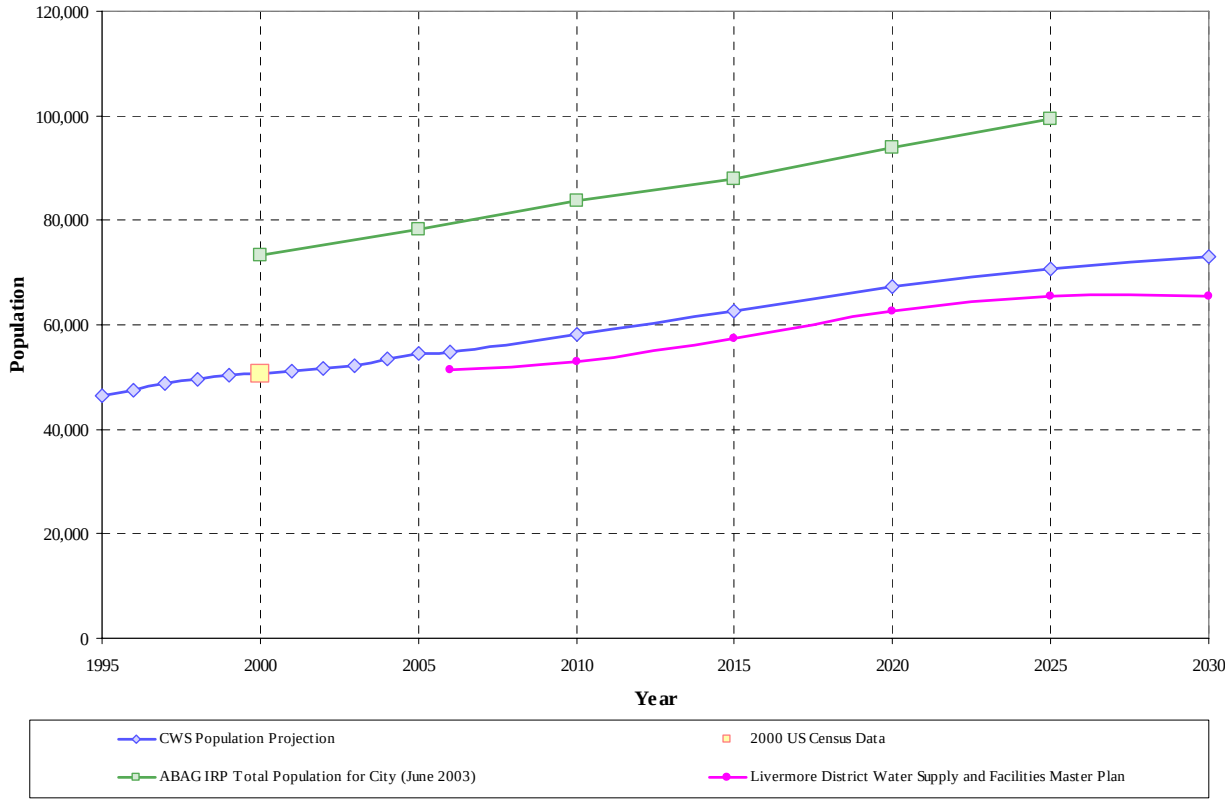


Table 2.2-2: Population - Current and Projected (Table 2)						
	2005	2010	2015	2020	2025	2030
Service Area Population	54,494	58,103	62,530	67,294	70,746	72,944

The population estimates for the district are compared to projections made by other governmental agencies, as shown in Figure 2.2-2. Cal Water's population projection is compared to the projections presented by the Association of Bay Area Governments (ABAG)[2], and to those in Cal Water's Livermore District Water Supply and Facilities Master Plan.

Figure 2.2-2: Estimated Population Comparison

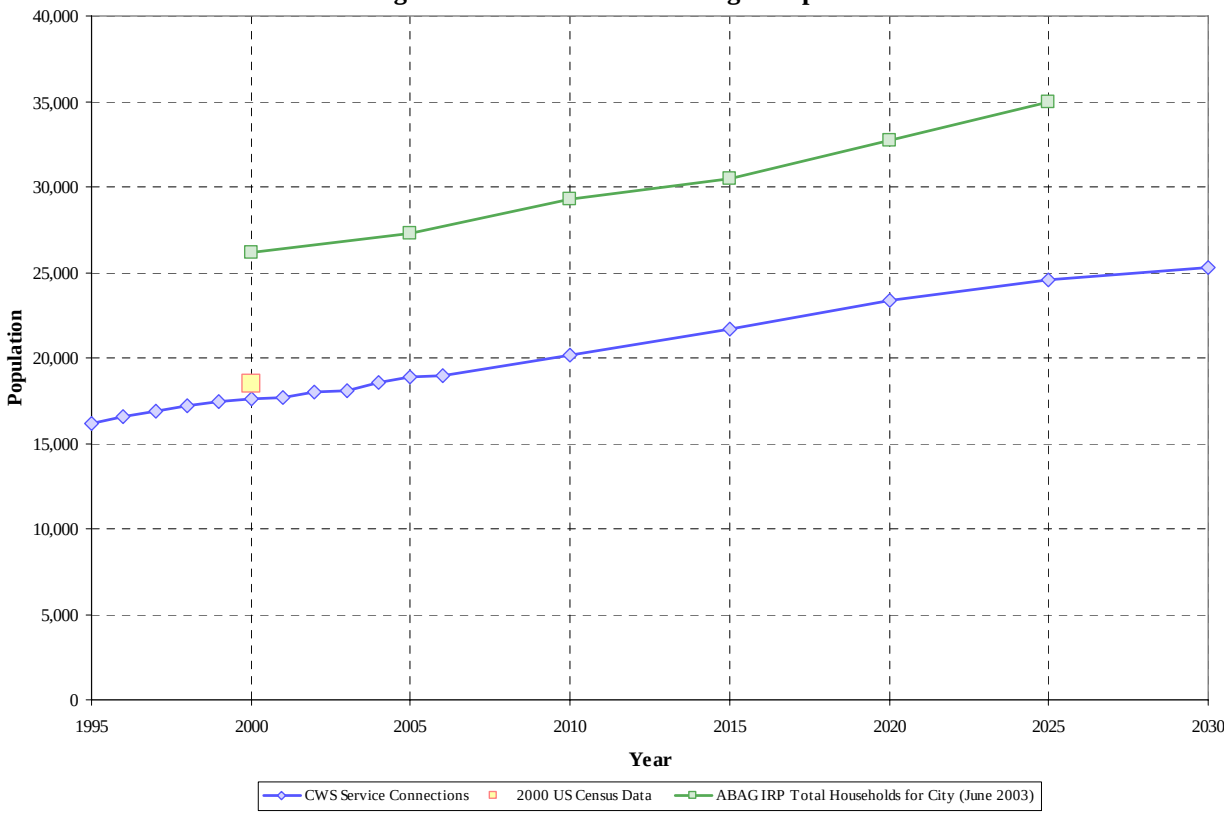


From the graph above, we can see that the growth rate projected by California Water Service Company is very similar to the projected rate of increase estimated by ABAG. However, the ABAG projection includes areas of the City of Livermore that are not included in Cal Water's service area. As a result ABAG's total population figures are greater, but the rate of increase is similar.

Cal Water's population projection is based on 5-year average growth rate for the District. The Water Supply and Facilities Master Plan based the projected growth on land use mapping of the District. Both Cal Water estimates indicate the reduced growth rate that is expected as Cal Water's service area is built out over the next 20 years.

Similarly, the housing count was estimated by comparing the US Census 2000 data and the service counts for the Livermore District, Figure 2.2-3. The service count for the year 2000 is lower than the US Census 2000 housing units estimate. This is most likely the result of district service connections including one meter that serves several housing units, such as duplexes or apartments, whereas the US Census data totals all of the housing units (single and multifamily residences). The US Census 2000 housing unit figures were established by summarizing the individual census blocks enclosed within the service area of the district.

Figure 2.2-3: Estimated Housing Comparison



2.3 Climate

The climate for the Livermore District is moderate with hot dry summers and cool winters. The majority of precipitation falls during late autumn, winter, and early spring.

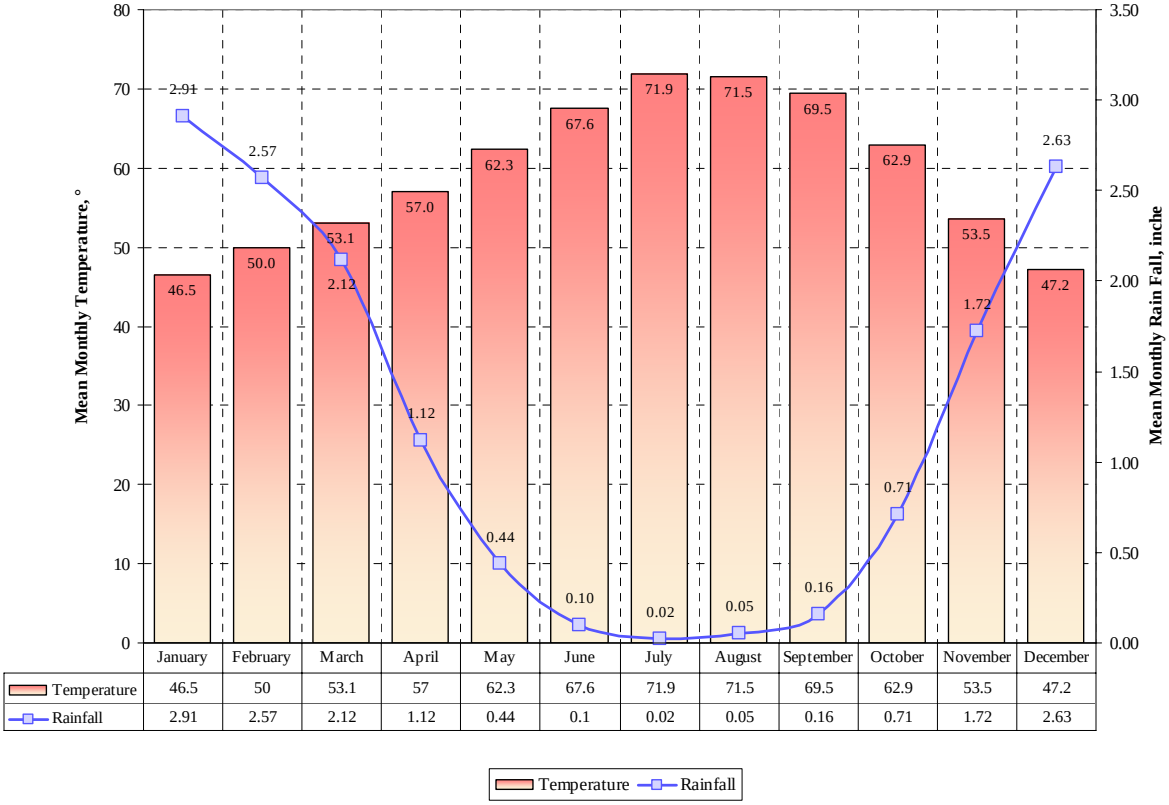
The following table, Table 2.3-1, lists the average annual conditions for the closest weather station to the Livermore District. The average rainfall for the district is 29% of the annual total evapotranspiration value.

Table 2.3-1: Average Annual Climate (Table 3)

Average Temperature	Average Rainfall	Annual Total Evapotranspiration
59.4°F	14.5 inches	49.42 inches

Figure 2.3-1 displays the average monthly temperature and rainfall[3].

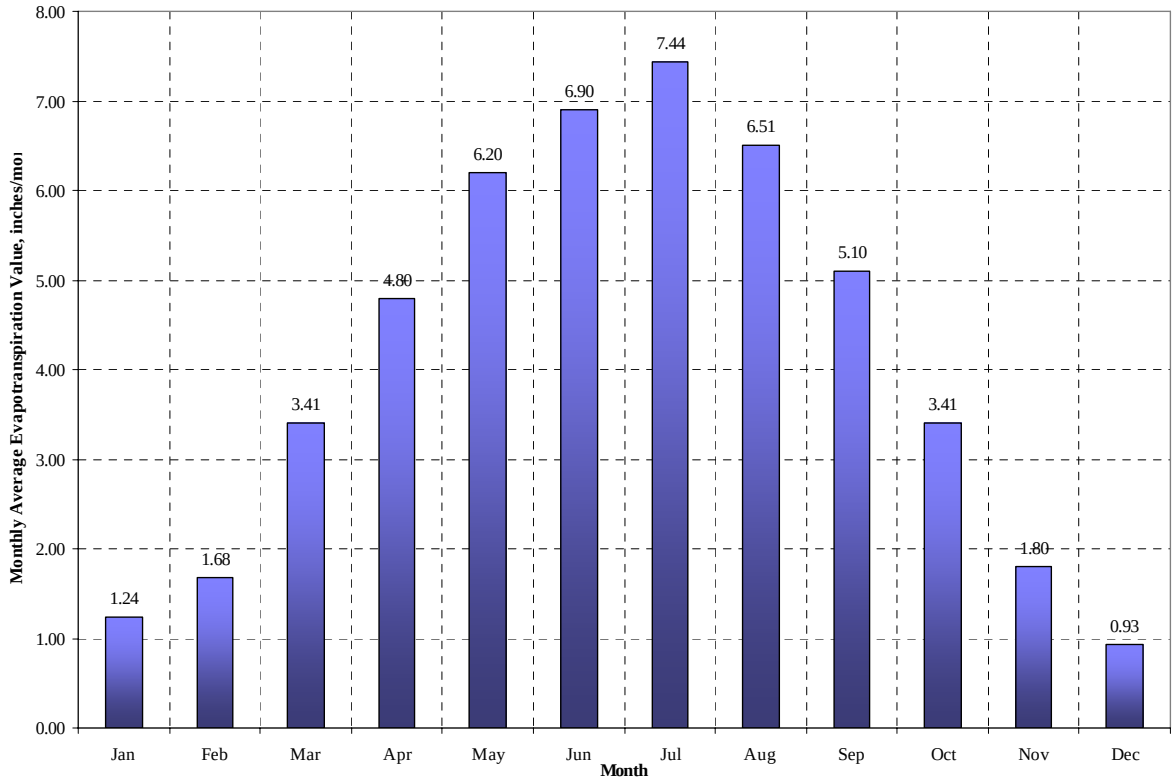
Figure 2.3-1: Average Monthly Temperature and Rainfall (Table 3)



	January	February	March	April	May	June	July	August	September	October	November	December
Temperature	46.5	50	53.1	57	62.3	67.6	71.9	71.5	69.5	62.9	53.5	47.2
Rainfall	2.91	2.57	2.12	1.12	0.44	0.1	0.02	0.05	0.16	0.71	1.72	2.63

Figure 2.3-2 displays the monthly average evapotranspiration values for the area of the district[4]. Evapotranspiration values estimate the amount of water loss by the combination of two separate processes: evaporation from soil surface and transpiration by plants.

Figure 2.3-2: Monthly Average ETo Values (Table 3)



Additional climate data is provided in the Appendix C, worksheet 18[5].

3 Water Sources

3.1 Introduction

Water furnished to customers in the Livermore District is a combination of purchased imported water and groundwater. The projected water supply sources and volumes based on average consumption are summarized in Table 3.1-1.

Table 3.1-1: Current and Planned Water Supplies (Table 4) (AFY)

Water Supply Sources	2005	2010	2015	2020	2025	2030
Zone 7 Water Agency	8,470	10,320	12,600	13,200	13,650	13,700
Cal Water Groundwater Wells	3,069	3,069	3,069	3,069	3,069	3,069
Transfers in or out	-	-	-	-	-	-
Exchanges In or out	-	-	-	-	-	-
Recycled Water (projected use)	-	-	-	-	-	-
Desalination	-	-	-	-	-	-
Total	11,539	13,389	15,669	16,269	16,719	16,769

3.2 Purchased Water

Purchased imported water currently satisfies approximately 71 percent of the district's water requirements. Zone 7 imports the purchased water used in the Livermore District into the Livermore-Amador Valley. Water is delivered through the South Bay Aqueduct, a facility of the State Water Project, which is owned and operated by the California Department of Water Resources.

Zone 7, a State Water Project contractor, provides regional water treatment and distribution of the imported water, along with management of the local groundwater supplies. The delivery of imported water is made through nine service connections to the Zone 7 distribution feeder network.

The total rated capacity of these nine service connections is 19,300 gallons per minute (gpm), which if operated at full capacity could deliver 27.8 MGD. This rate of delivery falls short of being adequate to deliver the largest projected 31.4 MGD maximum day demand for the year 2030 based on the typical 1.9:1 maximum day to average day ratio.

Zone 7 and Cal Water have entered into a thirty-year contract for a municipal and industrial water supply. The current contract entered into on November 16, 1994, is the second contract of its nature with Zone 7. The contract sets forth the terms and conditions that govern the delivery and use of both imported water and groundwater. Cal Water agreed to accept a Groundwater Production Quota (GPQ), discussed in Section 3.4, and to purchase imported water from Zone 7 in order to meet all remaining demand in its Livermore District. In return, Zone 7 agrees to procure an imported water supply, which it will treat for delivery as a potable supply, and to maintain the quantity of water

stored in the Main Basin of the Livermore-Amador Valley. The purchase agreement between Cal Water and Zone 7 is provided as a reference in Appendix J. Zone 7's Urban Water Management Plan is provided as a reference in Appendix K.

3.3 Surface Water

The Livermore District does not impound or divert surface water as a means to meet supply requirements.

3.4 Groundwater

Groundwater currently supplies approximately 29 percent of the district's supply requirements. This percentage is expected to decrease over time as the district grows. In 2006, the district used virtually all of its 3,069 AFY groundwater rights allotment. All supply requirements beyond this quantity have been and will be supplied by purchasing imported water through Zone 7.

Cal Water currently has 12 groundwater wells within the Livermore District; 10 of which are active, and 2 that are inactive. The total design capacity of the active wells is 5,965 GPM or 8.6 MGD. The design capacity of the wells without the largest sized well in service is 5,065 GPM or 6.0 MGD. Additional information for the wells is shown in Appendix C. The historical volume of the groundwater pumped is shown in Table 3.4-1.

Table 3.4-1: Amount of Groundwater pumped – AFY (Table 6)

Basin Name (s)	2000	2001	2002	2003	2004	2005	2006
Livermore Valley Groundwater Basin	3,403	3,570	3,483	3,408	3,083	3,072	3,067
% of Total Water Supply	30.4%	32.9%	30.4%	28.5%	24.5%	26.9%	25.4%

By approving the contract mentioned in Section 3.2, Cal Water agreed to accept a Groundwater Production Quota (GPQ). Cal Water's annual GPQ is 3,069 acre-feet. The contract authorizes:

- The carry over of unused GPQ in an amount up to 20 percent of the annual GPQ
- The production of groundwater in excess of the GPQ provided Cal Water pays a recharge fee for this additional water.
- The implementation, as supply conditions permit, of a conjunctive use storage program.
- The transfer of GPQ between Cal Water and other water purveyors that contract with Zone 7

Based on the GPQ, the amount of groundwater projected to be pumped for the District is shown on Table 3.4-2.

Table 3.4-2: Amount of Groundwater projected to be pumped – AFY (Table 7)

Basin Name(s)	2010	2015	2020	2025	2030
Livermore Valley Groundwater Basin	3,069	3,069	3,069	3,069	3,069
% of Total Water Supply	22.9%	19.6%	18.9%	18.4%	18.3%

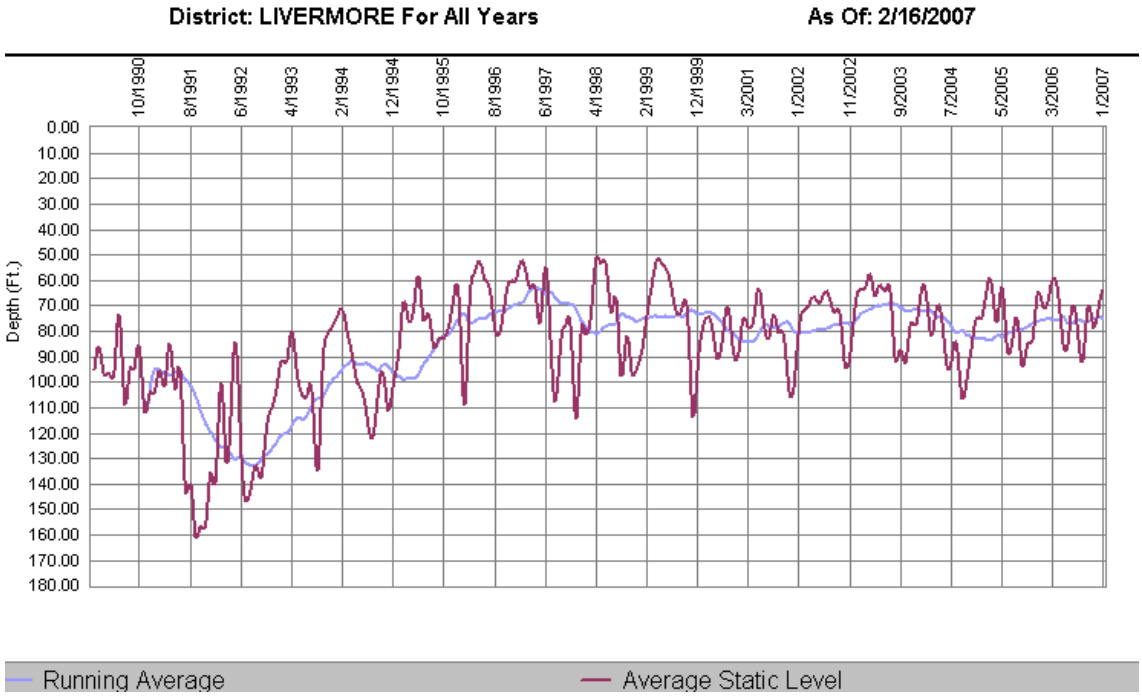
The GPQ as established through the contract is based on the annual safe yield of the Main Basin of the Livermore-Amador Valley. The annual safe yield for the Main Basin is 13,200 acre-feet. Zone 7 recharges the Main Basin using storm runoff and imported supplies. When surplus imported supplies are available Zone 7 can authorize the sale of in-lieu treated water. Through this program, Cal Water purchases the surplus imported water in-lieu of pumping groundwater. This enables storage of groundwater supplies for future use and delivery of water at a cost comparable to pumping the groundwater.

The district has 26 storage tanks with a total capacity of 13.6 million gallons. These tanks are operated in conjunction with the wells, the Zone 7 connections, and booster pumps to collect and distribute water throughout the service area.

While the wells are capable of producing nearly three times the district's annual groundwater pumping quota, they are not capable of producing average day, maximum day and peak flow conditions. During these demand periods, the District must rely on deliveries from Zone 7.

Due to artificial recharge, the average static groundwater elevations in the district have remained relatively constant over the past decade. Short periods of groundwater elevation decline and recovery have occurred during this period. The recent extended multi-year drought (1987-1992) reduced the availability of replenishment water, and coupled with increased growth rate, caused a decline in static groundwater elevation. Drought recovery began to become apparent in 1994, with an increase in the average static groundwater elevation, as shown in Figure 3.4-1.

Figure 3.4-1: District Well Level Average



3.4.1 Basin Boundaries and Hydrology

As described in DWR Bulletin 118 California's Groundwater, the Livermore Valley Groundwater Basin extends from the Pleasanton Ridge east to the Altamont Hills and from the Livermore Upland north to the Orinda Upland. Surface drainage features include Arroyo Del Valle, Arroyo Mocho, and Arroyo Las Positas (collectively referred to as the Arroyos) as principal streams, with Alamo Creek, South San Ramon Creek and Tassajara Creek as minor streams. All streams converge on the west side of the basin forming Arroyo de la Laguna, which flows south and joins Alameda Creek in Sunol Valley. Some geologic structures restrict the lateral movement of groundwater, but the general groundwater gradient is to the west, then south towards Arroyo de la Laguna.

Additional details of the basin are given in the DWR's Groundwater Bulletin 118, see Appendix D[6]:

The following is given as summary of the basin:

- San Francisco Bay Hydrologic Region
- Livermore Valley Groundwater Basin
- Groundwater Basin Number: 2-10
- Basin is un-adjudicated

3.4.2 Groundwater Management Plan

The groundwater basin that Cal Water pumps from is an un-adjudicated basin. Recharge efforts are managed by the Zone 7 Water Agency. The Agency's management plan in attached in Appendix I.

3.5 Recycled Water

The recycling of wastewater offers several potential benefits to Cal Water and its customers. Perhaps the greatest of these benefits is to help maintain a sustainable groundwater supply either through direct recharge, or by reducing potable supply needs by utilizing recycled water for appropriate uses (e.g., landscape, irrigation) now being served by potable water. Currently, no wastewater is recycled for direct reuse in the District. The potential amount of recycled water that can be produced is proportional to the amount of wastewater that is generated by District, and is discussed in the following sections.

3.5.1 Wastewater Collection

The City of Livermore owns and operates the sewer system consisting of gravity sewers and pumping stations to collect wastewater from residential, commercial, and industrial customers. The collected wastewater is conveyed to the Livermore Water Reclamation Plant for treatment where it undergoes tertiary treatment with chlorination. The tertiary treatment consists of microfiltration and reverse osmosis and produces disinfected tertiary recycled water. The Water Reclamation Plant was last upgraded in 1993 and has a capacity to treat 8.5 MGD is currently treating an average flow of 7.5 MGD average flow of wastewater. Approximately 2 MGD of recycled water is provided to customers during the peak season for such applications as firefighting, irrigation of landscaping, golf

course irrigation, airports, and wineries. During the off season, only 0.4 MGD of recycled water is used. None of this recycled water use occurs in Cal Water's Livermore service area.

The water not used for recycling is pumped to the transport system of the Livermore Amador Valley Water Management Agency (LAVWMA) for ultimate discharge into the San Francisco Bay. LAVWMA owns and operates the facilities that convey treated wastewater from the member agencies' treatment plants west over the Dublin grade, through Castro Valley and the City of San Leandro, to a pipeline operated by the East Bay Discharger's Authority (EBDA). EBDA de-chlorinates the effluent and discharges it through a deepwater outfall into the San Francisco Bay. Along this route, a portion of the effluent water from the LAVWMA line is extracted, filtered and then recycled by Caltrans for irrigation of landscaping along Interstates 580 and 80.

3.5.2 Estimated Wastewater Generated

Estimates for the district wastewater quantity since 1980 are shown in Figure 3.5-1 and were calculated by annualizing 90 percent of January water use in the Cal Water's service area. The future quantity of waste generation is based on a linear equation of the historical estimates. The estimated volume of wastewater generated for the district in five-year increments to the year 2030 is presented in Table 3.5-1

Figure 3.5-1: Estimated District Annual Wastewater Generated

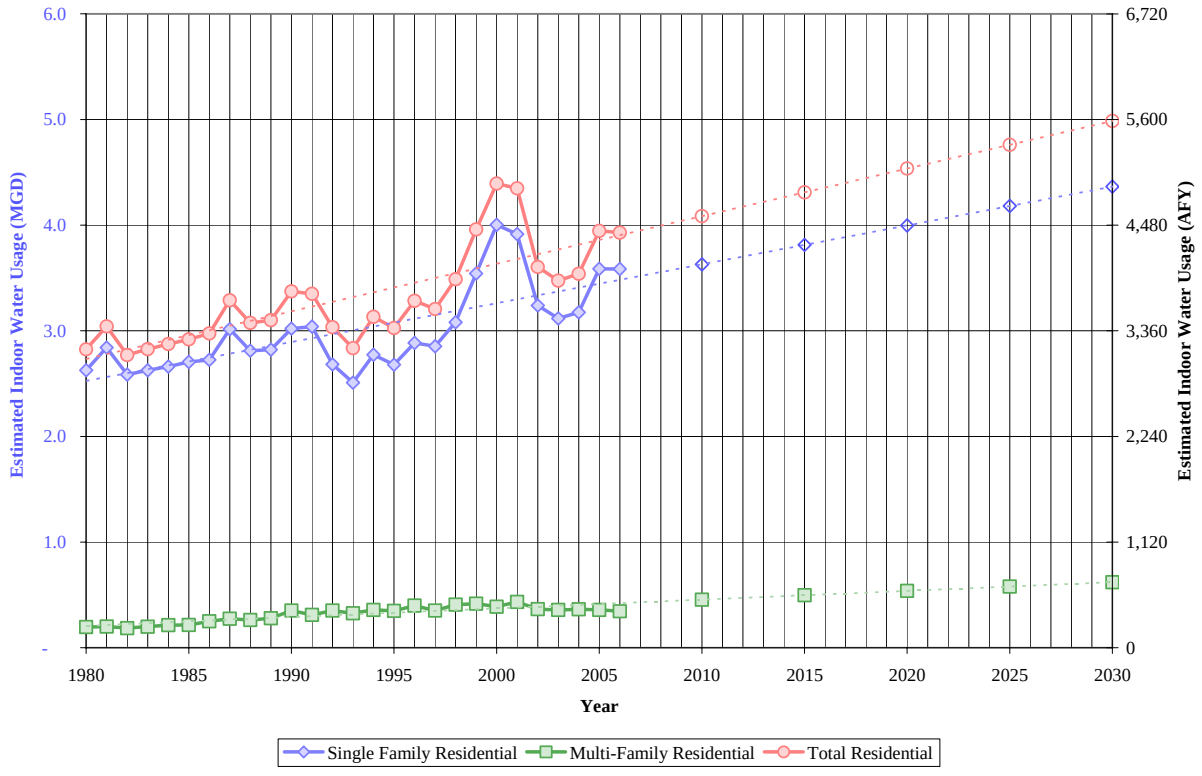


Table 3.5-1: Disposal of wastewater (non-recycled) AF Year (Table 34)							
Method of disposal	**Treatment Level**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
Discharged to San Francisco Bay	Tertiary	4,419	4,576	4,828	5,080	5,333	5,585
	Total	4,419	4,576	4,828	5,080	5,333	5,585

3.5.3 Potential Water Recycling

Because Cal Water's service area is mostly built out, increasing the use of recycled water would require the installation of new piping systems throughout the district. Retrofitting the existing system to bring recycled water to existing customers would be costly. Cal Water's Water Supply and Facilities Master Plan for the Livermore District included an analysis of potential recycled water customers and their projected demand. The analysis found that there is a potential demand of 780 AFY of recycled water in the Livermore service area. Based on the capital cost of the required infrastructure to develop a recycled water supply, the unit cost of recycled water would be $3,352 per acre-foot, which is almost three times the cost of imported water from Zone 7. In addition, customers not receiving recycled water would be forced to bear the burden of increased rates to help fund these capitol projects. It is therefore unlikely that the existing distribution system will be retrofitted to deliver recycled water to current customers.

3.6 Desalinated Water

There are no opportunities for the development of desalinated water in the District.

3.7 Transfer or Exchange Opportunities

Cal Water is not currently pursuing transfer or exchange opportunities in its Livermore District.

3.8 Water Supply Reliability

A chart comparing annual rainfall since 1980 to the average annual rainfall is shown in Figure 3.8-1 with the average annual rainfall for the district of 14.5 inches. The District experienced two Single Dry Year periods in which the year before and the year after had either average or above average rainfall. The first driest year occurred in 1994 when the rainfall was 35.5% below average (9.4 inches). The second Single Dry Year occurred in 1997, when the rainfall was 7.1% below average (13.5 inches). Water demand increased significantly during this second period and is taken as the Single Dry Year shown in Table 3.8-1. The three Multiple Dry-Water Years used are based on the most recent and consecutive lowest annual rainfall totals which occurred in 1987 to 1992. This period coincides with the drought conditions that California experienced during the same period.

Figure 3.8-1: Comparison of Annual Rainfall to Historical Average

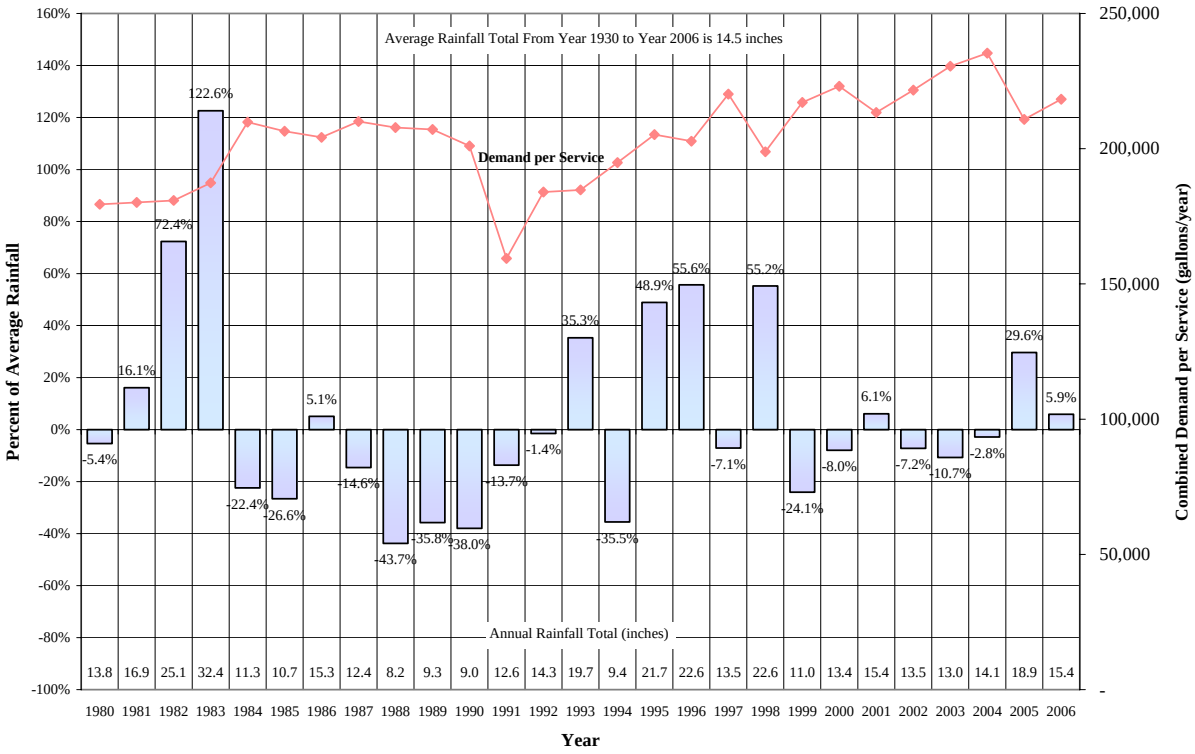


Table 3.8-1: Basis of Water Year Data (Table 9)	
Water Year Type	**Base Year (s)**
Average Water Year	2004
Single-Dry Water Year	1997
Multiple-Dry Water Years	1987-1992

The supply reliability is shown in Table 3.8-2 and indicates that during below average rainfall periods, demand increases and has been met by the given supply.

Table 3.8-2: Supply Reliability - AF Year (Table 8)					
Source	Average / Normal Water Year (2006)	Single Dry Water Year (2007)	Multiple Dry Water Years		
			Year 1 (2008)	Year 2 (2009)	Year 3 (2010)
Zone 7	8,840	9,210	9,580	9,950	10,320
Groundwater	3,069	3,069	3,069	3,069	3,069
Total	**11,909**	**12,279**	**12,649**	**13,019**	**13,389**
% of Normal	-	103.1%	103.0%	102.9%	102.8%

Cal Water is not a regional water wholesaler and does not store water seasonally in reservoirs. Therefore total runoff figures can not be used to determine supply reliability. Total supply amounts have been used instead, which makes comparison among multiple years difficult due to the increasing service counts over time.

Both sources of supply are reliant on Zone 7 water. According to Zone 7 policy, 100 percent of municipal and industrial supply will be available to treated water customers even during multiple dry year periods. And Zone 7's groundwater recharge efforts will provide at least 75 percent of its estimated maximum daily demand. In the event that SWP deliveries are reduced, Zone 7 will be able to meet its treated water demands by pumping previously stored or banked groundwater resources. Current Zone 7 supply projections show that the available supply through 2030 is over 35,000 AFY greater than the projected demand. Because of this Cal water can expect that there will be sufficient supply to meet customer demands during multiple dry year scenarios.

Although the historical climatic record shows that the demand can be met by the supply, other factors which may threaten the reliability of supply are listed in Table 3.8-3.

Table 3.8-3: Factors Resulting In Inconsistency of Supply (Table 10)				
Name of supply	Legal	Environmental	Water Quality	Climatic
Zone 7	✓		✓	✓
Groundwater	✓		✓	✓

Although unlikely, any change to current agreements with Zone 7 or the SWP could negatively affect the future availability of supply. Cal Water's current 30-year contract with Zone 7 ensures adequate supply through 2024.

Historically, Cal Water has been able to meet all state and federal water quality regulations. Chemicals of concern in the Livermore District include Arsenic, Boron, Chromium, Nitrate, and organic compounds. None of these chemicals is expected to cause significant problems with the quality of water delivered to Cal Water's customers. Currently, Cal Water is using wellhead treatment and blending for both Nitrates and the

organic compounds tetrachloroethylene (PCE) and trichloroethylene to ensure concentrations are below Maximum Contamination Levels (MCL) for these chemicals.

As noted earlier, short-term drought events should not pose a serious threat to the reliability of supply in the Livermore District. During extended droughts, as the primary source of supply shifts from SWP deliveries to groundwater withdrawals, reliability of supply would decrease as the drought event continued.

3.8.1 Water Quality

The drinking water delivered to customers in the Livermore District meets or surpasses all federal and state regulations. The U.S. Environmental Protection Agency as authorized by the Federal Safe Drinking Water Act of 1974 sets drinking water standards. A state can either adopt the USEPA standard or set state standards that are more stringent than those set by the federal government.

There are two general types of drinking water standards, Primary and Secondary. Primary Standards are designed to protect public health by establishing MCL for substances in water that may be harmful to humans. MCLs are established very conservatively for each contaminant and are generally based on health effects which may occur if a person were to drink two liters of the water per day for 70 years. Secondary Standards are based on the aesthetic qualities of the water such as taste, odor, color, and certain mineral content. These standards, established by the State of California, specify limits for substances that may affect consumer acceptance of the water.

As stated above, nitrate and organic compounds are the primary contaminants of concern in the district. Arsenic, boron, and chromium are all found below current MCLs for these compounds. Nitrate contamination is believed to be from septic systems in areas not served by the City of Livermore's sewer system. Nitrate is generally found in the northeastern portion of the Livermore District. Wells that are affected by the presence of nitrate are blended with Zone 7 supply to manage high concentrations. Wells contaminated with organic compounds retrofitted with granulated activated carbon (GAC) wellhead treatment or blending to ensure that concentrations remain below MCLs for these compounds.

3.9 Water Supply Projects

The provisions of the thirty year contract with Zone 7 are such that, Cal Water may not purchase or receive with or without compensation either directly or indirectly, any water for use in its service area from any source other than extraction of its Groundwater Pumping Quota or from purchase from Zone 7. Any financial incentive to seek other sources of supply are removed by a contract provision that obligates Cal Water to pay Zone 7 for all its fixed costs that are associated with any quantity of water purchased from another source.

These provisions are in the contract to protect Zone 7's financial base. This base is necessary because as a State Water Project contractor Zone 7 is obligated to cover its

portion of the project cost. In addition, Zone 7 must have the ability to finance facility construction. However, these provisions also obligate Zone 7 to take all prudent actions to maintain and enhance the reliability of the imported supply.

Cal Water will work with Zone 7, as it is able to improve the water supply reliability for the Valley. The contract has been structured to permit greater flexibility in the management of the Valley's water resources. The In-lieu pumping program and the emergency over-extraction provisions of the contract will be used to balance the annual fluctuations in supply availability.

Zone 7 has adopted a plan to develop future water supplies. In their January 1994 Water Supply Planning report, Zone 7 sets forth its long-range supply objectives.

Conservation is a central objective in this plan. Cal Water has set a goal to achieve a ten-percent reduction in demand over pre-drought conditions. Water recycling, groundwater management, increased deliveries through State Water Project improvements, and water transfers are additional objectives of this plan. Cal Water supports the Zone 7 Water Supply Plan and will assist as needed to accomplish these objectives.

Cal Water will continue its annual main replacement program to upgrade and improve the Livermore District's distribution system.

Cal Water has developed a Water Supply and Facilities Master Plan for the District in 2007. Water quality, supply reliability, and supply redundancy issues are addressed; resulting capital improvement projects that are scheduled for the following 20 years.

In order to address the issue of aging infrastructure, Cal Water is developing a company-wide groundwater well and panelboard replacement program.

Other future water supply projects are summarized in Table 3.9-1. The table lists a tank replacement which, though not a water supply, will help maintain system pressure during peak period times.

Table 3.9-1: Future Water Supply Projects (Table 17)

Project Name	Projected Start Date	Projected Completion Date
Replace Existing Tank	2009	2009

4 Water Shortage Contingency Plan

4.1 Worst Case Water Supply Availability

This section describes measures the company may take in times of supply shortages. During periods of water shortages, the company's conservation programs can be expanded and may include more restrictive measures such as mandatory reductions, rationing, and penalties.

4.2 Stages of Action

California Water Service Company has developed a four-stage rationing plan. The plan includes voluntary and mandatory stages. Approval from the CPUC must be obtained prior to implementation of mandatory restrictions.

Table 4.2-1: Consumption Reduction Methods (Table 27)

Shortage	Stage	Demand Reduction Goal	Type Of Program
Minimum 5 - 10%	Stage 1	10% reduction	Voluntary
Moderate 10 - 20%	Stage 2	20% reduction	Voluntary or Mandatory*
Severe 20 - 35%	Stage 3	35% reduction	Mandatory*
Critical 35 - 50%	Stage 4	50% reduction	Mandatory*

* Mandatory = Allocations

4.2.1 Actions to Be Undertaken By California Water Service Company

The following outline lists the actions to be taken during periods when a reduction in consumption is required:

Stage 1

- California Water Service Company maintains an ongoing public information campaign consisting of distribution of literature, speaking engagements, monthly bill inserts, and conservation messages printed in local newspapers.
- Educational programs in area schools are also ongoing.

Stage 2

- California Water Service Company will aggressively continue its public information and education programs.
- Ask consumers for 10 to 20 percent voluntary or mandatory water use reductions.
- Prior to implementation of mandatory reductions, obtain approval from CPUC.
- Lobby for passage of drought ordinances by appropriate governmental agencies.

Stage 3

- Implement mandatory reductions after receiving approval from CPUC.
- Maintain rigorous public information campaign explaining water shortage conditions.
- Water use restrictions go into effect; prohibited uses can include watering resulting in gutter flooding, using a hose without shutoff device, filling of pools or fountains, etc.
- Limiting landscape irrigation by restricting the hours of the day and or days of the week during which water for irrigation can be used.
- Monitor production weekly for compliance with necessary reductions.
- Installation of a flow restrictor on the service line of customers who consistently violate water use restrictions.

Stage 4

- All of steps taken in prior stages intensified.
- Discontinuance of water service for customers consistently violating water use restrictions.
- Monitor production daily for compliance with necessary reductions.
- More restrictive conditions for, or a prohibition, of landscape irrigation

4.2.2 Mandatory Prohibitions

Due to Cal Water's investor-owned status, it is not authorized to pass any ordinances. Should conditions warrant mandatory reductions, Cal Water will request authority to add Tariff Rule 14.1, Mandatory Water Conservation Plan (see Appendix E), to existing tariffs for a district. Included in Rule 14.1 is Section A. Conservation - Nonessential or Unauthorized Water Use which prohibits use of water for filling or refilling of swimming pools, use of water which results in flooding or runoff in gutters, etc.

4.2.3 Consumption Limits

California Water Service Company maintains extensive water use records on individual metered customer accounts. These records are reviewed in the districts on a daily basis to identify potential water loss problems.

In order to protect itself against serious and unnecessary waste or misuse of water, Cal Water may meter any flat rate service and apply the regularly established meter rates where the customer continues to misuse or waste water beyond five days after Cal Water has given the customer written notice to remedy such practices.

4.2.4 Monitoring Procedure during Periods of Water Shortages

During all stages of water shortages, daily production figures are reported to and monitored by the district manager on a daily basis. Consumption will be monitored through these daily production figures in the district for compliance with necessary reductions.

4.2.5 Penalties or Charges for Excessive Use

Cal Water, after one written warning, shall install a flow-restricting device on the service line of any customer observed by Cal Water personnel to be using water for any non-essential or unauthorized use defined in Section A. of Tariff Rule 14.1 (see Appendix E). Repeated violations of unauthorized water use will result in discontinuance of water service.

4.2.6 Analysis of Revenue and Expenditure Impacts

California Water Service Company is an investor-owned water utility and, as such, is regulated by the CPUC. On March 8, 1989, the Commission instituted an investigation to determine what actions should be taken to mitigate the effects of water shortages on the State's regulated utilities and their customers. In decision D. 90-07-067, effective July 18, 1990, the Commission authorized all utilities to establish memorandum accounts to track expenses and revenue shortfalls caused both by mandatory rationing and by voluntary conservation efforts. Subsequently, D. 90-08-55 required each class A utility (more than 10,000 connections) seeking to recover revenues from a drought memorandum account to submit; for Commission approval, a water management program that addresses long-term strategies for reducing water consumption. Utilities with approved water management programs were authorized to implement a surcharge to recover revenue shortfalls recorded in their drought memorandum accounts.

However, the Commission's Decision 94-02-043 dated February 16, 1994, states:

> *10. Now that the drought is over, there is no need to track losses in sales due to residual conservation.*
> *11. The procedures governing voluntary conservation memorandum accounts (see D.92-09-084) developed in this Drought Investigation will no longer be available to water companies as of the date of this order.*
> *12. Procedures and remedies developed in the Drought Investigation that are not specifically authorized for use in the event of future drought in these Ordering Paragraphs will no longer be available to water companies as of the date of this order except upon filing and approval of a formal application.*
> *(CPUC Decision 94-02-043, Findings of Fact, paragraphs 10-12)*

It was at this time that Cal Water significantly curtailed conservation activities in its districts. At the time that triggers for voluntary or mandatory reductions should occur in the future, Cal Water will determine if a filing to the CPUC is necessary to enforce the reductions and to begin tracking lost sales from the required reductions.

4.3 Implementing the Plan

Section 357 of the Water Code requires that suppliers that are subject to regulation by the CPUC shall secure its approval before imposing water consumption regulations and restrictions required by water shortage emergencies.

4.4 Supply Shortage Triggers

Although California Water Service Company's Livermore District is not currently experiencing a supply shortage, Cal Water intends to manage its supply prudently. If a supply deficiency should occur, Cal Water will implement the appropriate "Stage of Action" unless the Public Utilities Commission adopts findings to implement a less restrictive stage.

Table 4.4-1: Water Supply Triggering Levels	
Stage	% Shortage
Stage 1	Up to 10% supply reduction
Stage 2	10 to 20% supply reduction
Stage 3	20 to 35% supply reduction
Stage 4	35 to 50% supply reduction

4.5 Three-Year Minimum Water Supply

Table 4.5-1 lists the minimum water supply for the next three years based on current trends of the supply. The District would be able to meet demand over this three-year sequence without a shortage by maintaining the pumping rate of the groundwater wells. The purchased water would remain the same since Zone 7 would rely on its groundwater storage withdrawals from banking reserves, and/or transfers and exchanges.

Table 4.5-1: Three-Year Estimated Minimum Water Supply (Table 24) (AFY)				
Source	**Normal**	**Year 1**	**Year 2**	**Year 3**
Purchased water	8,840	9,210	9,580	9,950
Cal Water Groundwater Wells	3,069	3,069	3,069	3,069
Total	11,909	12,279	12,649	13,019

4.6 Catastrophic Water Supply Interruption

Cal Water has an Emergency Response Plan in place that coordinates overall company response to a disaster in any or all of its districts. In addition, the Emergency Response Plan requires each district to have a local disaster plan that coordinates emergency responses with other agencies in the area.

Cal Water also inspects its facilities annually for earthquake safety. To prevent loss of these facilities during an earthquake, auxiliary generators and improvements to the water storage facilities have been installed as part of our annual budgeting and improvement process.

During an emergency, the Livermore District can transfer water through an interconnection to or from the neighboring water system owned by the City of Livermore Water Department. This interconnection can be used to help offset the impact of interrupted service to district customers or, being two way connections, these facilities can be used to supply either imported water or pumped groundwater from the District to

the City of Livermore water system. Also, if Zone 7 experiences a period of supply deficiency, Cal Water may extract groundwater from the Main Basin in excess of the normal contract amount.

5 Water Use Provisions

5.1 Distribution of Services

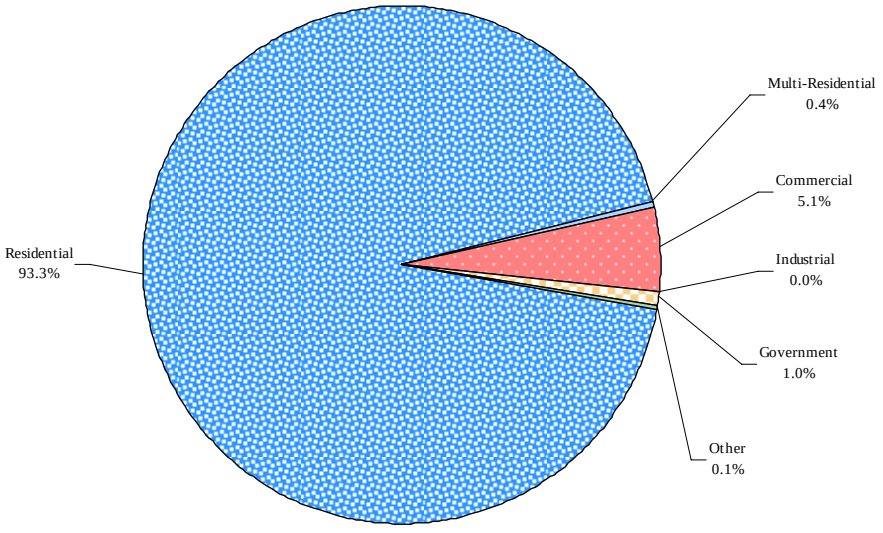
California Water Service Company classifies customer service connection categories as follows:

- Single Family Residential
- Multi Family Residential
- Commercial
- Industrial
- Government
- Other

The residential sector of CWS water service customers includes permanent single and multifamily residents and does not include service for seasonal customers.

Land use in the Livermore District is dominated by residential and commercial activities, as seen in the service count of the District, Figure 5.1-1. Single-family residential services account for 93.3 percent of all services; multifamily residential services represent 0.4 percent, and commercial services 5.1 percent. Thus, 98.8 percent of all services are for residential and commercial facilities. The remaining 1.2 percent includes industrial, governmental uses, and other functions such as temporary construction meters.

Figure 5.1-1: Distribution of Services (2006)



5.2 Historical and Current Water Demand

Demand per service was established as a function of historical sales and service data. Projected demand is the mathematical product of total projected services and demand per service. Historical sales values are illustrated in Figure 5.2-1. Historical service counts are illustrated in Figure 5.2-2.

Figure 5.2-1: Historical Sales

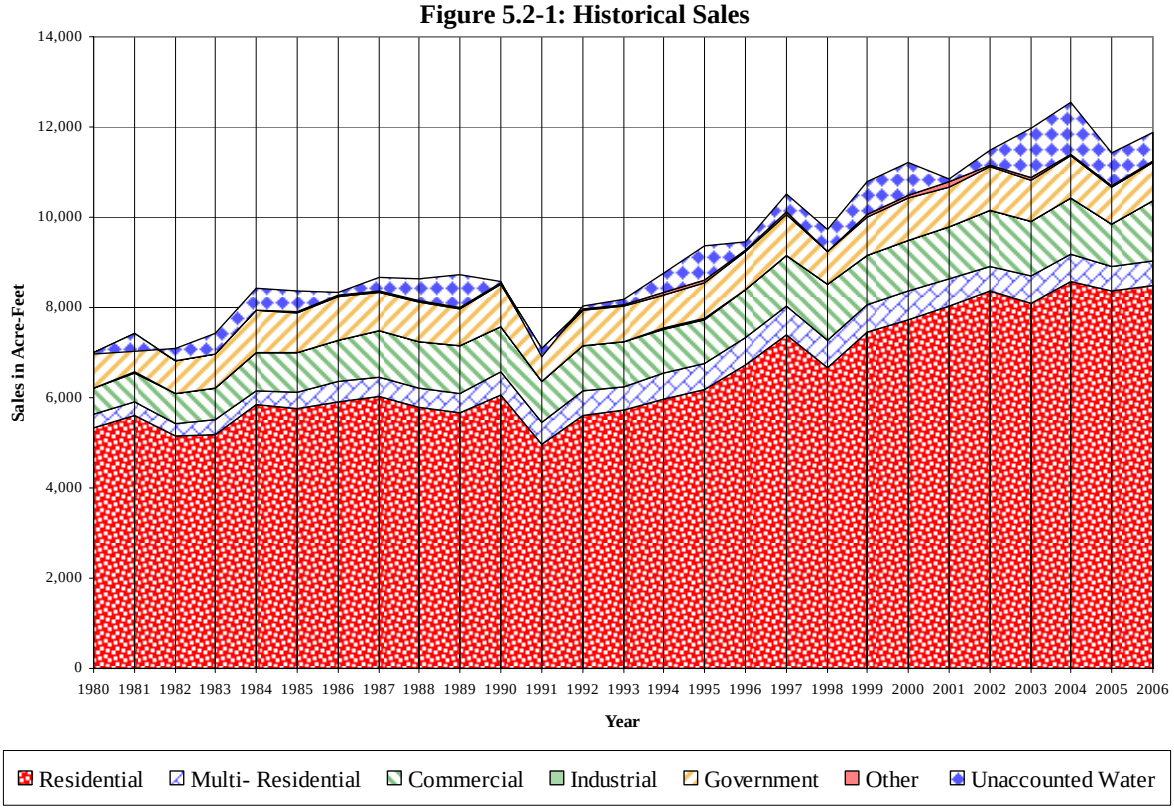
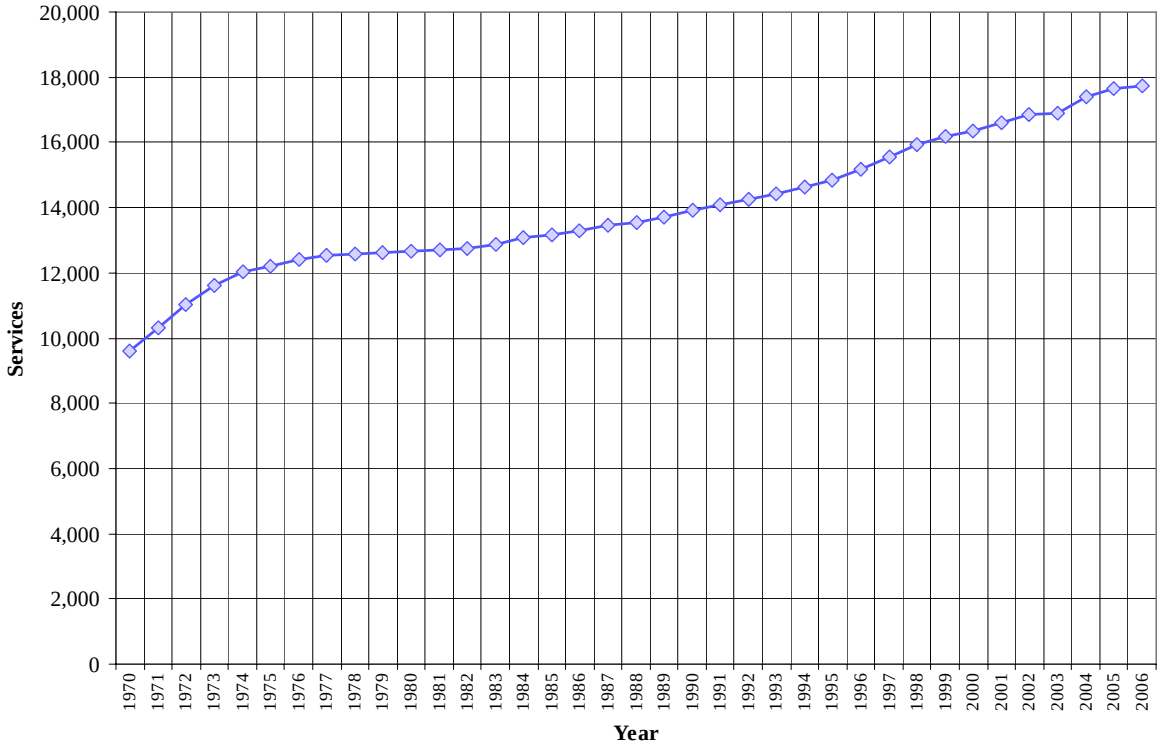
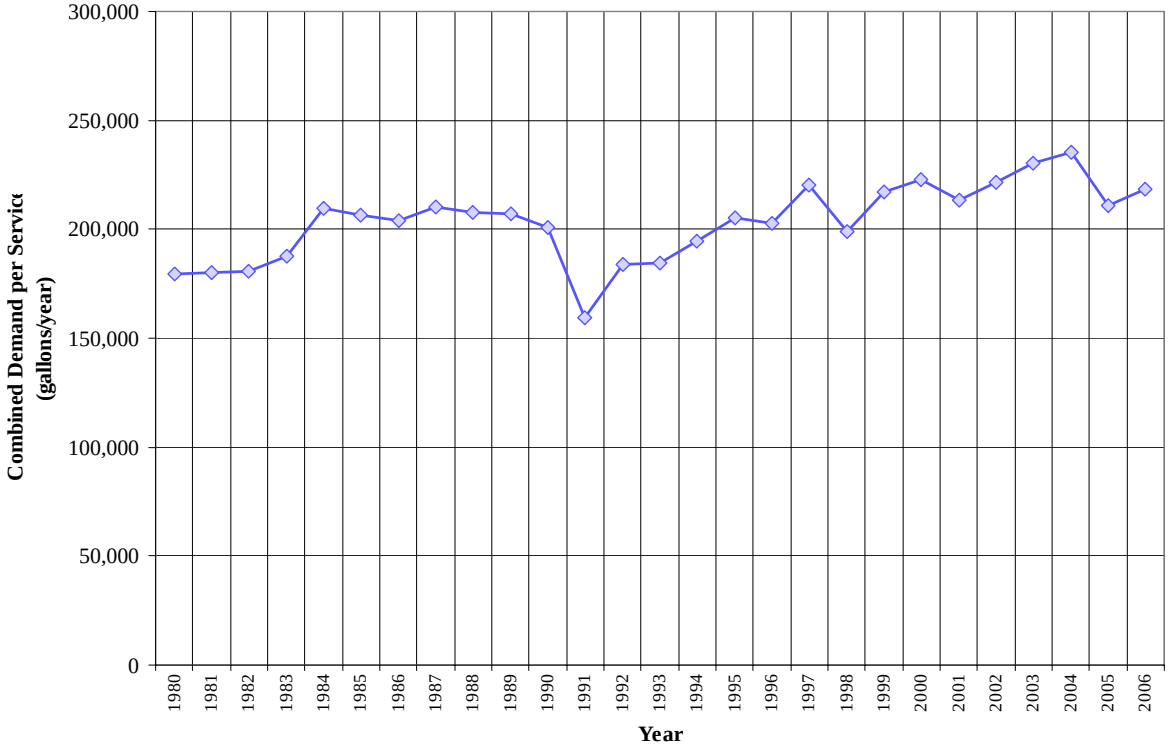


Figure 5.2-2: Historical Service Counts



The combined demand for all services fluctuates between 160,000 to 240,000 gallons per service per year, Figure 5.2-3.

Figure 5.2-3: Historical Demand per Service



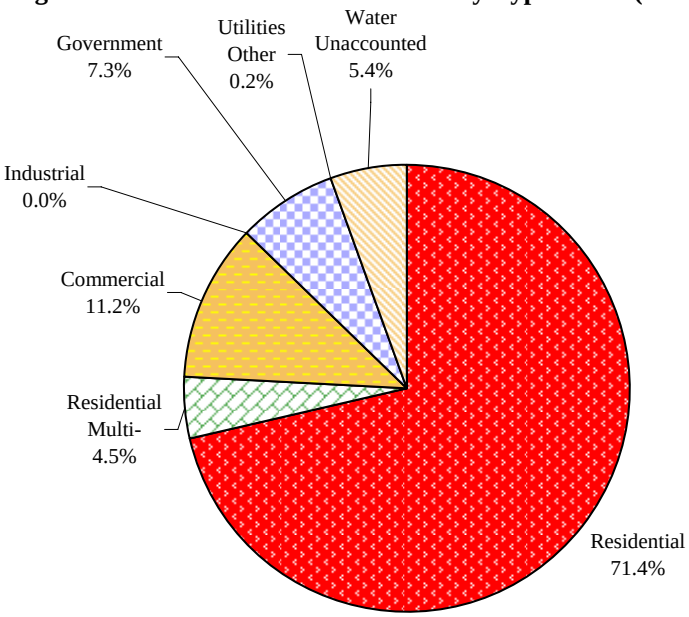
Demand began declining in 1989 in response to the last drought and was capped by a reduction in 1991 as compared to 1990. Since 1991 demand has steadily increased. Curbing demand will require the implementation of conservation activities. The Company's goal is a 10% reduction in demand (based on pre-drought levels). Implementation of Best Management Practices will assist in achieving this goal.

5.3 Per Capita Water Demand

Based on the end of 2006 total demand, per-capita water use in the district is summarized in Table 5.3-1. Based on the total demand of 3,876 million gallons and Livermore District's estimated population of 54,740, water use in 2006 was 197 gallons per capita per day. In comparison, the statewide value is 190 gallons per capita per day and the Sacramento Hydrological Region value was 301 gallons per capita per day.

Table 5.3-1: Per Capita Water Demand (2006)		
Units	All Users	Residential
Million Gallons	3,876	2,941
Estimated Population	54,740	54,740
Gallons/Person in Year	71,799	53,731
Gallons Per Capita Per Day	196.7	147.2
Gallons Per Capita Per Minute	0.137	0.102

Figure 5.3-1: Percent of Total Demand by Type of Use (2006)



For the purpose of projecting total system demand, the projected number of services for each customer class was multiplied by the demand per service for that classification. This process was employed because of the significant difference between the demand per service associated with certain uses and the combined or average demand per service.

Single family residential water use represents one of the smallest demand per service segments in the district with a 5 year average of 169,163 gallons per service per year, yet this category uses 71.4 percent of the total demand. The multifamily residential use was 4.5 percent of the total demand with a demand per service that has a 5 year average of 2,457,437 gallons per service per year. The combined residential sector component of demand is equal to 76.2 percent of total demand. Unaccounted for water averages 5.4 percent, which is within acceptable levels.

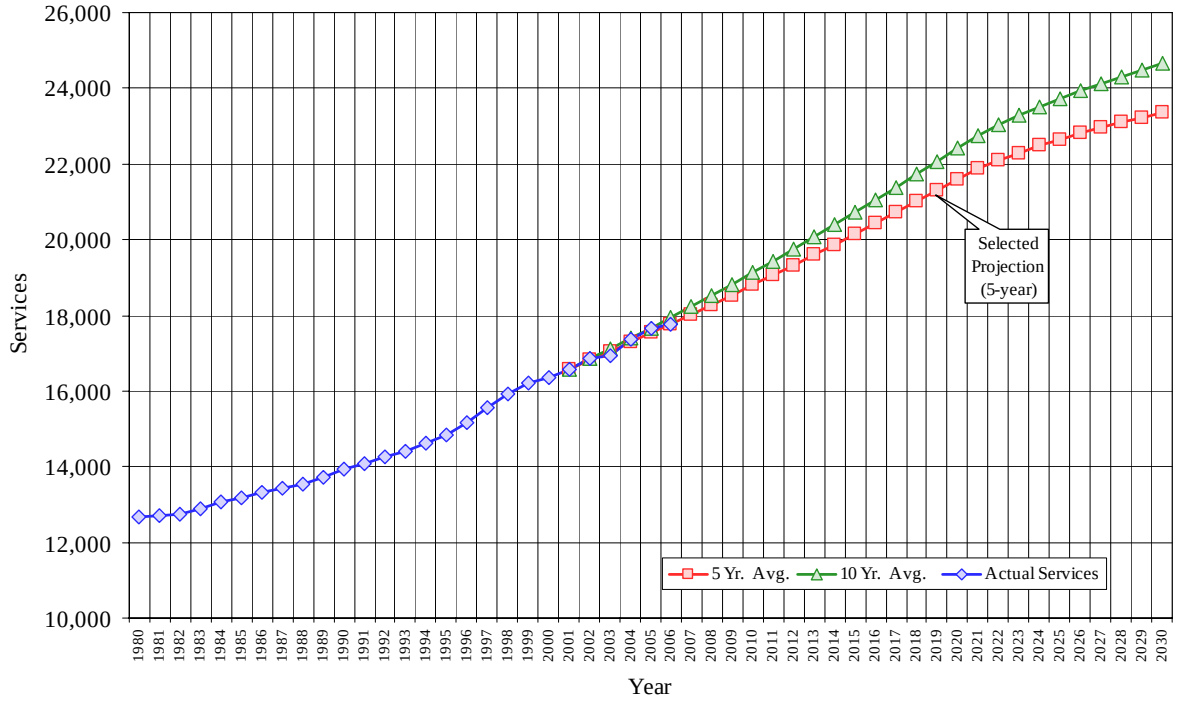
5.4 Historical and Projected Water Demand

Total system demand was projected by multiplying the number of services for each customer class by the demand per service for that class. This process incorporates the significant differences between the demand per service associated with each customer

class and the different growth rates for each class. The service projection is shown in Figure 5.4-1.

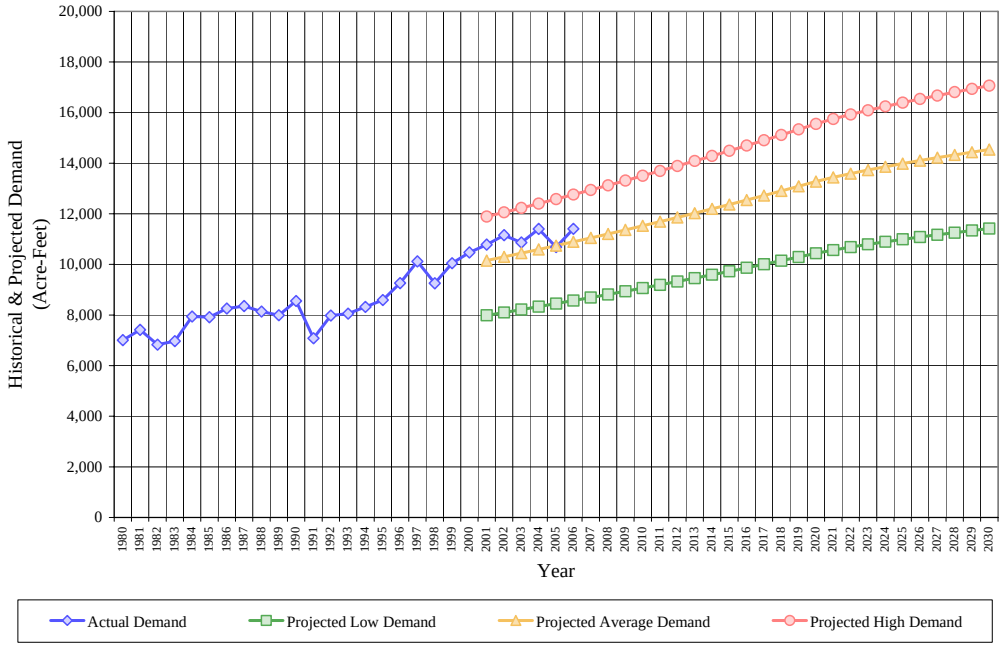
Projected service connections based on past service counts are labeled 5-Year Average and 10-Year Average. The 5-Year Average is the short-term growth rate, calculated from 2002 to 2006, which has an overall annual average growth rate of 1.37%. The 10-Year Average, the long-term growth rate calculated from 1997 to 2006, exhibits an overall annual average growth rate of 1.59%. As shown in the following graph, the 5-year growth rate has the strongest correlation with the historical trend.

Figure 5.4-1: Historical & Projected Services



Three projection scenarios were used to develop a range of projected demand for the Livermore District. The previously discussed service connection growth pattern was applied to three different sets of demand per service data. Data generated through each scenario is compiled and located separately in Appendix C (Worksheets 10, 11, and 12). Comparative demand data for the three scenarios is presented in Figure 5.4-2. The starting point for each projection was the actual annual average number of services in 2001. This provides a comparison of projected values to actual values over a several-year period.

Figure 5.4-2: Historical & Projected Demand (without system losses)



5.4.1 Scenario 1

The District's five-year average growth pattern was applied to the lowest recorded demand per service values from each customer class. Scenario #1 forecasts total demand for the Year 2030 at 11,419 AF (without system losses). This scenario provides a bottom end for the projected demand range. This scenario represents the level of demand Cal Water customers could achieve if an emergency existed. Projected low system demands in 5-year increments, starting in 2010, are shown in Table 5.4-1.

5.4.2 Scenario 2

The District's five-year average growth pattern was combined with the ten-year average demand per service for each customer class to project the most probable demand values through the Year 2030. This scenario forecasts total demand for the Year 2030 at 14,542 AF (without system losses). Scenario #2 represents the normal position of the demand range that should most likely occur provided the 10% conservation goal established by the Company is achieved and maintained. To accomplish this level of demand it will be essential to effectively promote and implement appropriate conservation programs. Projected average system demands in 5-year increments, starting in 2010, are shown in Table 5.4-2.

5.4.3 Scenario 3

The District's five-year average growth pattern was combined with the highest recorded demand per service value for each customer class. Scenario #3 forecasts demand for the Year 2030 at 17,066 AF (without system losses). This scenario provides a top end for the projected demand range. Projected high system demands in 5-year increments, starting in 2010, are shown in Table 5.4-3.

Table 5.4-1: Past, Current, and Projected Water Deliveries for Scenario 1 (Table 12a)											
		Water Use Sectors	Single family	Multifamily	Commercial	Industrial	Institutional/Gov.	Landscape/ Agriculture	Recycled	Other	Total
2000	metered	# of accounts	15,300	75	805	3	163		-	23	16,369
		Deliveries AFY	7,731	629	1,132	2.7	916	-	-	63	10,472
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2005	metered	# of accounts	16,457	75	903	1	174	-	-	31	17,641
		Deliveries AFY	8,355	541	947	-	824	-	-	21	10,688
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2010	metered	# of accounts	17,500	85	978	2	201	-	-	34	18,800
		Deliveries AFY	6,585	533	973	0.1	953	-	-	23	9,067
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2015	metered	# of accounts	18,747	91	1,064	2	215	-	-	36	20,156
		Deliveries AFY	7,054	571	1,058	0.1	1,020	-	-	25	9,729
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2020	metered	# of accounts	20,083	97	1,158	3	231	-	-	39	21,610
		Deliveries AFY	7,557	611	1,152	0.1	1,092	-	-	27	10,439
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2025	metered	# of accounts	20,997	102	1,260	3	247	-	-	42	22,650
		Deliveries AFY	7,901	638	1,253	0.1	1,170	-	-	29	10,991
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2030	metered	# of accounts	21,570	104	1,371	3	264	-	-	45	23,357
		Deliveries AFY	8,116	656	1,363	0.1	1,252	-	-	31	11,419
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-

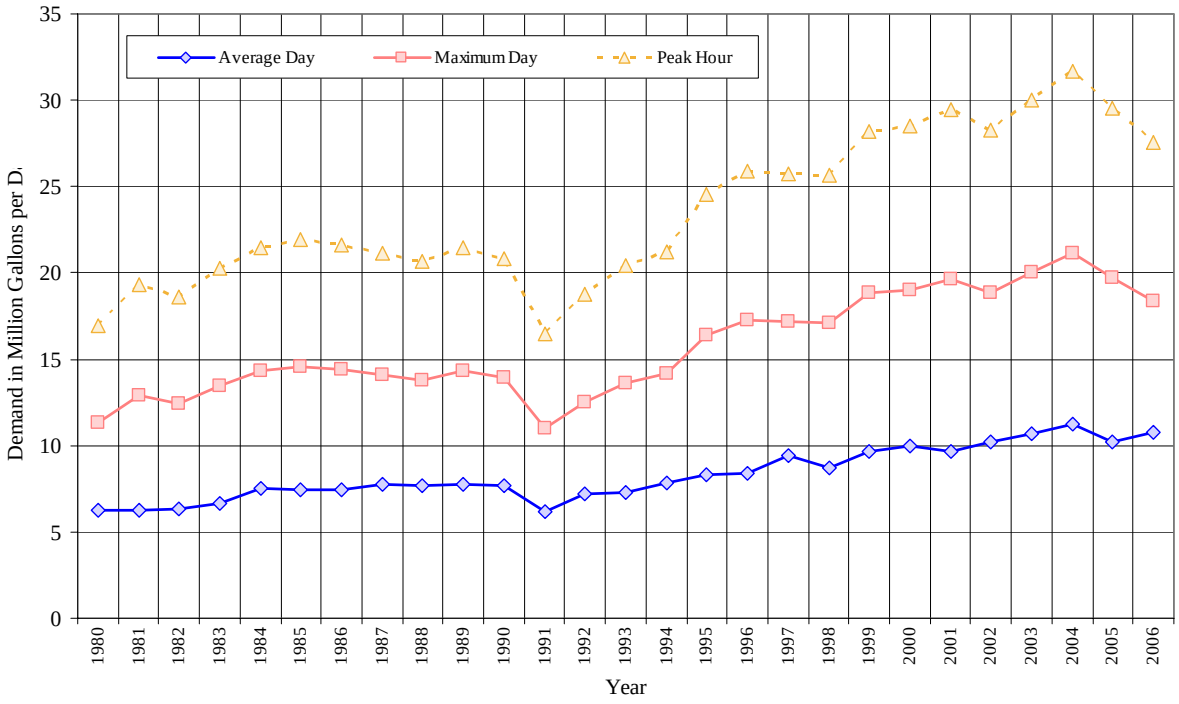
Table 5.4-2: Past, Current, and Projected Water Deliveries for Scenario 2 (Table 12b)											
		Water Use Sectors	Single family	Multifamily	Commercial	Industrial	Institutional/Gov.	Landscape/ Agriculture	Recycled	Other	Total
2000	metered	# of accounts	15,300	75	805	3	163	-	-	23	16,369
		Deliveries AFY	7,731	629	1,132	2.7	916	-	-	63	10,472
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2005	metered	# of accounts	16,457	75	903	1	174	-	-	31	17,641
		Deliveries AFY	8,355	541	947	-	824	-	-	21	10,688
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2010	metered	# of accounts	17,500	85	978	2	201	-	-	34	18,800
		Deliveries AFY	8,212	651	1,346	2.2	1,250	-	-	66	11,528
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2015	metered	# of accounts	18,747	91	1,064	2	215	-	-	36	20,156
		Deliveries AFY	8,797	697	1,465	2.4	1,338	-	-	71	12,370
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2020	metered	# of accounts	20,083	97	1,158	3	231	-	-	39	21,610
		Deliveries AFY	9,424	746	1,594	2.6	1,433	-	-	76	13,275
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2025	metered	# of accounts	20,997	102	1,260	3	247	-	-	42	22,650
		Deliveries AFY	9,853	779	1,734	2.7	1,534	-	-	82	13,985
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2030	metered	# of accounts	21,570	104	1,371	3	264	-	-	45	23,357
		Deliveries AFY	10,122	800	1,887	2.9	1,642	-	-	87	14,542
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-

Table 5.4-3: Past, Current, and Projected Water Deliveries for Scenario 3 (Table 12c)											
		Water Use Sectors	Single family	Multifamily	Commercial	Industrial	Institutional/Gov.	Landscape/ Agriculture	Recycled	Other	Total
2000	metered	# of accounts		75	805	3	163	-	-	23	16,369
		Deliveries AFY	7,731	629	1,132	2.7	916	-	-	63	10,472
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2005	metered	# of accounts	16,457	75	903	1	174	-	-	31	17,641
		Deliveries AFY	8,355	541	947	-	824	-	-	21	10,688
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2010	metered	# of accounts	17,500	85	978	2	201	-	-	34	18,800
		Deliveries AFY	9,297	793	1,659	5.8	1,599	-	-	149	13,504
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2015	metered	# of accounts	18,747	91	1,064	2	215	-	-	36	20,156
		Deliveries AFY	9,960	849	1,805	6.2	1,712	-	-	160	14,492
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2020	metered	# of accounts	20,083	97	1,158	3	231	-	-	39	21,610
		Deliveries AFY	10,669	909	1,964	6.6	1,833	-	-	171	15,553
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2025	metered	# of accounts	20,997	102	1,260	3	247	-	-	42	22,650
		Deliveries AFY	11,155	950	2,137	7.1	1,963	-	-	183	16,396
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-
2030	metered	# of accounts	21,570	104	1,371	3	264	-	-	45	23,357
		Deliveries AFY	11,459	976	2,325	7.6	2,101	-	-	196	17,066
	unmetered	# of accounts	-	-	-	-	-	-	-	-	-
		Deliveries AFY	-	-	-	-	-	-	-	-	-

5.5 Average, Maximum, and Peak Demand

The average day demand (ADD) and maximum day demands (MDD) are shown in the following graph and are based on the historical records for the District. The Peak Hour Demand (PHD) shown in the graph is based on a Peaking Factor of 1.5 times MDD which is which is typical of other Cal Water Districts. The historical ADD, MDD, and PHD values are shown in Figure 5.5-1

Figure 5.5-1: Average Day, Maximum Day, and Peak Hour Demand



The ADD, MDD, and PHD data discussed above were, along with the projected services, used to project the different demands until 2030. These projections are based on comparing supply and demand, and not the capacity of the distribution system. For Cal Water's Water Supply and Facilities Master Plan for Livermore, West Yost Associates developed a hydraulic model to determine the distribution system's ability to deliver the projected ADD, MDD, and PHD. The model results are described in detail in the Master Plan. Table 5.5-1 contains the projected values for ADD, MDD, and PHD through 2030 in five year increments.

Table 5.5-1: Average Day, Maximum Day, and Peak Hour Demands			
Projected Year	Average Day	Maximum Day	Peak Hour
	(MGD)	(MGD)	(MGD)
2005			
Scenario 1	7.6	14.3	21.5
Scenario 2	10.0	18.9	28.3
Scenario 3	12.3	23.2	34.8
2010			
Scenario 1	8.1	15.4	23.1
Scenario 2	10.7	20.3	30.4
Scenario 3	13.2	24.9	37.4
2015			
Scenario 1	8.7	16.5	24.8
Scenario 2	11.5	21.8	32.6
Scenario 3	14.1	26.7	40.1
2020			
Scenario 1	9.4	17.7	26.6
Scenario 2	12.3	23.3	35.0
Scenario 3	15.2	28.7	43.0
2025			
Scenario 1	9.9	18.6	28.0
Scenario 2	13.0	24.6	36.9
Scenario 3	16.0	30.2	45.3
2030			
Scenario 1	10.2	19.4	29.1
Scenario 2	13.5	25.6	38.3
Scenario 3	16.6	31.4	47.2

5.6 Summary

California Water Service Company does not provide water to other agencies and does not supply water for projects such as saline barriers or groundwater recharge and does not plan to supply water for these purposes in the future.

The district system losses based on average demand projections are summarized in Table 5.6-1.

Table 5.6-1: Additional Water Uses and Losses - AF Year (Table 13 and 14)

Water Use	2000	2005	2010	2015	2020	2025	2030
Sales to Other Agencies	-	-	-	-	-	-	-
Saline barriers	-	-	-	-	-	-	-
Groundwater recharge	-	-	-	-	-	-	-
Conjunctive use	-	-	-	-	-	-	-
Raw water	-	-	-	-	-	-	-
Recycled	-	-	-	-	-	-	-
Unaccounted-for system losses	734	728	477	511	548	574	592
Total	734	728	477	511	548	574	592

The past, current, and projected water deliveries based on the average projected consumption rate is presented in Table 5.6-2.

Table 5.6-2: Total Water Use - AF Year (Table 15)

Water Use	2000	2005	2010	2015	2020	2025	2030
Total of Tables 12, 13, 14	11,206	11,974	12,004	12,881	13,823	14,559	15,134

Figure 5.6-1 graphically displays the past, current, and projected water deliveries for all three scenarios including the unaccounted for system losses, as well as the projected demand estimated by the Water Supply and Facilities Master Plan. Figure 5.6-2 shows the historical and average projected water source by type of source.

Figure 5.6-1: Historical & Projected Demand (system losses incorporated)

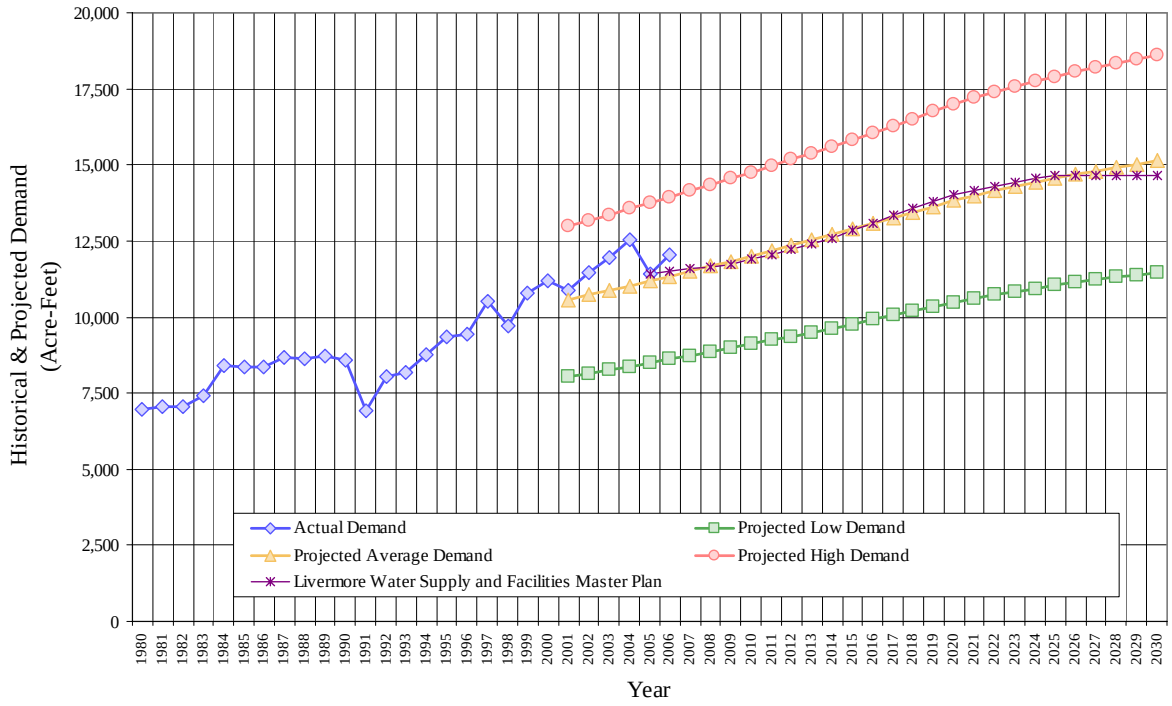
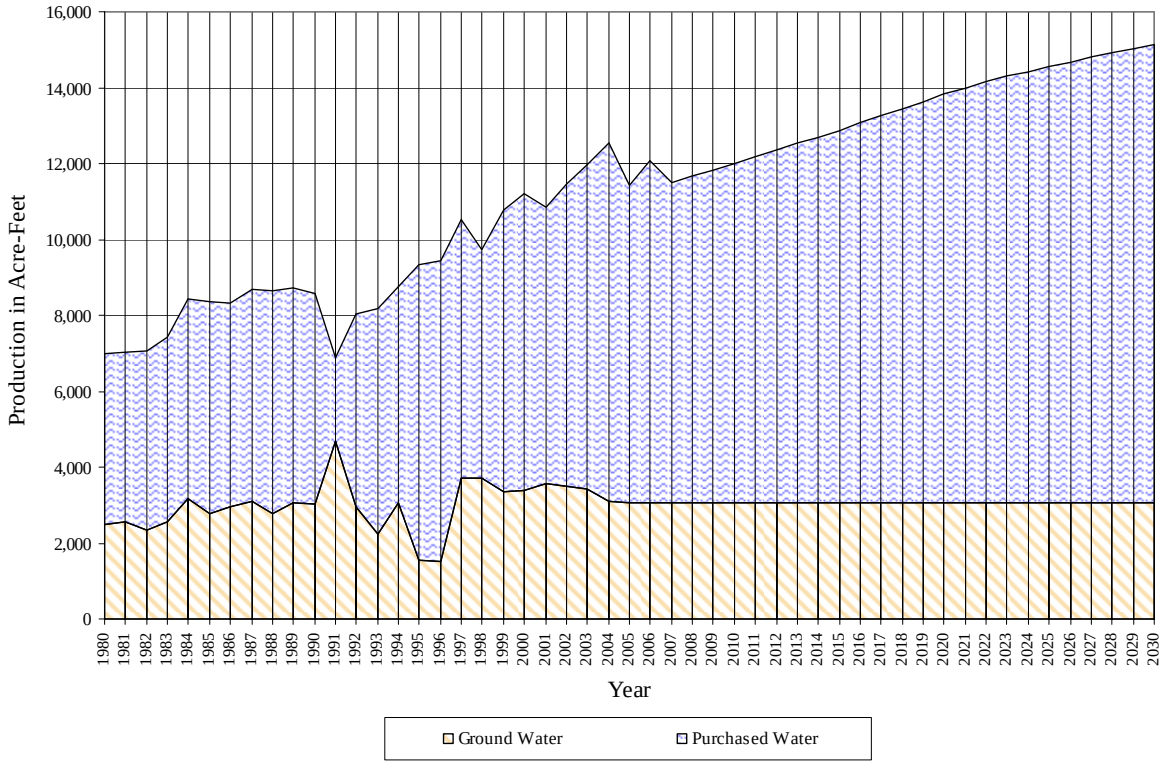


Figure 5.6-2: Historical & Average Projected Sources



The projected supply provided to Zone 7 is shown in Table 5.6-3.

Table 5.6-3: Agency Demand Projections Provided to Wholesale Suppliers – AFY (Table 19)					
Wholesaler	**2010**	**2015**	**2020**	**2025**	**2030**
Zone 7 Water Agency	10,320	12,600	13,200	13,650	13,700

The wholesaler projection to Cal Water, as stated in their Urban Water Management Plan, is shown in Table 5.6-4. The table lists the possible water sources that Zone 7 has available to provide the water supply. The quantity provided in the table lists only the Cal Water portion and does not include the quantity that Zone 7 is obligated to provide to other agencies.

Table 5.6-4: Wholesaler Quantified the Planned Sources of Water- AFY (Table 20)					
Wholesaler sources	**2010**	**2015**	**2020**	**2025**	**2030**
Zone 7 Wells	10,320	12,600	13,200	13,650	13,700
State Water Project					
SWP – Carryover					
Arroyo Del Valle Watershed					
Semitropic Pumpback					
Byron Bethany Irrigation District					

6 Supply and Demand Comparison

6.1 Normal-Year Comparison

Tables 6.1-1, 6.1-2, and 6.1-3 compare the current and projected water supply and demand based on average consumption (Scenario 2). The projected increase in demand is 133% at year 2030 when compared to the 2005 demand.

The tables show that Cal Water is able to meet the long term demand for the District with a normal water supply. A normal water supply assumes full entitlement from Zone 7, and groundwater is adequate.

Table 6.1-1: Projected Normal Water Supply - AF Year (Table 40)

	2010	2015	2020	2025	2030
Zone-7 purchased water	10,320	12,600	13,200	13,650	13,700
Cal Water Groundwater Wells	3,069	3,069	3,069	3,069	3,069
Supply Total	13,389	15,669	16,269	16,719	16,769
% of Normal Year	112%	132%	137%	140%	141%

Table 6.1-2: Projected Normal Water Demand - AF Year (Table 41)

	2010	2015	2020	2025	2030
Demand	12,004	12,881	13,823	14,559	15,134
% of year 2005	105%	113%	121%	128%	133%

Table 6.1-3: Projected Supply and Demand Comparison - AF Year (Table 42)

	2010	2015	2020	2025	2030
Supply totals	13,389	15,669	16,269	16,719	16,769
Demand totals	12,004	12,881	13,823	14,559	15,134
Difference	1,385	2,788	2,446	2,160	1,635
Difference as % of Supply	10%	18%	15%	13%	10%
Difference as % of Demand	12%	22%	18%	15%	11%

6.2 Single Dry-Year Comparison

While District operational records show that demand increases during a single-dry year when compared to a year with more normal rainfall, public outreach programs encouraging users to conserve more water can offset that increase. Water demand increases are due principally to increased landscape irrigation to offset lower than normal precipitation. Tables 6.2-1, 6.2-2, and 6.2-3 compare the current and projected water supply and demand based on consumption rate that occurred during the most recent single-dry year for District (1997).

For this comparison, no reduction in water supply from the Zone 7 is assumed because as stated in their Urban Water Management Plan, that Zone 7 has through:

> *"Proper planning, along with construction and utilization of efficient facilities, enables Zone 7 to maintain a water supply system with a reliability of 100%. The management of storage facilities and their associated conveyance systems, is a vital component of Zone 7's ability to deliver a sustainable water supply during dry and critically dry years."*

For the groundwater supply, by maintaining pumping to the safe yield for Main Basin, it is not anticipated that the supply of groundwater would be diminished; therefore the total capacity of groundwater supply is considered the same as for a normal year.

Table 6.2-1: Projected Single Dry-year Water Supply - AF Year (Table 43)

	2010	2015	2020	2025	2030
Zone-7 purchased water	10,320	12,600	13,200	13,650	13,700
Cal Water Groundwater Wells	3,069	3,069	3,069	3,069	3,069
Supply total	13,389	15,669	16,269	16,719	16,769
% of Normal Year	100.0%	100.0%	100.0%	100.0%	100.0%

Table 6.2-2: Projected Single Dry-year Water Demand - AF Year (Table 44)

	2010	2015	2020	2025	2030
Demand	13,072	14,029	15,056	15,863	16,498
% of projected normal	108.9%	108.9%	108.9%	109.0%	109.0%

Table 6.2-3: Projected Single Dry-year Supply and Demand Comparison - AF Year (Table 45)

	2010	2015	2020	2025	2030
Supply totals	13,389	15,669	16,269	16,719	16,769
Demand totals	13,072	14,029	15,056	15,863	16,498
Difference	317	1,640	1,213	856	271
Difference as % of Supply	2.4%	10.5%	7.5%	5.1%	1.6%
Difference as % of Demand	2.4%	11.7%	8.1%	5.4%	1.6%

6.3 Multiple Dry-Year Comparison

During a multiple dry-year, Cal Water will increase demand management measures as outlined in Section 4 in order to bring about a reduction in normal demand. Because of reduced precipitation, many customers will be inclined to increase irrigation to maintain landscaping.

Tables 6.3-1, 6.3-2, and 6.3-3 compare the projected water supply and demand occurring between 2006 and 2010 during an extended drought lasting the full length of this period.

During a multi-year dry period, the following assumptions are made with respect to each source of supply:

- Since Zone 7 has determined the safe yield for Main Basin, Cal Water will continue to pump its allotted groundwater throughout the drought period.
- As stated in Section 6.2, Zone 7 has planned for multiple year drought periods with water banking and transfers, thus no reduction is assumed from Zone 7.

Although active measures taken by Cal Water to induce water conservation are ongoing, the conservative assumption is made that, for this analysis, the average annual consumption (Scenario 2) will prevail during the years from 2006 – 2010. Demand would be considered average for years 1, 2 and 3 and then is reduced by 24% for year 4 and 5. This reduction is the lowest demand from the historical record for the District which would be accomplished when optional or mandatory water use restrictions are expected to be implemented.

Table 6.3-1: Projected Supply During Multiple Dry Year To 2010 (Table 46)
AFY

	2006	2007	2008	2009	2010
Zone-7 purchased water	8,840	9,210	9,580	9,950	10,320
Cal Water Groundwater Wells	3,069	3,069	3,069	3,069	3,069
Supply total	11,909	12,279	12,649	13,019	13,389
% of Normal Year	100.0%	100.0%	100.0%	100.0%	100.0%

Table 6.3-2: Projected Demand Multiple Dry Year To 2010 (Table 47)
AFY

	2006	2007	2008	2009	2010
Demand	11,346	11,507	11,670	8,980	9,107
% of projected normal	100.0%	100.0%	100.0%	75.9%	75.9%

Table 6.3-3: Projected Supply And Demand Comparison To 2010 (Table 48)
During Multiple Dry Year Period - AFY

	2006	2007	2008	2009	2010
Supply totals	11,909	12,279	12,649	13,019	13,389
Demand totals	11,346	11,507	11,670	8,980	9,107
Difference	563	772	979	4,039	4,282
Difference as % of Supply	4.7%	6.3%	7.7%	31.0%	32.0%
Difference as % of Demand	5.0%	6.7%	8.4%	45.0%	47.0%

Tables 6.3-4, 6.3-5, and 6.3-6 compare the projected water supply and demand between years 2011 and 2015.

Supply amounts are based on the assumption that no reduction will occur during multi-dry years.

Demand is considered average (Scenario 2) for years 1, 2 and 3 and then is reduced by 24%, which is the lowest demand (Scenario 1) from the historical record for the District for years 4 and 5.

Table 6.3-4: Projected Supply During Multiple Dry Year To 2015 (Table 49)
AFY

	2011	2012	2013	2014	2015
Zone-7 purchased water	10,776	11,232	11,688	12,144	12,600
Cal Water Groundwater Wells	3,069	3,069	3,069	3,069	3,069
Supply total	13,845	14,301	14,757	15,213	15,669
% of Normal Year	100.0%	100.0%	100.0%	100.0%	100.0%

Table 6.3-5: Projected Demand Multiple Dry Year To 2015 (Table 50)
AFY

	2011	2012	2013	2014	2015
Demand	12,175	12,348	12,523	9,635	9,772
% of projected normal	100.0%	100.0%	100.0%	75.9%	75.9%

Table 6.3-6: Projected Supply And Demand Comparison To 2015 (Table 51)
During Multiple Dry Year Period - AFY

	2011	2012	2013	2014	2015
Supply totals	13,845	14,301	14,757	15,213	15,669
Demand totals	12,175	12,348	12,523	9,635	9,772
Difference	1,670	1,953	2,234	5,578	5,897
Difference as % of Supply	12.1%	13.7%	15.1%	36.7%	37.6%
Difference as % of Demand	13.7%	15.8%	17.8%	57.9%	60.4%

Tables 6.3-7, 6.3-8, and 6.3-9 compare the projected water supply and demand between years 2011 and 2015.

Supply amounts are based on the assumption that no reduction will occur during multi-dry years.

Demand is considered average (Scenario 2) for years 1, 2 and 3 and then is reduced by 24%, which is the lowest demand (Scenario 1) from the historical record for the District for years 4 and 5.

Table 6.3-7: Projected Supply During Multiple Dry Year To 2020 (Table 52)
AFY

	2016	2017	2018	2019	2020
Zone-7 purchased water	12,720	12,840	12,960	13,080	13,200
Cal Water Groundwater Wells	3,069	3,069	3,069	3,069	3,069
Supply total	15,789	15,909	16,029	16,149	16,269
% of Normal Year	100.0%	100.0%	100.0%	100.0%	100.0%

Table 6.3-8: Projected Demand Multiple Dry Year To 2020 (Table 53)
AFY

	2016	2017	2018	2019	2020
Demand	13,064	13,250	13,438	10,338	10,485
% of projected normal	100.0%	100.0%	100.0%	75.9%	75.8%

Table 6.3-9: Projected Supply And Demand Comparison To 2020 (Table 54)
During Multiple Dry Year Period - AFY

	2016	2017	2018	2019	2020
Supply totals	15,789	15,909	16,029	16,149	16,269
Demand totals	13,064	13,250	13,438	10,338	10,485
Difference	2,725	2,659	2,591	5,811	5,784
Difference as % of Supply	17.3%	16.7%	16.2%	36.0%	35.6%
Difference as % of Demand	20.9%	20.1%	19.3%	56.2%	55.2%

Tables 6.3-10, 6.3-11, and 6.3-12 compare the projected water supply and demand between years 2011 and 2015.

Supply amounts are based on the assumption that no reduction will occur during multi-dry years.

Demand is considered average (Scenario 2) for years 1, 2 and 3 and then is reduced by 24%, which is the lowest demand (Scenario 1) from the historical record for the District for years 4 and 5.

Table 6.3-10: Projected Supply During Multiple Dry Year To 2025 (Table 55)
AFY

	2021	2022	2023	2024	2025
Zone-7 purchased water	13,290	13,380	13,470	13,560	13,650
Cal Water Groundwater Wells	3,069	3,069	3,069	3,069	3,069
Supply total	16,359	16,449	16,539	16,629	16,719
% of Normal Year	100.0%	100.0%	100.0%	100.0%	100.0%

Table 6.3-11: Projected Demand Multiple Dry Year To 2025 (Table 56)
AFY

	2021	2022	2023	2024	2025
Demand	13,995	14,151	14,296	10,943	11,039
% of projected normal	100.0%	100.0%	100.0%	75.8%	75.8%

Table 6.3-12: Projected Supply And Demand Comparison To 2025 (Table 57)
During Multiple Dry Year Period - AFY

	2021	2022	2023	2024	2025
Supply totals	16,359	16,449	16,539	16,629	16,719
Demand totals	13,995	14,151	14,296	10,943	11,039
Difference	2,364	2,298	2,243	5,686	5,680
Difference as % of Supply	14.5%	14.0%	13.6%	34.2%	34.0%
Difference as % of Demand	16.9%	16.2%	15.7%	52.0%	51.5%

Tables 6.3-13, 6.3-14, and 6.3-15 compare the projected water supply and demand between years 2011 and 2015.

Supply amounts are based on the assumption that no reduction will occur during multi-dry years.

Demand is considered average (Scenario 2) for years 1, 2 and 3 and then is reduced by 24%, which is the lowest demand (Scenario 1) from the historical record for the District for years 4 and 5.

Table 6.3-13: Projected Supply During Multiple Dry Year To 2030 (Table 55)
AFY

	2026	2027	2028	2029	2030
Zone-7 purchased water	13,660	13,670	13,680	13,690	13,700
Cal Water Groundwater Wells	3,069	3,069	3,069	3,069	3,069
Supply total	16,729	16,739	16,749	16,759	16,769
% of Normal Year	100.0%	100.0%	100.0%	100.0%	100.0%

Table 6.3-14: Projected Demand Multiple Dry Year To 2030 (Table 56)
AFY

	2026	2027	2028	2029	2030
Demand	14,682	14,800	14,915	11,388	11,469
% of projected normal	100.0%	100.0%	100.0%	75.8%	75.8%

Table 6.3-15: Projected Supply And Demand Comparison To 2030 (Table 57)
During Multiple Dry Year Period - AFY

	2026	2027	2028	2029	2030
Supply totals	16,729	16,739	16,749	16,759	16,769
Demand totals	14,682	14,800	14,915	11,388	11,469
Difference	2,047	1,939	1,834	5,371	5,300
Difference as % of Supply	12.2%	11.6%	11.0%	32.1%	31.6%
Difference as % of Demand	13.9%	13.1%	12.3%	47.2%	46.2%

7 Water Demand Management

7.1 California Urban Water Conservation Council

California Water Service Company is a California Urban Water Conservation Council (CUWCC) member. The CUWCC was created to increase efficient water use statewide through partnerships among urban water agencies, public interest organizations, and private entities. The Council's goal is to integrate urban water conservation Best Management Practices (BMP) into the planning and management of California's water resources. Annual reports filed with the CUWCC are attached in Appendix G. The reports are considered complete according to the CUWCC website.

7.2 Water Conservation Best Management Practices

Implementation of these water conservation BMPs will help limit water demand from customers within the District's service area. This will result in a reduction of water supply requirements for Cal Water's Livermore District, while also reducing the impact of water use statewide. This chapter presents an analysis of urban water conservation BMPs and a description of the methods used to conduct the analysis.

The unpredictable water supply and ever increasing demand on California's complex water resources have resulted in a coordinated effort by the Department of Water Resources (DWR), water utilities, environmental organizations, and other interested groups to develop a list of urban BMPs for conserving water. This consensus-building effort resulted in a Memorandum of Understanding Regarding Urban Water Conservation in California (MOU), as amended March 9, 2005, among parties, which formalizes an agreement to implement these BMPs and makes a cooperative effort to reduce the consumption of California's water resources. The MOU is administered by the CUWCC and is its primary tool for encouraging efficient water use throughout the State.

As a signatory of the MOU, Cal Water has agreed to implement the BMPs as defined in Exhibit 1 of the MOU that are cost beneficial, and complete such implementation in accordance with the schedule assigned to each BMP. The MOU requires that a water utility implement only the BMPs that are economically beneficial. If a BMP is not economically feasible, the water utility may request an economic exemption for that BMP. The BMPs as defined in the MOU are generally recognized as standard definitions of water conservation measures. Table 7.2-1 presents the BMPs as defined by the MOU.

Table 7.2-1: Water Conservation Best Management Practices	
No.	**BMP Name**
1.	Water survey programs for single-family residential and multi-family residential connections
2.	Residential plumbing retrofit
3.	System water audits, leak detection and repair
4.	Metering with commodity rates for all new connections and retrofit of existing connections
5.	Large landscape conservation programs and incentives
6.	High-efficiency washing machine rebate programs
7.	Public information programs
8.	School education programs
9.	Conservation programs for commercial, industrial, and institutional accounts
10.	Wholesale agency assistance programs
11.	Conservation pricing
12.	Conservation coordinator
13.	Water waste prohibition
14.	Residential ULFT replacement programs

7.3 Economic Analysis Methodology

An economic analysis was conducted for six of the 14 BMPs that are described in the MOU (i.e. BMP nos. 1, 2, 5b, 6, 9, and 14). Economic analyses were not done for BMPs 3, 7, 8, 10, 11, 12, and 13 because they are essentially non-quantifiable, but often critical to the success of those BMPs that are quantifiable. All residential services in the Livermore District are metered, therefore BMP4 does not apply. Analysis was also not performed for BMP 5a because Cal Water does not currently distinguish between services with dedicated irrigation meters and those with mixed use meters.

The cost-effectiveness economic analyses were performed using spreadsheet models developed by the CUWCC. In some cases, the models were modified to more closely represent the types of programs that Cal Water would actually be implementing. Each BMP model projects the dollar values of the benefits and costs that would result from implementing a particular BMP. The benefit and cost figures are based on the number of interventions to be completed in accordance with CUWCC coverage requirements, in what is typically a three year implementation schedule. This three year time frame was chosen to coincide both with Cal Water's Urban Water Management Plan submittal schedule for the Livermore District, and its PUC rate case filings.

For BMP 5b, large landscape surveys, Cal Water considered a three year implementation schedule unrealistic and planned a longer five year implementation schedule instead. To be consistent with the other BMP's, the economic analysis of only the first three years are included in the tables below. However, the cumulative water savings data represents full implementation.

Because the models do not account for multiple year implementation schedules, each BMP model was run individually for each year from 2007 to 2009, with values adjusted for inflation as appropriate. BMPs with positive benefit to cost ratios are considered economically feasible and should be implemented as described in the MOU. The results of the economic analysis are discussed in the following section. Several cost sharing opportunities are available through the Zone 7 Water Agency. The economic analyses for BMPs 6 and 14 were designed to include these opportunities, which are reflected in the results.

Important terms and formulas that are common to all the worksheets in the model are defined in Table 7.3-1. Assumptions used in the economic analysis for each BMP are described in Appendix H. Additional assumptions were provided from a guideline from the California Urban Water Conservation Council[7].

Table 7.3-1 Definition of Terms Used in the Economic Analysis

Term	Definition	Comments
Present Value Benefits:	The total dollar value saved due to conservation resulting from BMP implementation.	Includes both water agency and societal benefits.
Present Value Costs:	The total implementation costs per BMP program.	Includes both water agency and societal costs.
Net Present Value:	Total benefits minus total costs without discounting for time.	A value greater than zero indicates an economically justifiable BMP.
Benefit-Cost Ratio:	The sum of the total benefits divided by the sum of the total costs.	A value greater than one indicates an economically justifiable BMP.
Simple Unit Supply Cost:	The cost per unit (AF) for conserved water.	A value less than CWSC's current marginal cost indicates a less expensive source of supply for conserved water.

7.4 Economic Analysis Results

Table 7.4-1 summarizes the results of the economic analysis.

Table 7.4-1: Benefit-Cost Analysis Summary

BMP 1: Residential Surveys

	2007		2008		2009	
Perspective	**Agency**	**Society**	**Agency**	**Society**	**Agency**	**Society**
Program Costs	$212,102	$212,102	$219,058	$219,058	$224,228	$224,228
Total Benefits	$123,131	$234,573	$127,107	$244,087	$129,639	$248,821
Net Present Value	($88,971)	$22,471	($91,951)	$25,029	($94,589)	$24,593
Benefit-Cost Ratio	0.58	1.11	0.58	1.11	0.58	1.11
Unit Supply Cost ($/AF)	$2,341	$2,341	$2,417	$2,417	$2,475	$2,475

BMP 2: Residential Plumbing Retrofits

	2007		2008		2009	
Perspective	**Agency**	**Society**	**Agency**	**Society**	**Agency**	**Society**
Program Costs	$69,326	$69,326	$71,612	$71,612	$73,078	$73,078
Total Benefits	$75,456	$142,843	$77,893	$147,424	$79,444	$150,555
Net Present Value	$6,130	$73,517	$6,281	$75,812	$6,366	$77,477
Benefit-Cost Ratio	1.09	2.06	1.09	2.06	1.09	2.06
Unit Supply Cost ($/AF)	$1,337	$1,337	$1,381	$1,381	$1,410	$1,410

BMP 5b: Large Landscape Surveys

	2007		2008		2009	
Perspective	**Agency**	**Society**	**Agency**	**Society**	**Agency**	**Society**
Program Costs	$42,409	$150,665	$44,683	$156,509	$45,995	$160,099
Total Benefits	$216,322	$252,227	$223,309	$260,373	$227,756	$265,558
Net Present Value	$173,913	$101,562	$178,626	$103,864	$181,761	$105,459
Benefit-Cost Ratio	5.10	1.67	5.00	1.66	4.95	1.66
Unit Supply Cost ($/AF)	$266	$946	$281	$983	$289	$1,006

BMP 6: High Efficiency Washing Machine Rebates

	2007		2008		2009	
Perspective	**Agency**	**Society**	**Agency**	**Society**	**Agency**	**Society**
Program Costs	$19,535	$167,535	$19,797	$167,797	$19,946	$167,946
Total Benefits	$68,919	$280,046	$71,145	$288,944	$72,562	$295,465
Net Present Value	$49,384	$112,511	$51,348	$121,147	$52,616	$127,519
Benefit-Cost Ratio	3.53	1.67	3.59	1.72	3.64	1.76
Unit Supply Cost ($/AF)	$344	$2,955	$349	$2,959	$352	$2,962

Table 7.4-1: Benefit-Cost Analysis Summary (Continued)						
BMP 9: CII Surveys						
	2007		**2008**		**2009**	
Perspective	**Agency**	**Society**	**Agency**	**Society**	**Agency**	**Society**
Program Costs	$54,569	$93,101	$55,803	$94,335	$56,703	$95,235
Total Benefits	$276,546	$401,377	$279,257	$406,740	$284,818	$414,871
Net Present Value	$221,977	$308,276	$223,454	$312,405	$228,115	$319,636
Benefit-Cost Ratio	5.07	4.31	5.00	4.31	5.02	4.36
Unit Supply Cost ($/AF)	$264	$451	$270	$457	$274	$461
BMP 14: ULFT Replacement Program						
	2007		**2008**		**2009**	
Perspective	**Agency**	**Society**	**Agency**	**Society**	**Agency**	**Society**
Program Costs	$196,503	$368,947	$196,530	$374,635	$196,548	$378,293
Total Benefits	$1,203,549	$1,492,209	$1,242,419	$1,540,549	$1,267,162	$1,571,371
Net Present Value	$1,007,046	$1,123,262	$1,045,889	$1,165,914	$1,070,614	$1,193,078
Benefit-Cost Ratio	6.12	4.04	6.32	4.11	6.45	4.15
Unit Supply Cost ($/AF)	$181	$340	$181	$345	$181	$349

According to the analysis, BMPs 2, 5b, 6, 9, and 14 have a positive Net Present Value from both the water agency and society perspectives and thus exhibit a benefit/cost ratio over 1.0, as shown in Table 7.4-1.

Cal Water proposes adding the implementation of BMPs 2, 5b, 6, 9, and 14 to the existing programs beginning in 2007. The implementation of these BMPs will result in a total water savings of 4,998 AF over a 30-year period and will cost a total of $1,257,704. The potential annual water savings for all BMPs is shown graphically on Figure 7.4-1 and the proposed annual water savings is shown on Figure 7.4-2. The total water savings resulting from this level of coverage is also summarized in Tables 7.4-2 and 7.4-3.

Figure 7.4-1: Potential Water Savings

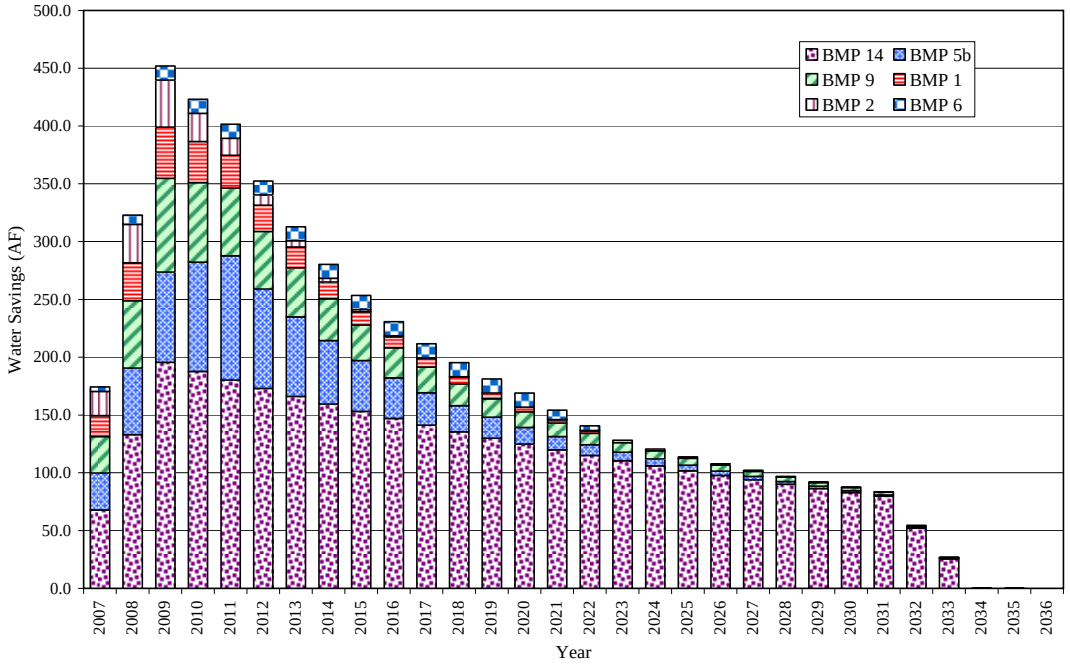


Figure 7.4-2: Proposed Water Savings

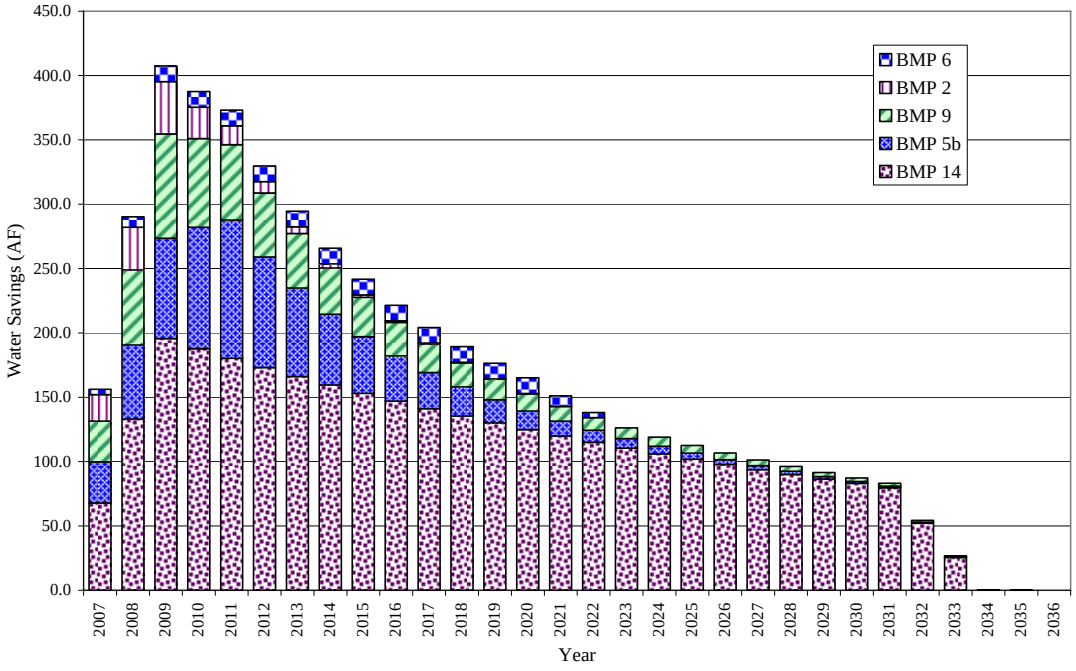


Table 7.4-2: Water Savings and Implementation Costs				
BMP	**Total Interventions**	**Potential Water Savings (AF)**	**Proposed Water Savings (AF)**	**Total Implementation Costs**
BMP 1	2,907	272	0	$0
BMP 2	8,079	156	156	$214,016
BMP 5b	170	796	796	$227,754
BMP 6	888	170	170	$59,278
BMP 9	114	620	620	$167,075
BMP 14	7,827	3,256	3,256	$589,581
Total:	19,985	5,270	4,998	$1,257,704

Figures 7.4-1 and 7.4-2 and Table 7.4-2 do not include the water savings and costs associated with BMPs 3, 7, 8, 10, 11, 12, and 13 since no specific level of effort is defined in the MOU for these BMPs. BMP 13 is covered by CPUC General Order 103, and has no cost unless triggered by a water shortage condition.

Table 7.4-3: Annual Water Savings

Year	BMP 1				BMP 2				BMP 5b					
	Incremental Savings (AF)			Annual Savings (AF)	Incremental Savings (AF)			Annual Savings (AF)	Incremental Savings (AF)					Annual Savings (AF)
	2007	2008	2009		2007	2008	2009		2007	2008	2009	2010	2011	
2007	18.2			18.2	20.7			20.7	32.0					32.0
2008	14.6	18.2		32.7	12.4	20.7		33.2	25.6	32.0				57.5
2009	11.6	14.6	18.2	44.4	7.5	12.4	20.7	40.6	20.5	25.6	32.0			78.0
2010	9.3	11.6	14.6	35.5	4.5	7.5	12.4	24.4	16.4	20.5	25.6	32.0		94.3
2011	7.5	9.3	11.6	28.4	2.7	4.5	7.5	14.6	13.1	16.4	20.5	25.6	32.0	107.4
2012	6.0	7.5	9.3	22.7	1.6	2.7	4.5	8.8	10.5	13.1	16.4	20.5	25.6	85.9
2013	4.8	6.0	7.5	18.2	1.0	1.6	2.7	5.3	8.4	10.5	13.1	16.4	20.5	68.8
2014	3.8	4.8	6.0	14.5	0.6	1.0	1.6	3.2	6.7	8.4	10.5	13.1	16.4	55.0
2015	3.1	3.8	4.8	11.6	0.3	0.6	1.0	1.9	5.4	6.7	8.4	10.5	13.1	44.0
2016	2.4	3.1	3.8	9.3	0.2	0.3	0.6	1.1	4.3	5.4	6.7	8.4	10.5	35.2
2017	2.0	2.4	3.1	7.4	0.1	0.2	0.3	0.7	3.4	4.3	5.4	6.7	8.4	28.2
2018	1.6	2.0	2.4	6.0	0.1	0.1	0.2	0.4	2.7	3.4	4.3	5.4	6.7	22.5
2019	1.3	1.6	2.0	4.8	0.0	0.1	0.1	0.2	2.2	2.7	3.4	4.3	5.4	18.0
2020	1.0	1.3	1.6	3.8	0.0	0.0	0.1	0.1	1.8	2.2	2.7	3.4	4.3	14.4
2021	0.8	1.0	1.3	3.1	0.0	0.0	0.0	0.1	1.4	1.8	2.2	2.7	3.4	11.5
2022	0.6	0.8	1.0	2.4	0.0	0.0	0.0	0.1	1.1	1.4	1.8	2.2	2.7	9.2
2023	0.5	0.6	0.8	2.0	0.0	0.0	0.0	0.0	0.9	1.1	1.4	1.8	2.2	7.4
2024	0.4	0.5	0.6	1.6	0.0	0.0	0.0	0.0	0.7	0.9	1.1	1.4	1.8	5.9
2025	0.3	0.4	0.5	1.2	0.0	0.0	0.0	0.0	0.6	0.7	0.9	1.1	1.4	4.7
2026	0.3	0.3	0.4	1.0	0.0	0.0	0.0	0.0	0.5	0.6	0.7	0.9	1.1	3.8
2027	0.2	0.3	0.3	0.8	0.0	0.0	0.0	0.0	0.4	0.5	0.6	0.7	0.9	3.0
2028	0.2	0.2	0.3	0.6	0.0	0.0	0.0	0.0	0.3	0.4	0.5	0.6	0.7	2.4
2029	0.1	0.2	0.2	0.5	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.5	0.6	1.9
2030	0.1	0.1	0.2	0.4	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.4	0.5	1.5
2031	0.1	0.1	0.1	0.3	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.3	0.4	1.2
2032		0.1	0.1	0.2		0.0	0.0	0.0		0.2	0.2	0.2	0.3	0.9
2033			0.1	0.1			0.0	0.0			0.2	0.2	0.2	0.6
2034				0.0				0.0				0.2	0.2	0.3
2035				0.0				0.0					0.2	0.2
2036				0.0				0.0						0.0
Total:				271.8				155.5						796.0

Table 7.4-3 Continued: Annual Water Savings

Year	BMP 6				BMP 9				BMP 14				Potential Annual Savings (AF)	Proposed Annual Savings (AF)
	Incremental Savings (AF)			Annual Savings (AF)	Incremental Savings (AF)			Annual Savings (AF)	Incremental Savings (AF)			Annual Savings (AF)		
	2007	2008	2009		2007	2008	2009		2007	2008	2009			
2007	4.1			4.1	31.5			31.5	67.9			67.9	174.4	156.2
2008	4.1	4.1		8.1	26.8	31.5		58.3	65.2	67.9		133.0	322.9	290.2
2009	4.1	4.1	4.1	12.2	22.8	26.8	31.5	81.1	62.6	65.2	67.9	195.6	451.9	407.5
2010	4.1	4.1	4.1	12.2	19.4	22.8	26.8	69.0	60.1	62.6	65.2	187.8	423.1	387.6
2011	4.1	4.1	4.1	12.2	16.5	19.4	22.8	58.6	57.7	60.1	62.6	180.3	401.5	373.1
2012	4.1	4.1	4.1	12.2	14.0	16.5	19.4	49.8	55.3	57.7	60.1	173.1	352.5	329.8
2013	4.1	4.1	4.1	12.2	11.9	14.0	16.5	42.3	53.1	55.3	57.7	166.1	312.8	294.7
2014	4.1	4.1	4.1	12.2	10.1	11.9	14.0	36.0	51.0	53.1	55.3	159.5	280.4	265.8
2015	4.1	4.1	4.1	12.2	8.6	10.1	11.9	30.6	49.0	51.0	53.1	153.1	253.4	241.8
2016	4.1	4.1	4.1	12.2	7.3	8.6	10.1	26.0	47.0	49.0	51.0	147.0	230.8	221.5
2017	4.1	4.1	4.1	12.2	6.2	7.3	8.6	22.1	45.1	47.0	49.0	141.1	211.7	204.2
2018	4.1	4.1	4.1	12.2	5.3	6.2	7.3	18.8	43.3	45.1	47.0	135.5	195.3	189.3
2019	4.1	4.1	4.1	12.2	4.5	5.3	6.2	16.0	41.6	43.3	45.1	130.0	181.2	176.4
2020	4.1	4.1	4.1	12.2	3.8	4.5	5.3	13.6	39.9	41.6	43.3	124.8	169.0	165.1
2021		4.1	4.1	8.1	3.2	3.8	4.5	11.5	38.3	39.9	41.6	119.8	154.2	151.1
2022			4.1	4.1	2.8	3.2	3.8	9.8	36.8	38.3	39.9	115.0	140.6	138.2
2023				0.0	2.3	2.8	3.2	8.3	35.3	36.8	38.3	110.4	128.2	126.2
2024				0.0	2.0	2.3	2.8	7.1	33.9	35.3	36.8	106.0	120.6	119.0
2025				0.0	1.7	2.0	2.3	6.0	32.6	33.9	35.3	101.8	113.8	112.5
2026				0.0	1.4	1.7	2.0	5.1	31.3	32.6	33.9	97.7	107.6	106.6
2027				0.0	1.2	1.4	1.7	4.4	30.0	31.3	32.6	93.8	102.0	101.2
2028				0.0	1.0	1.2	1.4	3.7	28.8	30.0	31.3	90.1	96.8	96.2
2029				0.0	0.9	1.0	1.2	3.1	27.6	28.8	30.0	86.5	92.0	91.5
2030				0.0	0.8	0.9	1.0	2.7	26.5	27.6	28.8	83.0	87.6	87.2
2031				0.0	0.6	0.8	0.9	2.3	25.5	26.5	27.6	79.7	83.5	83.2
2032				0.0		0.6	0.8	1.4		25.5	26.5	52.0	54.5	54.3
2033				0.0			0.6	0.6			25.5	25.5	26.8	26.7
2034				0.0				0.0				0.0	0.3	0.3
2035				0.0				0.0				0.0	0.2	0.2
2036				0.0				0.0				0.0	0.0	0.0
Total:				170.2				619.9				3,256.1	5,269.5	4,997.7

7.5 Additional Issues

Non-economic factors including environmental, social, technological, health, and customer impacts, are not thought to be significant in deciding which BMPs to implement in the Livermore District. No water supply projects are currently planned that would supply water at a higher unit cost. Cal Water has the legal authority to implement the BMPs. However, the costs of implementing these BMPs are subject to CPUC approval.

7.6 Previous Water Demand Management Program Accomplishments

The Company believes that managing demand is an important element in the overall management of water supply and has made efforts to promote conservation through educational, informational, and customer assistance activities. Cal Water had been conducting conservation programs in the Livermore District for several years. However, as a result of the February 1994 CPUC Decision 94-02-1-043 ordering that conservation memorandum accounts be closed, conservation activities have been significantly curtailed in all Cal Water districts.

7.6.1 External Measures to Achieve Public Support

Environmental organizations are seeking expanded water conservation programs and accomplishments by regulated water companies, including more effective and equitable price signals for water consumers and additional cost-effective investments in water efficiency measures by the companies and their customers. Such improvements in water efficiency measures will serve generally to reduce diversions from California's rivers, protect and restore the State's aquatic ecosystems, and reduce energy consumption. Cost-effective efficiency measures will also help mitigate the rising costs of water, wastewater, and energy utility service for consumers and communities.

In 2006 Cal Water participated in a collaborative effort to seek support from the CPUC to increase conservation activities in all districts. Cal Water, California American Water Company, and Golden State Water Company, along with the Mono Lake Committee and the Natural Resources Defense Council provided Joint Recommendations for water conservation to the CPUC. These Recommendations, which are endorsed by eight additional environmental organizations, present a framework for increasing water use efficiency state-wide. Based on these recommendations, Cal Water is proposing an increase in conservation spending to at least 1.5 percent of revenues. A copy of the Joint Water Conservation Recommendations is included in Appendix F.

In addition, Cal Water participates in cooperative conservation activities with the local community. Table 7.6-1 indicates the status of current BMP programs in the Livermore service area.

Table 7.6-1: Conservation Measures		
Conservation Measure	Date Implemented	Program End Date
BMP 02 Plumbing Retrofit	Proposed	2009
BMP 05b Large Landscape Survey	Proposed	2011
BMP 6 HE Washing Machines	Proposed	2009
BMP 07 Public Information	1994	Ongoing
BMP 08 School Programs	1994	Ongoing
BMP 09 CII Surveys	Proposed	2009
BMP 14 Toilet Rebates	Proposed	2009

7.6.2 Internal Measures to Achieve Efficient Water Management

Cal Water currently implements internal measures that are intended to achieve efficient water management; these are discussed below:

Distribution System Water Audit and Leak Detection Program

Cal Water implemented an in-house water audit and leak detection program for its distribution systems. The program was administered by a company employee equipped with state-of-the-art leak detection equipment and trained in the methodology described in the American Water Works Association's *Manual of Water Supply Practices: Water Audits and Leak Detection*. It was expected that each district would be audited once every three years. After realizing initial success, this program was suspended as the rate of leak repair outpaced the rate of new leaks being found.

Water Efficient Landscape Guidelines

In 1992, water efficient landscape guidelines were developed (See Appendix F). These guidelines apply to all landscapes designed for Cal Water properties including renovations. For ease of adoption by districts with a multitude of climates and microclimates, the guidelines are generic. They do, however, adhere to water efficient landscape (Xeriscape) principles.

7.7 Overall District Goals

Cal Water recognizes the importance of conservation in managing its own water resources. While economic and regulatory constraints of integrating conservation into supply management have proven challenging, Cal Water is participating in efforts to develop demand management strategies, standards, and criteria by working with the

California Urban Water Conservation Council. This Council was formed as part of the MOU primarily to oversee the implementation of the BMPs and to improve water conservation practices and analyses. Cal Water is committed to this process and the development of an integrated resource plan.

Cal Water's conservation programs are intended to assist customers in their efforts to use water efficiently as well as to educate them about their water supply overall. This will lead them to make informed decisions concerning the efficient use of water and enable them to better respond to required reductions in water use should a water shortage or emergency occur. During periods of water shortages, the Company's conservation programs can be expanded and may include more restrictive measures such as mandatory reductions, rationing, and penalties.

7.8 Implementation

For the next three years Cal Water's conservation program is planning to coordinate the implementation of seven BMPs in Livermore. The current budget amounts are listed in Table 7.8-1 below. For those BMPs for which a cost effectiveness analysis was performed, only BMP 1 was deemed not cost effective. The budget amounts listed below represent a lesser degree of implementation than was used in cost effective analysis. The budget amounts necessary to reach the full coverage requirements and schedule as specified in the MOU are listed in Table 7.8-2.

Table 7.8-1: Current Annual Conservation Program Budget 2007 – 2009					
Program		2007	2008	2009	Total
BMP-2	Plumbing Retrofits	$14,481	$14,481	$14,481	$43,443
BMP-5	Large Landscape Surveys	$18,564	$18,564	$18,564	$55,692
BMP-6	Washing Machine Rebate Program	$8,689	$8,689	$8,689	$26,067
BMP-7	Public Information Campaign	$10,000	$10,000	$10,000	$30,000
BMP-8	School Programs	$30,000	$30,000	$30,000	$90,000
BMP-9	Commercial, Industrial, and Institutional Audits	$7,644	$7,644	$7,644	$22,932
BMP-14	ULFT Replacement Programs	$60,683	$60,683	$60,683	$182,049
Total Per Year		$150,061	$150,061	$150,061	$450,183

According to the MOU Cal Water is required to implement only those BMPs that are cost effective. The cost effectiveness analysis found BMPs 2, 5b, 6, 9, and 14 to be economically feasible. BMPs 7 and 8 are ongoing and are essential to the success of the entire program but no cost effective analysis has been performed for them. The budget amounts listed below represent the estimated funding required to implement these BMPs according to the coverage level and schedule described in the MOU. Before implementing these BMPs Cal Water must receive approval from the CPUC.

Table 7.8-2: Proposed Annual Conservation Program Budget 2007 – 2009					
Program		2007	2008	2009	Total
BMP-2	Plumbing Retrofits	$69,326	$71,612	$73,078	$214,016
BMP-5	Large Landscape Surveys	$42,409	$44,683	$45,995	$133,087
BMP-6	Washing Machine Rebate Program	$19,535	$19,797	$19,946	$59,278
BMP-7	Public Information Campaign	$10,000	$10,000	$10,000	$30,000
BMP-8	School Programs	$30,000	$30,000	$30,000	$90,000
BMP-9	Commercial, Industrial, and Institutional Audits	$54,569	$55,803	$56,703	$167,075
BMP-14	ULFT Replacement Programs	$196,503	$196,530	$196,548	$589,581
Total Per Year		$422,342	$428,425	$432,270	$1,283,037

8 References

[1] LandView 5 and MARPLOT ® software, US Census Bureau/Environmental Protection Agency, downloaded from: http://www.census.gov/geo/landview/lv5/lv5.html, http://www.epa.gov/ceppo/cameo/marplot.htm

[2] City of Livermore General Plan 2003, City of Livermore, downloaded from http://www.ci.livermore.ca.us/general_plan/general_plan.html

[3] Groundwater Management Plan, Zone 7 Water Agency 2006, downloaded from http://www.zone7water.com/docs/annualreport06/annual-report-06.pdf

[4] California Irrigation Management Information System (CIMIS), EvapoTranspiration (Eto) Zones Map - Zone 8, http://wwwcimis.water.ca.gov/cimis/welcome.jsp

[5] Western Regional Climate Center, Livermore Station, http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?cadavi+nca

[6] California's Ground Water Bulletin 118, 2003; San Francisco Hydrologic Region; Livermore Valley Groundwater Basin; Groundwater Basin Number: 2-10

[7] A&N Technical Services, Inc. 2000. Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices. Prepared for the California Urban Water Conservation Council. Recent version download from: http://www.cuwcc.org/uploads/committee/Costs_Savings_28Apr2005_DraftFinal.pdf