LIVERMORE
CALIFORNIA

2015

Urban Water Management Plan

Livermore Municipal Water

June 2016

2015 Urban Water Management Plan

City of Livermore's
Livermore Municipal Water

Prepared by:

City of Livermore
Water Resources Division
101 W. Jack London Blvd.
Livermore, CA 94551
(925) 960-8100

Report Contact:
Dana d'Angelo, Management Analyst
dkdangelo@cityoflivermore.net

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Chapter 1: Introduction and Overview

The City of Livermore has prepared this 2015 Urban Water Management Plan (UWMP) for the City's Livermore Municipal Water system in accordance with the Urban Water Management Planning Act (Act) and its amendments. The Act requires every urban retail water supplier to prepare and adopt an UWMP in years that end in 0 and 5 to document its water supply planning efforts.

The Act defines an urban retail water supplier as "a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes". The UWMP supports an urban retail water supplier's long-term water resource planning, and ensures adequate water supplies are available to meet existing and future water demands. The reliability and efficient use of water supplies are assessed over a 20-year planning horizon during normal, dry and multiple dry year conditions.

It should be noted that this UWMP covers the City-owned Livermore Municipal Water service area only. The Livermore Municipal Water system, which serves a portion of the City of Livermore, is operated and maintained by the City of Livermore Public Works Department's Water Resources Division (WRD). Water service for the balance of the City of Livermore is provided by the California Water Service Company (Cal Water); Cal Water prepares a separate Urban Water Management Plan documenting its activities.

This UWMP includes information required by the Water Conservation Act of 2009. In February 2008, Governor Arnold Schwarzenegger set a goal of a 20% statewide reduction in per capita daily water use by year 2020. The reduction in per capita daily water use outlined in the 20 x 2020 plan was supported by legislation passed in November 2009 (SBX7_7 Steinberg), also known as the Water Conservation Bill of 2009.

Since 2010, there have been changes to the UWMP requirements. Each urban retail water supplier is required to provide narratives describing their water demand management measures addressing the nature and extent of each measure implemented over the past five years, and include plans to implement demand management measures with targets and progress tracking to achieve water use targets. UWMPs must quantify and report on distribution system water loss. Urban retail water suppliers must also analyze and define water features that are artificially supplied with water, separately from swimming pools and spas. UWMPs and amendments must be submitted electronically and standardized tables specified by the California Department of Water Resources must be used. Applicable changes have been incorporated into this UWMP.

The City of Livermore adopted its first UWMP for the Livermore Municipal Water system in 1992. A Water Shortage Contingency Plan was prepared and adopted in 1991. The City updated and adopted UWMPs for the Livermore Municipal Water system, including

updates to the Water Shortage Contingency Plan, in 1995, 2005, and 2011. This 2015 UWMP updates and supersedes all previous UWMPs.

Chapter 2: Plan Preparation

The City of Livermore updates the UWMP for the Livermore Municipal Water system every five years, documenting the latest results of water supply planning efforts including other planning processes that integrate with the UWMP. This includes the City of Livermore General Plan, Water Master Plan, Recycled Water Master Plan, and regional water reports such as wholesale water agency Zone 7's UWMP, Groundwater Management Plan for the Livermore-Amador Valley Groundwater Basin, and Water Supply Evaluation Update. Coordination and outreach are key elements to developing the UWMP, and each of these planning efforts relies on information found in the other documents to support and enhance the plan.

2.1 Basis for Preparing a Plan

The Urban Water Management Planning Act (Act), California Water Code (CWC) 10617 defines an urban retail water supplier as "a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes". In 2015, the City of Livermore provided water for municipal purposes to 10,170 connections, thereby meeting the requirement for preparing an UWMP. The City of Livermore manages only the Livermore Municipal Water system, which is Public Water System Number 01-10-011.

The Act and its amendments require every urban water supplier to prepare and adopt an UWMP in years that end in 0 and 5. The 2015 updated UWMP is to be submitted to the DWR by July 1, 2016.

The City of Livermore has prepared this 2015 Urban Water Management Plan (UWMP) for the Livermore Municipal Water system in accordance with the Act and its amendments, documenting the water supply planning efforts, for timely submission using standardized forms, tables and displays as specified by the DWR.

Table 2-1 City of Livermore Water Public Water System (DWR Table 2-1)

Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015 (MG)
01-10-001	City of Livermore	10,170	1,484
TOTAL		10,170	1,484

2.2 Individual Compliance

This 2015 UWMP was developed as an individual UWMP reporting solely on the City's Livermore Municipal Water service area in close coordination with water wholesaler Zone 7 Water Agency (Zone 7) and other stakeholders. Regional agencies and stakeholders have been notified as outlined in the section 2.5 Coordination and Outreach.

Table 2-2 Plan Identification (DWR Table 2-2)

Table 2-2: Plan Identification		
Select Only One	**Type of Plan**	
☑	**Individual UWMP**	
	☐	Water Supplier is also a member of a RUWMP
	☐	Water Supplier is also a member of a Regional Alliance
☐	**Regional Urban Water Management Plan (RUWMP)**	

2.3 Fiscal or Calendar Year and Units of Measure

This 2015 UWMP reports data on a calendar year basis of January 1st through December 31st. Report table column labels will signify the end year of the calendar year. The use of calendar year reporting remains consistent throughout the plan. All water volumes are reported in million gallons (MG), unless otherwise indicated. The use of million gallons reporting remains consistent throughout the plan.

Table 2-3 Agency Identification (DWR Table 2-3)

Table 2-3: Agency Identification	
Type of Agency (select one or both)	
☐	Agency is a wholesaler
☑	Agency is a retailer
Fisc r Calendar Year (select one)	
☑	UWMP Tables Are in Calendar Years
☐	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Date that the Fiscal Year Begins (mm/dd)	
Units of Measure Used in UWMP (select from Drop down)	
Unit	MG

2.4 Coordination and Outreach

2.4.1 Wholesale and Retail Coordination

The City's Livermore Municipal Water system purchases all of its potable supplies from wholesale water supplier, the Zone 7 Water Agency, and has provided Zone 7 staff with water use projections in five-year increments from 2015 to 2035, or as far as data is available. Zone 7 staff has provided City of Livermore staff with information on existing and planned sources of water over the same five-year increments from 2015 through 2035 and for average, single, and multiple-dry years for inclusion in this 2015 UWMP. The City's Livermore Municipal Water is not a wholesale supplier.

During the preparation of this UWMP, staff worked particularly closely with Zone 7 staff and the other retailers to ensure consistency. Tri-Valley water retailers including California Water Service Company, Dublin San Ramon Services District, City of Pleasanton and City of Livermore (Retailers) met several times during the development of Zone 7's UWMP to discuss and provide necessary information including service area populations, water demand projections, and recycled water plans. Zone 7 staff completed their UWMP early to assist Retailers in preparing their individual UWMPs, and to ensure consistency of supply and demand projections between the Retailer and Zone 7 plans. Livermore staff coordinates closely with Zone 7 to project accurate demands, ensuring that Zone 7 can plan for and provide appropriate water deliveries. Due to the wholesale/retail relationship between Zone 7 and City of Livermore, staff relied on Zone 7 for information necessary to develop this 2015 UWMP.

Table 2-4 Water Supplier Information Exchange (DWR Table 2-4)

Table 2-4 Retail: Water Supplier Information Exchange
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name
Zone 7 Water Agency

2.4.2 Coordination with Other Agencies and the Community

In addition to the UWMP discussions between the Retailers and Zone 7 mentioned above, there is also close coordination between the Retailers and Zone 7 on water supply and quality issues. Staff from Retailers and Zone 7 meet frequently at both the operational and policy level to improve system operations or to plan for future supplies. City of Livermore staff routinely coordinates water supply discussions with other Tri-Valley water retailers and wholesaler through the Tri-Valley Water Retailers Group (TWRG).

City staff worked closely with the other retailers and wholesaler during the drought. Staff coordinated drought messages and met to discuss operational issues associated with a potential 2014 shortage. Over the last 18 months, Tri-Valley agencies formed a Water Policy Roundtable consisting of staff and elected officials. The Roundtable has met six

times to discuss water supply reliability and diversification for the Tri-Valley. More information on the Water Policy Roundtable is included in subsequent UWMP sections.

To encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan, City of Livermore Water staff encouraged public participation by providing notices announcing the preparation of the 2015 UWMP through a variety of methods including the following:

1. Including notice on customer water bills;
2. Posting notice at Livermore City Hall;
3. Posting notice at Civic Center Library;
4. Posting notice on the City of Livermore website;
5. Posting notice at the City's Multi-Service Center;
6. Mailing notice to the Livermore Chamber of Commerce;
7. Mailing notice to Livermore Downtown Association;
8. Mailing notice to large churches in the City of Livermore Water service area.

Despite the number of notices announcing the preparation of the 2015 Urban Water Management Plan, staff received no inquiries from the general public about the plan or the process. A sample copy of the notice announcing the preparation of the 2015 UMWP is included in Appendix B.

2.4.3 Notice to Cities and Counties

As required by California Water Code Section 10621(b), notice that updates to the UWMP update were being considered was provided to Alameda County Department of Public Works at least 60 days prior to the June 13, 2016 public hearing. A copy of the notification letter to Alameda County Public Works, dated April 4, 2016, is included in Appendix B.

While the City's Livermore Municipal Water system supplies potable water only in the City of Livermore, copies of the draft plan were sent for review and comment to the other Tri-Valley water retailers (City of Pleasanton, Dublin San Ramon Services District and California Water Service Company) and the Tri-Valley's wholesale supplier, the Zone 7 Water Agency.

Table 2-5 below summarizes the agencies or groups contacted, consulted or notified regarding the preparation of this 2015 UWMP for the Livermore Municipal Water system.

Table 2-5 Coordination with Appropriate Agencies

Table 2-5 Coordination with appropriate agencies					
Coordinating Agencies	**Participated in developing the plan**	**Commented on the draft**	**Was contacted for assistance**	**Was sent a copy of the draft plan**	**Was sent a notice of intention to adopt**
Other water suppliers **DSRSD, Pleasanton, Cal Water**			X	X	X
Water management agencies **Zone 7 Water Agency**	X	X	X	X	X
Relevant public agencies **Alameda County**					X
General public					X
Other – Chamber of Comm. **Livermore Downtown** **City's Multi-Service Center**					X
Other - Local Churches					X

Note that the California Environmental Quality Act (CEQA) does not apply to the preparation and adoption of the UWMP as stated in CWC 10652, and therefore did not require the public process associated with CEQA.

Chapter 3: Service Area and System Description

3.1 General Description

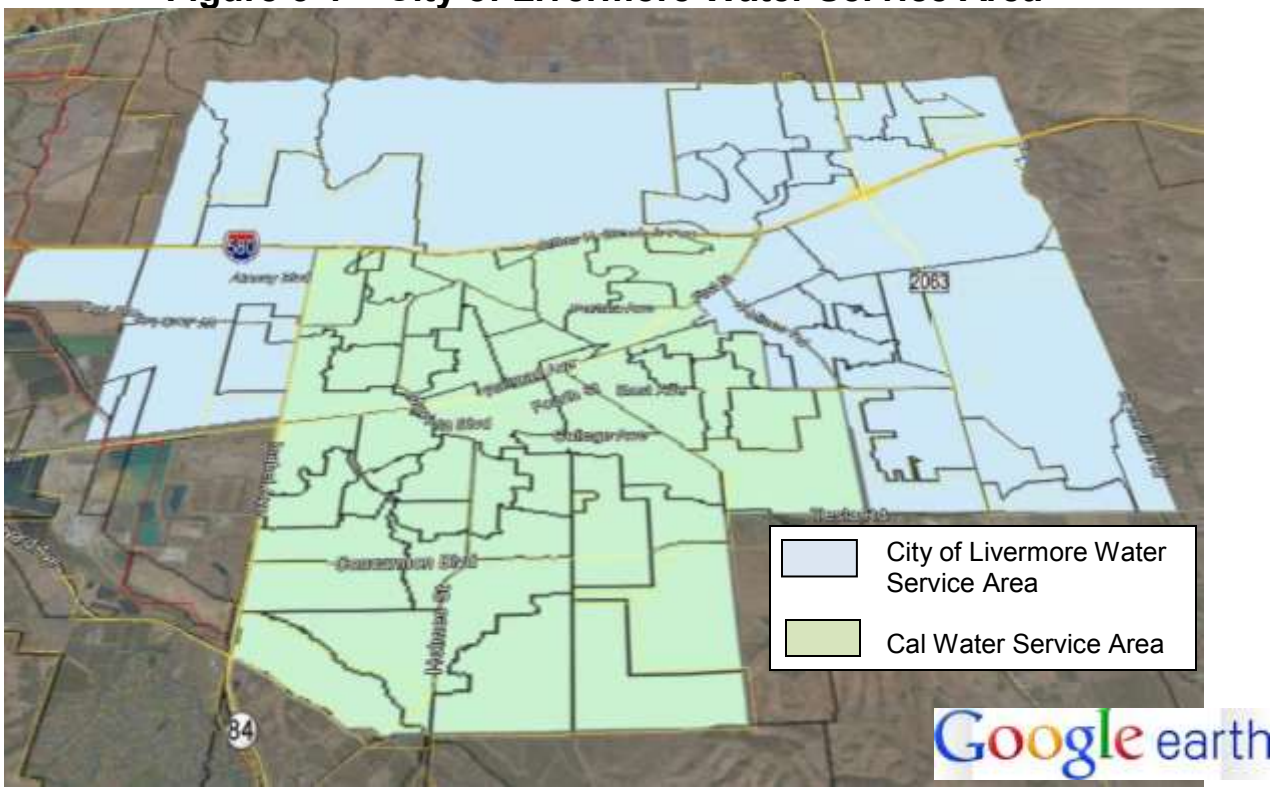
The City of Livermore's Livermore Municipal Water service area comprises portions of the City of Livermore, with the remainder of the City served by the California Water Service Company. Founded in 1869, the City of Livermore is the easternmost city in the San Francisco Bay Area, the gateway to the Central Valley. Protection by the coastal range provides the Livermore Valley with a mild climate that enhances the pursuit of a more relaxed, less congested lifestyle. The City of Livermore is California's oldest wine region, framed by award-winning wineries, farm lands and ranches. Located in Alameda County, the City is a public entity that operates as a Council-Manager government.

3.2 Service Area Boundary Map

The Livermore Municipal Water system distributes treated water purchased from water wholesaler Zone 7 Water Agency in the potable water service area shown below in Figure 3-1. The area comprises approximately 23 square miles and includes just over 10,000 service connections. The balance of the city of Livermore is provided water service by the California Water Service Company. There have been no changes to the Livermore Municipal Water service area since the beginning of the baseline period through 2015. The service area has about 160 acres of vacant or underutilized properties that are either under construction with housing or designated for residential use. This land has capacity for about 2,200 dwelling units, which includes the 476-unit Shea Sage project (under construction), 465 units associated with the Brisa Neighborhood Plan (under construction), and 495 units associated with the approved Arroyo Vista Neighborhood Plan. The remaining units are planned for infill sites spread throughout Springtown and eastern Livermore. A further description of the proportion of the service area built out is found in section *3.4.1 Other Demographic Factors Affecting Water Supply* below.

The City of Livermore's Recycled Water System is served entirely by the City of Livermore. A map of the Recycled Water System is found in *Section 6.5.3 Recycled Water System*.

Figure 3-1 – City of Livermore Water Service Area



3.3 Service Area Climate

The City of Livermore has a Mediterranean climate, with warm, dry summers and cool, moist winters. The average daily temperature in Livermore is 58.3°F with average annual high at 72.8°F and average annual low temperature at 47.8°F[1]. The average rainfall and evapotranspiration in Livermore are approximately 15.3 inches and 51.6 inches respectively[1], making the Livermore area relatively dry and arid, which may increase the associated irrigation demands within the City of Livermore Water service area.

Average monthly temperature, precipitation, and Evapotranspiration (ETo) data for the City of Livermore is shown below in Table 3-1[1] and Figure 3-2[2].

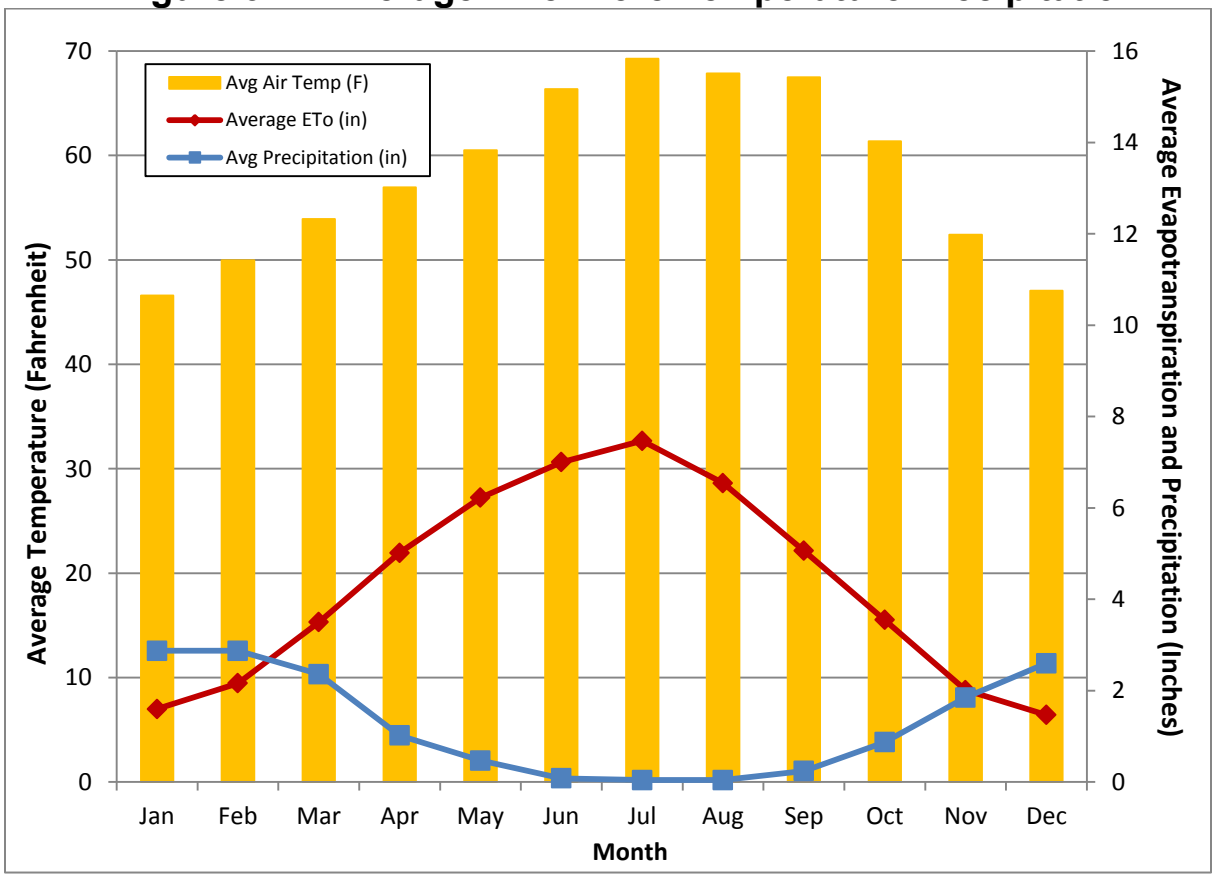
[1] Data for CIMIS Station 191 (Pleasanton) from January 2010 to December 2015, downloaded March 2016 from www.cimis.water.ca.gov
[2] Table 3-1 from USClimatedata.com
http://www.usclimatedata.com/climate.php?location=USCA0618

Table 3-1 Average Livermore Temperature/Precipitation

	Jan	Feb	March	April	May	June
Average high in °F	56	61	66	71	77	83
Average low in °F	39	42	44	46	50	54
Average precipitation (inch)	2.87	2.87	2.36	1.02	0.47	0.08
Average ETo (inch)	1.60	2.16	3.50	5.02	6.22	7.00

	July	Aug	Sep	Oct	Nov	Dec
Average high in °F	89	88	85	77	64	56
Average low in °F	55	57	55	50	43	39
Average precipitation (inch)	0.04	0.04	0.24	0.87	1.85	2.6
Average ETo (inch)	7.47	6.54	5.06	3.55	2.01	1.47

Figure 3-2 - Average Livermore Temperature/Precipitation



3.4 Service Area Population and Demographics

The City's Livermore Municipal Water 2015 service population was calculated using Methodology 2 from the March 2016 California Department of Water Resources guidance document, *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* to be consistent with the SB X7-7 baseline and target per capita water use and 2015 compliance. Data published by the U.S. Census Bureau served as the foundational building block for all population estimates used in this Urban Water Management Plan.

Portions of the City of Livermore are served by the California Water Service Company (Cal Water). To determine the population estimates for non-census years, the City of Livermore works closely with Cal Water to determine population served by each agency. The City of Livermore General Plan build-out covers the period 2003 to 2025. Both residential and non-residential development in the City has not kept pace with assumptions for build-out by 2025. The City of Livermore will begin a comprehensive General Plan update in 2018 which will include revised build-out projections that will be used for subsequent water supply planning.

The population within the City's Livermore Municipal Water service area has increased by 48% from 1990 to 2015. The Association of Bay Area Governments (ABAG) projects that the City of Livermore will reach residential "build-out" around 2040. ABAG's 2013 Regional Forecast Plan for the Bay Area projects a 25% population growth between 2015 and 2040 based on historic trends, and estimates about future economic and demographic conditions.

The current and projected populations within the City's Livermore Municipal Water service area are presented below in Table 3-2 (DWR Table 3-1).

Table 3-2 Population – Current and Projected (DWR Table 3-1)

Table 3-1 Retail: Population - Current and Projected						
Population Served	2015	2020	2025	2030	2035	2040*(opt)*
	28,782	29,213	31,700	32,391	32,391	32,391
NOTES: 15% projected population increase 2015-2020						

3.4.1 Other Demographic Factors Affecting Water Supply

Livermore is located in a mid- to high-income area relative to many parts of California, and has no significant employment, economic or industrial factors that will significantly impact the water supply relative to other local communities.

According to the U.S. Census Bureau, American Community Survey, the 2014 median household income in Livermore was $99,683 compared to the $61,489 statewide median household rate. In addition to a high median income, only about 5.5% of the

Livermore population was living below the poverty line as of 2014[3], compared to a statewide poverty rate of about 16.4% in 2014[3]. Therefore, water customers in the City of Livermore have historically had the resources available to support prudent water rates necessary to develop and maintain a safe and reliable water supply.

One factor affecting water supply is the suburban, East Bay Area location, and the corresponding expectation for relatively expansive public and private landscaping treatments on both residential and commercial projects that increase baseline water demands. Due to the level of additional public and private landscaping present in well-developed suburban communities such as Livermore, the corresponding per capita water consumption in the Livermore Municipal Water service area could be slightly higher than in some rural communities with less irrigated landscaping.

Another factor that might influence per capita water consumption is the number or percentage of single family residential units in the service area. Approximately 73% of the housing units in Livermore are single-family residential, compared to only about 54.6% state-wide[3]. A larger percentage of single-family residential units, with the associated landscaping, might increase the service area water demand compared to some other communities. Also, about 69.9% of housing units in Livermore are owner-occupied, compared to an ownership rate of only about 54.8% state-wide[3]. A higher percentage of home ownership in Livermore compared to the rest of California might increase overall water demands due to the fact that homeowners typically spend more time and effort on exterior landscaping (and therefore irrigation) compared to owners of rental properties.

Based on 2000 US Census data, approximately 75% of Livermore households were classified as “family households”, with 40% of households having children under 18 years of age in the home[4]. By comparison, only about 69% of California households were classified as “family households”, and about 36% reported children under 18 residing in the home[4]. A higher percentage of households with children and families compared to statewide averages would tend to drive overall water use higher in the service area than in communities with fewer households.

And finally, Livermore is fortunate to have a somewhat more educated population than the overall California average, with 20% of Livermore residents holding bachelor degrees and 11.5% holding graduate degrees compared to about 17% and 9.5% respectively statewide[5]. The higher percentage of advanced level degrees in Livermore might be due to the presence of the Lawrence Livermore National Laboratory and the associated research personnel who reside locally. A more educated population is likely to be more accepting of conservation and other environmental messages which may be necessary to achieve compliance with the Water Conservation Act of 2009.

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[3] “Livermore, California Fact Sheet”. 2014 American Community Survey, United States Census Bureau. 2014. Retrieved 2016-05-05.
[4] BayAreaCensus.com/cities/Livermore.html
[5] BayAreaCensus.com/cities/Livermore.html

A recent study in Canada found that increasing levels of education was one of the factors affecting the willingness of people to adopt conservation measures. The study also found that home ownership and higher income levels affect the willingness of residents to adopt energy and water conservation measures[6]. Therefore, the City's Livermore Municipal Water service area is well-positioned to have a high percentage of residents adopt conservation measures due to the relatively high income, education, and home-ownership levels in its service area. This was demonstrated during the historic 2014/2015 drought when Livermore Water customers conserved over 30% despite a mandate to save only about 20%.

Built-Out versus Areas of Future Development

There are several areas expected to absorb most of the growth, based on the availability of vacant land and existing land use regulations. Most of these areas are within the municipal water service area, especially with respect to job generation. The remainder of new development would occur on infill sites throughout the Cal Water service area, particularly in Livermore's downtown.

The Livermore Municipal Water service area has about 160 acres of vacant or underutilized properties that are either under construction with housing or designated for residential use. This land has capacity for about 2,200 dwelling units, which includes the 476-unit Shea Sage project (under construction), 465 units associated with the Brisa Neighborhood Plan (under construction), and 495 units associated with the approved Arroyo Vista Neighborhood Plan. The remaining units are planned for infill sites spread throughout Springtown and eastern Livermore.

The General Plan also provides capacity for about 4,500 dwelling units associated with a future BART station, contingent upon preparation of a Specific Plan. Both locations planned for a BART station are within the municipal water service area (i.e., Isabel and Greenville). For purposes of water planning, about 300 single-family units are assumed for the Greenville area, with about 4,200 units assumed for the Isabel Neighborhood Plan (under preparation).

Table 3-3 below shows the six areas expected to absorb the majority new businesses and jobs within the municipal water service area, along with the estimated amount of developable land. These commercial/industrial areas range from about 72% to 98% built-out. In sum, about 11% of the employment land area has capacity for new non-residential development.

[6] Statistics Canada. 2010. Households and the environment: Energy Use, 2007. Statistics Canada Catalog No. 11-526-S. 39p

Table 3-3 Areas of Anticipated Employment Growth

Area	Total Land Area (acres)	Estimate of Developable Land (acres)	Percent Built-out	Share of Developable Lands
Eastside Industrial Area	1,595	159	90%	37%
Isabel Neighborhood	575	137*	76%	32%
Oaks Business Park and vicinity	200	56	72%	13%
El Charro Specific Plan (lands designated for commercial uses)	160	42	74%	10%
National Labs (Lawrence Livermore and Sandia)	1,230	25	98%	6%
Springtown (commercial area along Vasco Road, north of I-580)	40	7	83%	2%
Total	*3,800*	*426*	*89%*	*100%*

** Some of this land would change to a residential designation upon adoption of the Isabel Neighborhood Plan, which the City is currently preparing to guide development around a proposed BART station at I-580/Isabel Avenue. The development would not occur without the BART locating a station at that location.*

Chapter 4: System Demands

This Section describes the current and past water demands in the City of Livermore's Livermore Municipal Water service area and projects the estimated future water demands to 2035 based on the assumed reduction in per capita water usage required by the Water Conservation Bill of 2009. Accurately tracking and reporting current water demands allows City staff to properly analyze the use of its resources and conduct water supply planning.

4.1 Recycled versus Potable and Raw Water Demand

City of Livermore water provides both potable water and recycled water to customers within its municipal water service area. The City also supplies a small amount of recycled water to the City of Pleasanton for landscape irrigation uses outside the Livermore service area.

Potable water is water that is safe enough to drink and prepare food and which typically has had various levels of treatment and disinfection. The City's Livermore Municipal Water system purchases all of its potable water supply from wholesaler Zone 7 and has no additional potable supply sources during normal operations. The City of Livermore Water does maintain emergency interties with other water retailers in the area to provide back-up supplies for short-term service interruptions.

Recycled water is municipal wastewater that has been treated to a specified quality to enable it to be used again for a beneficial purpose or discharged from a wastewater facility. The City of Livermore owns and operates a wastewater treatment facility and produces recycled water for beneficial purposes to off-set potable water use. Recycled water is addressed comprehensively in Chapter 6.5, but a summary of recycled water demand is included in Table 4-3 (DWR Table 4-3).

Raw water is untreated water that is used in its natural state or with minimal treatment. The City purchases a small amount of raw water from Zone 7 for use on a City-owned golf course. The City does not deliver raw water to any of its customers in its service area.

4.2 Water Uses by Sector

Sections 10631(e) (1) and (2) require urban water suppliers to quantify, to the extent that records are available, past and current water use, and projected water use over five-year increments. Water suppliers are required to identify the uses among sectors of water customer classes, including, but not necessarily limited to, all of the following uses: (1) Single-family residential; (2) Multifamily; (3) Commercial; (4) Industrial; (5) Institutional and governmental; (6) Landscape; (7) Sales to other agencies; (8) Conjunctive use; (9) Groundwater recharge; (10) Saline water intrusion barriers; and (11) Agricultural. These classifications were used to analyze reported consumption for

water use patterns by sector. The City's Livermore Municipal Water customer classifications are represented in sectors 1 through 7, and have no reportable uses in the remaining sectors.

4.2.1 Actual Demands

The actual potable water demands listed in Tables 4-1A (DWR Table 4-1) and 4-1B (2010 DWR Table 4) are based on metered, delivered water consumption information from 2015 and 2010 respectively, and are measured in million gallons. There is no reportable actual or projected raw water. There are no reportable actual or projected water use for Sales to other agencies; Conjunctive use; Groundwater recharge; Saline water intrusion barriers; or Agricultural uses.

Table 4-1A 2015 Actual Demands for Potable and Raw Water (DWR Table 4-1)

Table 4-1 Retail: Demands for Potable and Raw Water – Actual			
Use Type	2015 Actual		
	Additional Description *(as needed)*	Level of Treatment When Delivered	Volume
Single Family		Drinking Water	679
Multi-Family		Drinking Water	81
Commercial		Drinking Water	308
Landscape		Drinking Water	259
Institutional/Governmental		Drinking Water	23
Losses		Drinking Water	134
		TOTAL	1,484
NOTES: Volume in million gallons.			

Table 4-1B 2010 Actual Demands for Potable and Raw Water (DWR 2010 Table 4)

DWR 2010 Table 4- Retail: Demands for Potable and Raw Water – Actual			
Use Type	2010 Actual		
	Additional Description	Level of Treatment When Delivered	Volume
Single Family		Drinking Water	979
Multi-Family		Drinking Water	64
Commercial		Drinking Water	315
Landscape		Drinking Water	306
Institutional/Governmental		Drinking Water	24
Losses		Drinking Water	7
		TOTAL	1695
NOTES: Source – City of Livermore Water 2010 UWMP; volume in million gallons.			

In 2010, the City provided water service to 9,545 services and sold approximately 1,695 million gallons of water as shown in Table 4-1B.

Between 2010 and 2015, the City's municipal water system had grown by about 625 services, or about 6.6%, to 10,170 services, or about 3 times the growth in services between 2005 and 2010. Total volume of water sold *decreased 12.6%* between 2010 and 2015. This decrease in total water consumption despite the growth in services was due to increased conservation during the 2014/2015 California drought.

The total commercial water use declined by 7 MG, or about 2.4%, from 2010 to 2015; while Landscape and Institutional/Governmental water use declined by 30.6%, and 4.7% respectively during this period. Multi-family residential accounts increased by about 141%; however, water use increased by only 26.3% between 2010 and 2015. The number of Single-Family accounts increased by 4.2% during this period, while Single-Family consumption declined by 30.6%. Based on the number of residential services and water consumption data between 2010 and 2015, significant reductions in water consumption were achieved by the residential sector within the City's Livermore Municipal Water service area.

4.2.2 Projected Demands

Water demand projections for the future number and timing of residential services were calculated based on the location of the current Urban Growth Boundary (UGB) in relationship to the service area, the amount of growth projected in the Livermore General Plan, and historic growth rates. Water delivery projections were made using a variety of current and historic consumption data, a 2020 Water Use Target of 192 GPCD, and the estimated growth in the number of connections over time. There is no reportable projected raw water. There are no reportable projected water use for Sales to other agencies; Conjunctive use; Groundwater recharge; Saline water intrusion barriers; or Agricultural uses.

Table 4-2 Projected Demands for Potable and Raw Water (DWR Table 4-2)

Table 4-2 Retail: Demands for Potable and Raw Water - Projected					
Use Typ	Projected Water Use *Report To the Extent that Records are Available*				
	2020	2025	2030	2035	2040-opt
Single Family	938	1,017	1,039	1,039	
Multi-Family	112	121	124	124	
Commercial	425	461	471	471	
Landscape	358	388	396	396	
Institutional/Governmental	32	34	35	35	
Losses	185	201	205	205	
TOTAL	2,050	2,222	2,270	2,270	
NOTES: Volume in million gallons					

Potable water demand projections for water years 2030 and 2035 are estimated to remain level as the City of Livermore Water service area reaches build-out due to the Urban Growth Boundary (UGB). Livermore has an UGB that corresponds with Alameda County's Urban Growth Boundary. Livermore voters approved the South Livermore Urban Growth Boundary Initiative in 2000; and a North Livermore Boundary Initiative in 2002.

Table 4-3 Projected Total Water Demands (DWR Table 4-3)

Table 4-3 Retail: Total Water Demands						
	2015	2020	2025	2030	2035	2040 *(opt)*
Potable and Raw Water *From Tables 4-1 and 4-2*	1,484	2,050	2,222	2,270	2,270	
Recycled Water Demand* *From Table 6-4*	760	875	1,006	1,157	1,330	
TOTAL WATER DEMAND	2,244	2,925	3,228	3,427	3,600	
NOTES: Volume in million gallons.						

In addition to delivered potable water, the City also meets some of the water demand in the City of Livermore Water service area by using recycled water. Table 4-3 (DWR Table 4-3) reflects the projected amounts of recycled water that will be delivered in each water year based on the existing 2004 Recycled Water Master Plan.

City of Livermore provided the demand projections for its municipal water service area to Zone 7 and requested confirmation of the wholesale water agency's ability to meet the water demands. Zone 7 provided the information contained in Table 7-13 of their 2015 UWMP in response to the request for verification. Based on the response, Zone 7 can meet the requested demands through implementation of water supply projects identified in the Zone 7 Water Supply Evaluation Plan (discussed in further detail in Section 7 - System Reliability).

4.3 Distribution System Water Losses

System losses are the difference between the actual volume of water delivered into the distribution system and the actual metered consumption. Such apparent losses are always present in a water system due to metering/billing inaccuracies, pipe leaks, unauthorized connections or use; or faulty meters; unmetered services such as fire protection, and system and street flushing.

The City uses the American Water Works Association (AWWA) method to annually evaluate its distribution system losses. Historic water loss has averaged between 4-10% of total purchases depending on the year, and water use projections assume

decreasing percentages of water loss over time. For the most recent 12-month period of water loss starting January 2015, the water losses were estimated to be approximately 134 million gallons, or approximately 9 percent. Staff believes that limitations in the City's current metering/billing system are contributing to apparent water loss. The City is implementing Automated Meter Reading (AMR) in 2016/2017 and staff expects improvements in accounting for all water sold to lead to reduced water loss calculations.

Table 4-4 (DWR Table 4-4) summarizes the 12 month system losses. A copy of the City of Livermore's 2015 Water Audit worksheet is provided in Appendix A.

Table 4-4 12 Month Water Loss Audit Reporting (DWR Table 4-4)

Table 4-4 Retail: 12 Month Water Loss Audit Reporting	
Reporting Period Start Date	Volume of Water Loss*
01/2015	134
** Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.*	
NOTES:	

4.4 Estimating Future Water Savings

Water savings from codes, standards, ordinances, or transportation and land use plans are also known as "passive savings". These various factors generally decrease the water use for new and future customers, compared to historical customers. Water agencies are required to state the extent to which passive savings are considered in these water use projections. The City of Livermore Water did not include future water savings in projections. The future water savings projections are based on population multiplied by the City of Livermore Water's 2020 Conservation target, and do not take into account the potential savings that might result from future "passive savings" as noted in Table 4-5 (DWR Table 4-5) below.

Table 4-5 Inclusion in Water Use Projections (DWR Table 4-5)

Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook)	No
Are Lower Income Residential Demands Included In Projections?	Yes
NOTES: Housing Authority of the City of Livermore on Bluebell. Livermorehousingauthority.com	

4.5 Water Use for Lower Income Households

California Water Code 10631.1 requires water retailers to include projected water use for lower income single-family and multi-family households in projected water demands. A lower income household has an income 80% below the Bay Area median income, adjusted for family size. According to the City of Livermore 2015 to 2022 Housing

Element (Housing Element) adopted March 23, 2015, 25.6% of City of Livermore households have an income below 80% of the Area Median Income. In addition, the Housing Element indicates 15.9% of Lower Income households are renters and 9.7% of Lower Income households are owners.

Livermore is served by the City's Livermore Municipal Water and Cal Water. It would be difficult to determine the exact number of lower income households in each service area. Therefore projections assume 25.6% of the City's Livermore Municipal Water demands are attributed to low income households. The projections shown previously in Tables 4-2 (DWR Table 4-2) and 4-3 (DWR Table 4-3) include water use for single family and multi-family residential housing needed for low-income households, as identified in the Housing Element. Table 4-6 (DWR Table 4-5) presents portion of projected water demands for lower income single family and multi-family households.

Table 4-6 Projected Lower Income Potable & Raw Water Demands (DWR Table 4-5)

Table 4-5 Retail: Demands for Lower Income Potable and Raw Water - Projected					
Use Typ	Projected Water Use				
	2020	2025	2030	2035	2040-opt
Single Family	240	260	266	266	
Multi-Family	29	31	32	32	
TOTAL	269	291	298	298	
NOTES: Estimated projected water use of 25.6% of total projected demand in million gallons					

4.6 Climate Change

The water demand and use patterns may be impacted by climate change. Increased irrigation demand, increased evaporative losses due to warmer temperatures, and a longer growing season is anticipated when temperatures rise. Increasing the use of recycled water for these demands could mitigate the effects of climate change on water demand.

The potential impacts of climate change on water supplies are described in Chapter 6 System Supplies.

Chapter 5: Baseline and Targets

SB X7-7 Baseline and Targets

The adoption of the Water Conservation Act of 2009, also known as the SB X7-7, addresses urban and agricultural water conservation. The Water Conservation Act sets a goal of achieving 20% statewide reductions in urban per capita water use by the year 2020. Each urban water supplier, such as City's Livermore Municipal Water system, must determine baseline water use during their baseline period and target water use to be met for the years 2015 and 2020, reducing daily per capita water use as defined in SB X7-7.

5.1 Updating Calculations from 2010 UWMP

In its 2010 UWMP, the City first calculated its 2015 and 2020 Urban Water Use Target applying Methodology 3 to calculate baseline daily per capita water use, as well as Part II, Section D of the Guidebook to develop a baseline period and water use targets required by SB X7-7. The Water Conservation Bill of 2009 includes a provision that an urban water supplier may update its 2020 urban water use target in in its 2015 UWMP, and may use a different target method than was used in 2010.

After examining a sample of data from Department of Finance (DOF), DWR determined that significant discrepancies exist between DOF's projected populations for 2010 (based on 2000 U.S. Census data) and actual population for 2010, based on 2010 U.S. Census data. Therefore, if a water supplier did not use 2010 Census data for their baseline population calculations in the 2010 UWMP (the full census data set was not available until 2012) DWR has determined that these agencies must recalculate their baseline population for the 2015 UWMPs using 2000 and 2010 Census data. Therefore, baseline and target GPCD values in the 2010 UWMP must be modified accordingly in the 2015 UWMP, and standardized tables in the SB X7-7 Verification Form must be submitted with the 2015 UWMP.

5.2 Baseline Periods

SB X7-7 requires urban water retailers to determine their baseline daily per capita water use measured in gallons per capita per day (GPCD) over a 10 or 15 year baseline period. Urban water retailers that used less than 10% of recycled water in the year 2008 must use a 10 year baseline period. The 10 year baseline period is defined as a continuous 10 year period ending between December 31, 2004 and December 31, 2010. In 2015, urban water suppliers, such as the Livermore Municipal Water system, may change the years selected for its baseline period as compared to its 2010 UWMP.

Staff re-evaluated potable and recycled water supply data for the year 2008. During 2008, the City supplied 305 MG of recycled water, compared to 2,636 MG of total water deliveries. Therefore, approximately 11.6% of the 2008 water demand in the City of

Livermore Water service area was met with recycled water. Under the Water Conservation Bill of 2009, water suppliers who met at least 10% of the 2008 demand using recycled water may elect to extend the multi-year base period from 10 up to 15 years.

Determination of the 5-Year Baseline Period (Target Confirmation)
SB X7-7 also requires each urban water retailer to calculate water use, for a 5-year baseline GPCD water demand, or Target Confirmation, calculated over a continuous 5-year period that ends no earlier than December 31, 2007 and no later than December 31, 2010.

The City of Livermore Water selected the following baseline periods:

- 10-year Baseline Period: 1999 to 2008
- 5-year Baseline Period: 2004 to 2008

These baseline periods are listed in SB X7-7 Baseline Period Ranges in Appendix E. It should be noted that the 10-year and 5-year Baseline Periods are the same as reported in City's 2010 UWMP.

5.3 Service Area Population

The City of Livermore Water 2010 UWMP did not include 2010 US Census data because the full Census data was not available until 2012.The City's Livermore Municipal Water service area is not substantially the same as the boundary of the City of Livermore and is a Category 1 provider in accordance with Methodology 2 of DWR's *Methodologies* document. The DWR tool utilizes US Census data and electronic maps of the City's municipal water service area to obtain population data for census years, and uses the service connections to calculate the population for non-census years. Therefore, the DWR Population Tool was used to estimate the 2015 service area population of 28,782.

Historical service area population during the 10- and 5-year baseline periods is shown in SB X7-7 Table 3: Service Area Population in Appendix E. The revised service area population estimates were consistently less (by 17 to 22 percent) than the population estimates used for the SB X7-7 analysis in City of the Livermore Water's 2010 UWMP.

5.4 Gross Water Use

Gross water use is a measure of water that enters the distribution system of the supplier over a 12-month period with certain allowable exclusions. These exclusions are:

- Recycled water delivered within the service area. Recycled water use has been excluded from all calculation of gross water, as reflected in the SB X7-7 Tables. Water suppliers are not required to report their recycled water use, nor demonstrate any reduction in recycled water use for purposes of SB X7-7;

- Indirect recycled water (see Methodology 1 from the *Methodologies* document, DWR 2011);
- Water placed into long term storage (surface or groundwater);
- Water conveyed to another urban supplier;
- Water delivered for agricultural use;
- Process water.

Livermore Municipal Water's gross water use is based on the metered quantity purchased from the City's wholesale supplier, the Zone 7 Water Agency. As noted above, the Livermore Municipal Water has no other water supply sources and obtains all of its potable water from Zone 7. The City is not eligible to deduct indirect recycled water use or process water use. Total annual gross water use, which must be reported for each year in the baseline periods as well as 2015, the compliance year, are summarized in SB X7-7 Table 4 in Appendix E.

5.5 Baseline Daily Per Capita Water Use

Daily Per Capita Water Use is reported in gallons and is referred to as "Gallons per Capita per Day" or "GPCD". The GPCD is calculated for each of the baseline years and for the compliance year 2015. Annual gross water use is divided by annual service area population to calculate the annual GPCD for each year in the baseline periods. GPCD calculations reflect revised service area population estimates from the DWR Population Tool based on US Census data and electronic maps as discussed in 5.3 Service Area Population.

Using the revised service area population estimates and measured gross water use, the Base Per Capita Water Use for each year from 1989 through 2010 were calculated. This annual per capita water use data was used to calculate 10 and 15-year averages for the various potential 10 and 15-year base periods ending in 2004 through 2010. As previously discussed, City met more than 10% of its 2008 water demands with recycled water, and is entitled to use up to a 15-year baseline period for determining Base Per Capita Water Use. However, based on an analysis of the data, the City elected to use a 10-year baseline period.

The City of Livermore Water baseline daily per capita use has been calculated as follows:

- 10-year Baseline Daily per Capita Water Use
    - 240 GPCD for period 1999 to 2008
    - This value is 45 GPCD greater than the value calculated in 2010 UWMP (194.6 GPCD)
- 5-year Average Baseline Daily per Capita Water Use
    - 236 GPCD for period 2004 to 2008
    - This value is 40.6GPCD greater than the value calculated in 2010 UWMP (195.4 GPCD)

These 10-year Baseline Daily per Capita Water Use and 5-year Average Baseline Daily per Capita Water Use values are shown in SB X7-7 Table 5 Appendix E.

5.6 2015 and 2020 Targets

The Water Conservation Act sets a goal of achieving 20% statewide reduction in urban per capita water use by the year 2020 and an interim 2015 compliance year GPCD using one of four methods defined by SB X7-7 and DWR. A water supplier may select a different target method in its 2015 plan than it selected in its 2010 Plan. Once the 2015 Plan is submitted, the target method may not be changed in any amendments to the 2015 Plan or in the 2020 Plan. The 2020 water use target is calculated using one of the following four methods:

- Method 1: 80% of the base daily per capita water use;
- Method 2: Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscaped area water use; and commercial, industrial, and institutional uses;
- Method 3: 95% of the applicable State hydrologic region target as stated in the State's 2010 *20x2020 Water Conservation Plan*; or
- Method 4: An approach that consider the water conservation potential from (1) indoor residential savings (2) metering savings, (3) commercial, industrial and institutional savings, and (4) landscape and water loss savings.

After calculating the Base Daily Per Capita Water Use, the City used Method 1 to determine the 2020 Water Use Target by multiplying the base water use by 80%. This calculation yields a 2020 Water Use Target of 192 GPCD (0.8 X 240 GPCD = 192 GPCD).

The Water Conservation Bill of 2009 establishes minimum water use reduction requirements in addition to the general "20% reduction by 2020" requirement. Section 10608.22 of the California Water Code requires that the water use target not exceed 95% of a continuous 5-year period ending no earlier than December 31, 2007 and no later than December 31, 2010. The highest 5-year average during this date range was calculated to be for the period 2004 through 2008, with a corresponding gallons-per-capita-per-day of 236. Multiplying this value by 95% yields a 5-year baseline per capita water use of 224.2 GPCD, compared to a 2020 Water Use Target of 192 GPCD.

Since the calculated 2020 Water Use Target is LESS than 95% of the 5-year baseline value, no further reduction to the 2020 Water Use Target is required. Based on the guidance for calculating Minimum Water Use Reduction Requirements, the 2015 Water Use Target should be set at the mid-point between the 10-year baseline per capita water use and the 2020 water use target. Using a Base Per Capita Water Use of 240 GPCD and a 2020 Water Use Target of 192 GPCD, the interim 2015 Water Use Target would be 216 GPCD (240 GPCD – 192 GPCD = 48GPCD / 2 = 24 GPCD + 192 GPCD = 216 GPCD).

The City has not taken any allowable adjustments to the agency's gross water use. The 2015 and 2020 GPCD Targets have been calculated as follows:

- 2015 Water Use Target would be 216 GPCD
- 2020 Water Use Target of 192 GPCD

5.7 2015 Compliance Daily per Capita Water Use

The City's Livermore Municipal Water Actual 2015 GPCD is 141. This demonstrates compliance with established 2015 Interim Target GPCD as shown below in Table 5-1 (DWR Table 5-2) which makes no adjustment to compliance GCPD using weather normalization, economic adjustment, or extraordinary events. The Actual 2015 GPCD is also well below the final 2020 target, and therefore no additional assessment of present and proposed future measures, programs, or policies have been considered to achieve further water use reductions. The City's Livermore Municipal Water is not a wholesale supplier

Table 5-1 2015 Compliance (DWR Table 5-2)

Table 5-2: 2015 Compliance *Retail Agency or Regional Alliance Only*								
Actual 2015 GPCD*	2015 Interim Target GPCD*	**Optional Adjustments to 2015 GPCD** *From Methodology 8*					2015 GPCD* *(Adjusted if applicable)*	Did Supplier Achieve Targeted Reduction for 2015? Y/N
		Extraordinary Events*	Economic Adjustment*	Weather Normalization*	TOTAL Adjustments*	Adjusted 2015 GPCD*		
141	216	0	0	0	0	141	141	Yes
**All values are in Gallons per Capita per Day (GPCD)*								

Once the 2015 Plan is submitted, the target method may not be changed in any amendments to the 2015 Plan or in the 2020 Plan.

5.8 Regional Alliance

The City has chosen to comply with the requirements of SB X7-7 on an individual basis, and did not participate in a Regional Alliance; the Regional Alliance compliance per capita water demand was not calculated.

Chapter 6: System Supplies

This chapter describes and quantifies existing and future sources of water available to the City of Livermore's Livermore Municipal Water system, and discusses the origin of the water supply, water quality, quantity issues, and actions or projects anticipated to meet future water demands. Water volumes presented in this chapter reflect expectations for average or normal hydrologic year conditions.

6.1 Purchased or Imported Water

The City's Livermore Municipal Water system purchases all of its potable water supply for its service area from wholesaler Zone 7 Water Agency. Zone 7 is a multi-purpose agency that oversees water-related issues in the Livermore-Amador Valley. Zone 7 is a State Water Project (SWP) contractor that wholesales treated water to four retail water agencies, including the City of Livermore, and uses a combination of water supplies and water storage facilities to meet its customers' water demands. These include imported surface water from the SWP, water transferred from the Byron Bethany Irrigation District, local surface runoff captured in Del Valle Reservoir, groundwater extraction from the Livermore Valley Main Groundwater Basin, non-local groundwater storage in the Semitropic Water Storage District and Cawelo Water District, and future local storage in the Chain-of-Lakes. Zone 7 completed an update to its 2011 Water Supply Evaluation (WSE Update) in early 2016 to reassess its long-term water supply. The WSE Update provides a basis for Zone 7's water supply projections as included in Zone 7's 2015 UWMP. Tables 6-1 (Zone 7 2015 UWMP Table 6-7) and 6-2 (Zone 7 2015 UWMP Table 6-8) below from Zone 7's 2015 UWMP indicate 2015 Actual water sources supplies and projected Normal Year water sources supplies.

Table 6-1 Zone 7 Water Supplies in 2015 (Zone 7 2015 UWMP Table 6-7)

Water Supply	Additional Detail on Water Supply	Actual Volume (Acre-Feet)	Water Quality
Purchased or Imported Water	*SWP Table A at 20%*	16,100	Raw Water
Purchased or Imported Water	*Yuba Accord*	280	Raw Water
Purchased or Imported Water	*Multi-Year Pool*	100	Raw Water
Supply from Storage	*SWP Carryover*	9,100	Raw Water
Groundwater	*Main Basin*	2,000	Raw Water
Surface water	*Arroyo Valle*	2,860	Raw Water
Supply from Storage	*Non-Local Storage*	17,460	Raw Water
	Total	**47,900**	

Table 6-2 Zone 7 Summary of Projected Normal Year Water Supplies (Zone 7 2015 UWMP Table 6-8)

Water Supply	Additional Detail on Water Supply	Reasonably Available Volume (AFA)			
		2020	2025	2030	2035
Purchased or Imported Water	*State Water Project [Existing Conveyance – Early Long-Term (EC-ELT)]*	50,000	50,000	50,000	50,000
Purchased or Imported Water	*Yuba Accord*	145	145	N/A	N/A
Purchased or Imported Water	*Byron Bethany Irrigation District*	2,000	2,000	2,000	2,000
Surface water	*Arroyo Valle*	7,300	7,300	10,300	10,300
Purchased or Imported Water	*California Water Fix*	N/A	N/A	8,000	8,000
Other New Water Supplies	*Per WSE Update, could include desalination and/or potable reuse*	N/A	10,000	10,000	10,000
Supply from Storage	*Groundwater*	9,200	9,200	9,200	9,200
Supply from Storage	*Semitropic (used mainly in Dry Years)*	0	0	0	0
Supply from Storage	*Cawelo (used mainly in Dry Years)*	0	0	0	0
Supply from Storage	*State Water Project - Carryover*	10,000	10,000	10,000	10,000
	Total	**78,645**	**88,645**	**99,500**	**99,500**

The City of Livermore Water Reclamation Plant (LWRP) produces and supplies recycled water to the Livermore Municipal Water. Additional details about recycled water are available in Section 6.5 – Wastewater and Recycled Water. Table 6-3 (DWR Table 6-8) and Table 6-4 (DWR Table 6-9) include actual water supplies and projected water supplies. Recycled water use is based on current demand, anticipated growth, and the City's current 2013 Recycled Water Master Plan; additional recycled water supplies of over 2,000 million gallons per year are available.

Table 6-3 City of Livermore 2015 Actual Water Supplies (DWR Table 6-8)

Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2015		
		Actual Volume	Water Quality	Total Right or Safe Yield *(optional)*
Purchased or Imported Water	Purchased from Zone 7 Water Agency	1,484	Drinking Water	
Recycled Water	From City of Livermore WWTF	760	Recycled Water	
	Total	2,244		0
NOTES: Units in million gallons per year				

Table 6-4 City of Livermore Projected Water Supplies (DWR Table 6-9)

Table 6-9 Retail: Water Supplies — Projected						
Water Supply	Additional Detail on Water Supply	Projected Water Supply *Report To the Extent Practicable*				
		2020	**2025**	**2030**	**2035**	**2040** *(opt)*
		Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume
Purchased or Imported Water	Purchased from Zone 7 Water Agency	2,050	2,081	2,270	2,270	
Recycled Water	From City of Livermore WWTF	875	1,006	1,157	1,330	
Total		2,925	3,087	3,427	3,600	0
NOTES: Units in million gallons per year						

6.2 Groundwater

The City of Livermore does not pump groundwater to meet any water demands of the municipal water service area and has no adjudicated/unadjudicated basins. While the City does retain a small pumping quota of about 30 acre-feet per year, it is unlikely that it would be used during the 20 year planning horizon. The City does receive groundwater from wholesaler Zone 7 as part of the overall supply purchased from Zone 7.

6.2.1 Groundwater Management Plans

The City has not developed a Groundwater Management Plan. The Zone 7 Water Agency is the groundwater manager for the Tri-Valley and has developed both a Groundwater Management Program and a Salt Management Plan to ensure protection of the Livermore-Amador Valley Groundwater Basin. A copy of the Zone 7 Groundwater Management Plan on CD is included in Appendix D, and is available on the Zone 7 website at www.zone7water.com.

6.3 Surface Water

The City of Livermore does not self-supply surface water to meet any water demands of the municipal water service area. The City does receive surface water supplies from Zone 7 as part of the overall supply purchased for the service area.

6.4 Stormwater

The Clean Water Act requires states to address stormwater pollution entering storm drains, and the State of California requires a National Pollutant Discharge Elimination System (NPDES) permit to regulate stormwater discharges. The City of Livermore is a co-permittee under the Municipal Regional Stormwater NPDES Permit (MRP) which is

administered by the San Francisco Bay Regional Water Quality Control Board to eliminate pollutants from entering the storm drain system. The MRP requires municipalities to incorporate site design measures, source controls, treatment measures and flow duration controls on larger projects. Currently, the City is not intentionally diverting stormwater for beneficial reuse.

6.5 Wastewater and Recycled Water

Municipal recycled water is municipal wastewater that has been treated to a specified quality to enable it to be used again for a beneficial purpose and is used to offset potable water demand. For purposes of this UWMP, “recycled water” means only the municipal recycled water, which is water that has been treated and discharged from a municipal wastewater facility.

There are currently excellent opportunities to meet significant portions of the City’s Livermore Municipal Water service area demands with recycled water. The Livermore Water Reclamation Plant (LWRP) has been producing and distributing recycled water that meets Title 22 disinfected tertiary recycled water requirements for beneficial use and in accordance with the Regional Water Quality Control Board (RWQCB) permit since 1966. The City has a relatively well-developed recycled water program that currently distributes an average of about 2 million gallons of recycled water per day (MGD), with a peak demand of almost 3.5 million MGD.

The City updated its Recycled Water Master Plan in 2013. The plan identified a number of potential projects to extend recycled water infrastructure to large water users throughout the City. Due to the high infrastructure cost associated with a dual distribution system, the City chose to continue to expand the use of recycled water in its Recycled Water Use Area, to sell a small amount of recycled water to the City of Pleasanton, and to retain the rest of the existing recycled water production capacity for water supply uncertainty. Since the 2014/2015 drought, the Tri Valley water agencies have begun investigating water supply reliability and diversification.

Recycled Water Coordination

The Livermore Water Reclamation Plant treats all wastewater collected within the city limits of Livermore. Wastewater transport out of the area is handled through the Livermore Amador Valley Water Management Agency (LAVWMA), a joint powers authority (JPA) composed of Dublin San Ramon Services District, City of Livermore, and City of Pleasanton. Since 1979 LAVWMA has owned the conveyance facilities that transport treated wastewater from the LWRP over the Dublin grade, and eventually to the East Bay Dischargers Authority, which dechlorinates the effluent and discharges it through a deep-water pipeline into the San Francisco Bay.

Zone 7 is the groundwater basin management agency. Recognizing that recycled water is an important part of a complete water resource management program for the Livermore-Amador Valley, Zone 7 is incorporating its use in future water supply planning. Plans for water recycling within the Tri-Valley is coordinated amongst Zone 7,

the Retailers, the wastewater/recycled water agencies (City of Livermore, DSRSD, and Pleasanton), the regulatory agencies such as the Division of Drinking Water and the Regional Water Quality Control Board (RWQCB), and planning agencies such as the City of Livermore Community and Economic Development Department. Zone 7 was a co-permittee under the Master Water Recycling Permit issued by the RWQCB in December 1993, and works to manage salt loading in the Main Basin. City of Livermore Water is currently working with Zone 7 and other Retailers to explore the feasibility of potable reuse in the Tri-Valley area.

Wastewater Collection, Treatment, and Disposal

The City of Livermore has approximately 286 miles of sanitary sewer lines ranging in size from 6" to 48". Wastewater collected from the City of Livermore, Lawrence Livermore National Laboratory, and the City of Pleasanton's Ruby Hills housing development, is collected and treated at the City of Livermore Water Reclamation Plant (LWRP) located on the corner of West Jack London Blvd. and Isabel Ave/Kittyhawk Road (State Route 84) in the City of Livermore.

The LWRP receives an average daily dry weather flow of approximately 7.0 million gallons per day (MGD) (7,841 AF/Y) and is operated, and maintained by the City's Water Resources Division. Wastewater is treated using conventional primary and secondary wastewater treatment processes, as well as tertiary treatment to produce recycled water.

Conventional wastewater treatment processes consist of:

- Primary sedimentation where heavy organic solids are removed from the raw sewage and sent to the solids stabilization and dewatering facilities.
- Secondary treatment utilizing the activated sludge process which removes 85% - 95% of the remaining organic material after primary sedimentation.
- Disinfection using sodium hypochlorite to reduce the bacteria levels in the secondary effluent prior to disposal.
- Disposal of secondary effluent through the Livermore Amador Valley Water Management Agency (LAVWMA) pipeline.
- Solids stabilization using anaerobic digestion followed by belt pressing for dewatering prior to beneficial reuse as alternate daily cover or land application.

Tertiary treatment for water reclamation consists of:

- Mono-media filters where 95% - 99% of suspended material is removed from secondary effluent.
- Disinfection using ultraviolet light (UV) prior to disposal.

Tertiary treated effluent meeting California Title 22 requirements for unrestricted water reuse is recycled through landscape irrigation. An average 2.0 MGD (6.1 AF), with peak summer flows approaching 3.5 MGD, is tertiary treated recycled water. The tertiary filtration capacity of the LWRP is approximately 10 MGD; however, the UV disinfection capacity is currently limited to 6 MGD. Based on the current limitations of the UV system, the annual amount of recycled water that could be produced is approximately

2190 MG (6721AF/Y). By comparison, this amount is roughly equal to the total projected 2015 water demand for the entire City of Livermore Water service area. Therefore, significant potential exists for expanded recycled water use if feasible projects can be identified.

Wastewater that is not recycled is discharged out of the area through LAVWMA over the Dublin grade, and eventually to the East Bay Dischargers Authority, which dechlorinates the effluent and discharges it through a deep-water pipeline into the San Francisco Bay.

Table 6-6 (DWR Table 6-3) summarizes the information on the collection of wastewater generated in the City's municipal water service area, discharged treated wastewater, the amount of wastewater that received tertiary treatment and was recycled within and outside of the service area in 2015,

Table 6-6 Wastewater Treatment and Discharge in 2015 (DWR Table 6-3)

Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2015										
☐	No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table below.									
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	2015 volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Add additional rows as needed										
Livermore Water Reclamation Plant	EBDA at Oro Loma	City discharges secondary effluent to the LAVWMA Pipeline.	CA0038008	Bay or estuary outfall	Yes	Secondary, Disinfected - 2.2	2,061	924	782	19
						Total	2,061	924	782	19
NOTES: Volume in million gallons										

Recycled Water System

The City has practiced water reuse for over 30 years and last identified recycled water expansion opportunities in 2013. As noted above, the 2013 Recycled Water study found over 150 potential recycled water customers in the study area which includes City of Livermore Water and Cal Water service areas. However, the City chose to retain a majority of the remaining recycled water production capacity for a potential future water supply project. The City of Livermore and other Tri-Valley retailers and Zone 7 recently agreed to conduct a joint feasibility study to evaluate a potable reuse project.

The LWRP provides disinfected tertiary treated recycled water to the northwestern portion of the City. The distribution system consists of two above ground reservoirs with a holding capacity of 1.88 million gallons each. There are approximately 20 miles of distribution pipeline ranging in size from 4- to 18- inches, with 110 meter connections. There are also 100 recycled water fire hydrants available for contractors to use during

construction, and for firefighting and system maintenance. Currently, recycled water is provided for several uses including landscape and agricultural irrigation, fire protection, construction, street sweeping and toilet and urinal flushing. A copy of the Recycled Water Master Plan Executive Summary is in Appendix D. Below is a map of the distribution system providing recycled water in 2015.

Figure 6-1 Recycled Water Distribution System

Recycled Water Beneficial Uses - Current and Planned Uses of Recycled Water

The City of Livermore currently uses UV-disinfected tertiary treated effluent not exceeding a median total coliform value of 2.2 MPN/100 mL for all recycled water uses. The potential uses shown below in Table 6-7 (DWR Table 6-4) represent both the projected new facilities planned for the recycled water area as well as retrofitting existing facilities. In most cases it may not be economically feasible for existing developments that are currently using potable water for irrigation to switch to recycled water, nor would it be economically feasible to extend pipelines to serve a small number of customers with limited demands. Projected uses in Table 6.7 (DWR Table 6-4) are based on current uses plus expected growth and do not include potential projects identified in the 2013 Recycled Water Master Plan Update or a possible potable reuse project. Recycled water provided to the City of Pleasanton is used for and reported under the landscape irrigation category.

Table 6-7 Current and Projected Recycled Water Direct Beneficial Uses (DWR Table 6-4)

Table 6-4 Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area								
	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.							
Name of Agency Producing (Treating) the Recycled Water:		City of Livermore - Water Resources Division						
Name of Agency Operating the Recycled Water Distribution System:		City of Livermore Water Department						
Supplemental Water Added in 2015		0						
Source of 2015 Supplemental Water		N.A.						
Beneficial Use Type	General Description of 2015 Uses	Level of Treatment	2015	2020	2025	2030	2035	2040 (opt)
Agricultural irrigation								
Landscape irrigation (excludes golf courses)		Tertiary	174	201	231	265	305	
Golf course irrigation		Tertiary	142	164	188	216	249	
Commercial use		Tertiary	421	484	557	640	736	
Industrial use								
Geothermal and other energy production								
Seawater intrusion barrier								
Recreational impoundment								
Wetlands or wildlife habitat								
Groundwater recharge (IPR)*								
Surface water augmentation (IPR)*								
Direct potable reuse								
Other *(Provide General Description)*	Construction Water	Tertiary	23	26	30	35	40	
		Total:	760	875	1,006	1,157	1,330	
**IPR - Indirect Potable Reuse*								

Planned Versus Actual Use of Recycled Water

Current 2015 recycled water use data is shown below in Table 6-8 (DWR Table 6-5). Recycled water use between 2010 and 2015 increased by approximately 31%, from about 580 MG/yr. to about 760 MG/yr. Approximately 55% of the recycled water supplied by the City was used for commercial irrigation, while about 19% was used for

irrigation of the Las Positas Municipal Golf Course. An additional 23% was used for landscape irrigation of parks and public facilities, including the Livermore Water Reclamation Plant and the Livermore Municipal Airport. The remaining 3% was used for construction uses.

Table 6-8 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual (DWR Table 6-5)

Table 6-5 Retail: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual			
☐	Recycled water was not used in 2010 nor projected for use in 2015. The supplier will not complete the table below.		
Use Type		**2010 Projection for 2015**	**2015 Actual Use**
Agricultural irrigation			
Landscape irrigation (excludes golf courses)		233	174
Golf course irrigation		132	142
Commercial use		179	421
Industrial use			
Geothermal and other energy production			
Seawater intrusion barrier			
Recreational impoundment			
Wetlands or wildlife habitat			
Groundwater recharge (IPR)			
Surface water augmentation (IPR)			
Direct potable reuse			
Other	*Construction Water*	36	23
Total		580	760

6.5.5 Actions to Encourage and Optimize Future Recycled Water Use (table 6-6)

The primary and most effective action to increase recycled water use in the municipal water service area is the requirement that customers in the designated recycled water use area (LMW Zone 1) must use recycled water for irrigation. This requirement ensures that 100% of new customers in that area use recycled water for irrigation unless they can demonstrate a need for potable irrigation.

The main financial incentive to increase recycled water use in the City of Livermore Water service area is a reduced recycled water rate. By Livermore City Council policy, the recycled water rate is set at 80% of the potable water rate. Therefore, recycled water customers have a built-in incentive of at least 20% savings on their water consumption bill by using or switching to recycled water.

In addition to a reduced potable water rate, recycled water customers also avoid the one-time potable water connection fee from Zone 7 that represents a significant financial savings. Potable water connection fees from Zone 7 can range from $22,000 to

$56,000 for smaller meters (5/8" to 1"), and can exceed several hundred thousand dollars for large industrial or irrigation meters (3" to 6" or larger). Since connection fees are charged during initial project construction and are not refundable, these connection fee savings are only available to customers who initially install recycled water services, and not to those customers who subsequently switch from potable to recycled water.

Optimizing Recycled Use

As noted above, the City of Livermore currently requires all new development within the City's recycled water service area to use recycled water for outdoor irrigation purposes. Water Resources Division staff also encourages developers to use recycled water for toilet flushing inside certain categories of buildings, or to install dual plumbing for possible future use if the tenant is unknown at the time of construction.

Since all customers within the recycled water use area are required to use recycled water for irrigation, and the City does not currently supply recycled water to individual customers outside of the recycled water use area, it is impossible to evaluate the impact of the methods, such as financial incentives, used to encourage recycled water use. If the City expands the recycled water system into areas that are not required to use recycled water it will be better able to evaluate the impact of incentives to increase recycled water use. There are no current plans to expand recycled water use infrastructure in the future at this time as shown below in Table 6-9 (DWR Table 6-6).

Table 6-9 Methods to Expand Recycled Water Use (DWR Table 6-6)

Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
☑	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Add additional rows as needed			
		Total	0
NOTES: No current plans to expand the current infrastructure. Will have new customers.			

As previously indicated, the City of Livermore and other Tri-Valley water agencies are jointly studying the feasibility of a potable reuse project. The 2016 Zone 7 Water Supply Evaluation Update, which included a preliminary analysis of potable reuse, identified the potential for between 4,400 and 7,770 AF of potable reuse using recycled water in the Tri-Valley. Further study to confirm this potential supply is needed, and no additional use of recycled water for potable reuse has been included in Table 6-9 (DWR Table 6-6)..

6.6 Desalinated Water Opportunities

The City has few, if any, opportunities for developing desalinated water other than through regional transfers being considered in the Zone 7 2016 Water Supply Evaluation Update. The updated Zone 7 WSE identified the potential for 5,600 AF of supply from the Bay Area Regional Desalination Project. City staff will work with Zone 7 staff as necessary to support the use of desalination to diversify water supplies.

6.7 Exchanges or Transfers

The City's Livermore Municipal Water system has the opportunity for short-term, emergency water transfers through interties with the California Water Service Company, the City of Pleasanton and Dublin San Ramon Services District. The City also maintains a small intertie with the San Francisco Public Utilities Commission (SFPUC) Water System via the Lawrence Livermore National Laboratory. During an emergency, the City's municipal water service area could receive small amounts of water from that intertie. However, the intertie has historically been used for the City of Livermore Water to supply water to the Lawrence Livermore National Laboratory during planned, temporary interruptions of the SFPUC system.

The Livermore Municipal Water system has only limited opportunities for long-term water transfers due to its contract with the Zone 7 Water Agency. Under the current water supply contract, if the City obtains water from another source, it must still pay Zone 7 for the amount of water it would have normally purchased *unless the Zone is unable to supply the water*. Since Zone 7 has traditionally guaranteed all deliveries requested for the City's Livermore Municipal Water system, it has not been economical for the City to establish additional long-term transfer agreements with other suppliers. However, should Zone 7 be unable to meet future projected delivery requests, the City would be free to seek transfer agreements or develop other independent water sources.

6.8 Future Water Projects

The City has no planned projects to increase its independent water supply during the UWMP planning horizon as reflected below in Table 6-10 (DWR Table 6-7).

Table 6-10 Future Water Supply Projects (DWR Table 6-7)

Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☑	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
Need to include in body of UWMP.	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other agencies?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Agency *This may be a range*
	Drop Down List (y/n)	*If Yes, Agency Name*				
Add additional rows as needed						
NOTES: See Zone 7's 2015 UWMP to see new water supply projects in Chapter 6, Section 6.8						

The City will continue to work with Zone 7 to support and implement water supply projects, both independently and cooperatively with other local retailers through the Tri-Valley Water Retailers Group.

Zone 7's imported water supplies have decreased in reliability over the years as SWP reliability has declined. Zone 7's 2016 Water Supply Evaluation Update (WSE) examined water supply alternatives and potential future supply projects that may increase water supply reliability and meet demand growth. Zone 7 expects that a portfolio of these alternatives will be needed to meet future supply shortfalls including the California WaterFix, potable reuse options, and desalination. Zone 7's WSE Update includes new facilities or projects that may reduce the risk of water supply shortages during drought or other temporary unplanned emergency conditions including reliability intertie with another major water agency such as EBMUD or SFPUC, Chain of Lakes pipeline from Cope Lake to the Del Valle Water Treatment Plant, Los Vaqueros Emergency / Drought storage, and Well Master Plan wells.

Table 11-1 of the 2015 Zone 7 Water Agency Urban Water Management Plan shows the anticipated new supply for the 2020 and 2030 Planning Horizons in Normal, Single-Dry and Multiple Dry years; the table has been excerpted and is shown below[7].

In addition to these new supply options, Zone 7 is also participating in efforts to develop a California Water Fix and examining policies and operational practices for local groundwater and surface water storage to protect and maximize existing supplies. Therefore, the City's Livermore Municipal Water system will meet future demands in its service area through a combination of new local water supply projects such as regional desalination and potable reuse, a statewide California Water Fix, enhanced operation of existing surface and groundwater storage, and demand reductions required by the

[7] 2015 Zone 7 Water Agency Urban Water Management Plan

Water Conservation Bill of 2009.

6.9 Summary of Existing and Planned Sources of Water

Table 6-11 (DWR Table 8) summarizes the actual water supplies for the City's Livermore Municipal Water system. Table 6-12 (DWR Table 9) summarizes the future projected water supplies.

Table 6-11 Water Supplies – Actual (DWR Table 6-8)

Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2015		
		Actual Volume	Water Quality	Total Right or Safe Yield *(optional)*
Purchased or Imported Water	Purchased from Zone 7 Water Agency	1,484	Drinking Water	
Recycled Water	From City of Livermore WWTF	760	Recycled Water	
	Total	2,244		0
NOTES: Units in million gallons per year				

Table 6-12 Water Supplies – Projected (DWR Table 6-9)

Table 6-9 Retail: Water Supplies — Projected						
Water Supply	Additional Detail on Water Supply	**Projected Water Supply** *Report To the Extent Practicable*				
		2020	**2025**	**2030**	**2035**	**2040** *(opt)*
		Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume
Purchased or Imported Water	Purchased from Zone 7 Water Agency	2,050	2,222	2,270	2,270	
Recycled Water	From City of Livermore WWTF	875	1,006	1,157	1,330	
	Total	2,925	3,228	3,427	3,600	
NOTES: Units in million gallons per year						

Chapter 7: Water Supply Reliability

This chapter describes the long term reliability and vulnerability of the City's Livermore Municipal Water system's water supplies, as well as implemented or planned to be implemented water management tools for increasing the reliability of water supplies**.**

The reliability of City's retail potable water supply is subject to its water supply contract with Zone 7 and Zone 7's water supply reliability policy. Zone 7 has worked with the Tri-Valley water retailers to develop a reliable water system with a variety of supply sources. One of the important factors in developing this system was the Zone 7 Reliability Policy. On October 17, 2012, the Zone 7 Board of Directors approved a revised Water Supply Reliability Policy (Resolution No. 13-4230, included as Appendix A), which adopts the following level of service goals to guide the management of Zone 7's treated water supplies as well as its Capital Improvement Program (CIP):

- **Goal 1:** Zone 7 will meet its treated water customers' water supply needs, in accordance with Zone 7's most current Contracts for M&I Water Supply, including existing and projected demands as specified in Zone 7's most recent Urban Water Management Plan (UWMP), during normal, average, and drought conditions, as follows:
    - At least 85% of M&I water demands 99% of the time
    - 100% of M&I water demands 90% of the time

- **Goal 2:** Provide sufficient treated water production capacity and infrastructure to meet at least 80% of the maximum month M&I contractual demands should any one of Zone 7's major supply, production, or transmission facilities experience an extended unplanned outage of at least one week.

7.1 Constraints on Water Sources

The constraints on the Livermore Municipal Water's retail potable water supply are subject to its water supply contract with Zone 7 and Zone 7's water supply reliability policy and constraints. The following subsections are from Zone 7's 2015 UWMP, March 2016.[8]

7.1.1 Imported Water: State Water Project

Purchased water from the SWP is Zone 7's largest water source, providing over 80% of the treated water supplied to its customers on an annual average basis[8]. SWP water moves through the Sacramento-San Joaquin Delta (Delta) before it is conveyed by the California Aqueduct and the South Bay Aqueduct (SBA) to Zone 7's water facilities. The instability of the aging levees in the Delta (including their vulnerability to seismic events and climate change), regulatory uncertainty, water quality issues including saltwater

[8] Source: Zone 7 2015 UWMP, March 2016

intrusion, and the declining health of the Delta ecosystem all challenge the long-term reliability of the SWP and, more generally, the water conveyance capability of the Delta. Zone 7 and other SWP contractors are currently working with DWR and other key stakeholders to address the many complex issues undermining the Delta through the proposed California WaterFix. The proposed new diversion structure in the northern Delta, which allows for a dual-conveyance system, provides alternative intakes in case the Delta is affected by an earthquake, levee failure, or some other catastrophic event that impacts water quantity and quality in the Delta. DWR is working closely with regulatory and fish agencies to address regulatory uncertainty and protect the Delta ecosystem under an adaptive management framework based on the best available science. Finally, the dual conveyance system provides a tool for protecting fish during sensitive periods in the Delta. With these benefits, the California WaterFix is expected to significantly alleviate constraints on SWP operation. There are water quality considerations associated with the water that moves through the Delta. From a municipal water supply perspective, water quality issues in the Delta are associated with salinity from seawater intrusion; wastewater effluent discharges; agricultural drainages from the islands; and recreational activities. Zone 7 plans to install ozonation facilities at DVWTP in 2019 and at PPWTP in 2030; these facilities will provide improved water quality through treatment; the facilities are expected to result in more reliable production capacities from the surface water treatment plants.

7.1.2 Groundwater

The groundwater supply from the Livermore-Amador Valley Main Basis in generally consistent in mineral quality, whereas the surface water supply can see large deviations in the quality of water due to high and low surface water runoff and algae blooms. Zone 7 plans to augment its ability to recharge the Main Basin to maintain higher levels of local storage and allow for more pumping when necessary, which will improve both water supply reliability and salt management. Zone 7 plans to build an additional demineralization facility to continue to decrease the salt content of the Main Basin. Finally, Zone 7 is managing Cr(VI) levels in groundwater through blending, with consideration of treatment facilities in the future, if required.

7.1.3 Arroyo Valle

Historically, access to Zone 7's stored water in Lake Del Valle has not been problematic, unless there is an outage on the Del Valle Branch pipeline. Zone 7 closely coordinates use of Arroyo Valle water with DWR. Water collected from the local watershed is protected under the SBA Watershed Protection Program Plan. In general, the water quality of Arroyo Valle runoff is good, and does not affect the reliability of this water supply; however, as noted above, T&O can also affect supplies from Lake Del Valle. Zone 7 treats T&O using PAC, although a switch to groundwater supplies is sometimes necessary under excessive levels of T&O compounds. Algal blooms in the lake can also reduce production capacities. A new ozonation facility at DVWTP planned for 2019 will help address these issues.

7.1.4 Byron Bethany Irrigation District

Zone 7's other imported surface water supply, transfer water from BBID, is also linked to the Delta and SWP facilities. This exchange water is diverted from the Delta and delivered to Zone 7 via the SBA. Consequently, the conveyance challenges related to possible shutdown of Delta pumping due to a facility outage, levee failure, earthquake, water quality (e.g., salinity intrusion), and fish impacts apply to the BBID transfer water. Physical limitations in the SWP conveyance capacity could also affect delivery of this supply. These conveyance issues should be addressed by the California WaterFix. Curtailment of BBID's pre-1914 water rights during extremely dry hydrologic conditions (like in 2015) also affects the availability of this supply.

7.1.5 Local Storage

Zone 7 has three options for local storage: Lake Del Valle, the Main Basin, and, in the future, Chain of Lakes (COLs). The key constraint on the use of the Chain of Lakes for storage is the duration of mining activities, which affects when the remainder of the Chain of Lakes will be transferred to Zone 7 ownership and how much storage is available over time. Zone 7 continues to work closely with the mining companies and quarry operators so planning efforts can be coordinated.

7.1.6 Non-Local Storage

Access to banked water in Semitropic Water Storage District (Semitropic) and Cawelo Water District (Cawelo)—both located downstream of Zone 7—requires exchange/s with other SWP contractors located south of Kern County. There must be sufficient water flowing through the Delta to facilitate these exchanges, which could be a challenging condition to meet during a drought. Furthermore, the banked water must be conveyed through the Delta, rendering this supply susceptible to the Delta disruptions. Zone 7 will continue to coordinate closely with DWR, other SWP contractors, Semitropic, and Cawelo to ensure the future reliability of the banked water supplies. Some of Semitropic's wells are affected by arsenic. This is currently being managed through treatment before the affected groundwater water is pumped into the California Aqueduct.

Chapter 7 of the 2015 Zone 7 Water Agency Urban Water Management Plan discusses the constraints of each of the Zone's water supply sources and the overall system reliability through 2030.

To minimize the need for imported water, the City implements the Demand Management Measures (DMMs) described in Section 9 of this Urban Water Management Plan, and plans to maintain its efforts to ensure that water resources are used wisely and to meet the requirements of the SB X7-7.

In addition to efforts to minimize demand, the City supports Zone 7's efforts to maximize the use of local runoff via surface storage in Lake Del Valle, and future storage in the Chain of Lakes to minimize reliance on imported water. The City also supports Zone 7's groundwater basin management and recharge efforts, which help to reduce the amount of imported water needed.

The City of Livermore produces and distributes recycled water, which offsets a significant amount of potable water demand that would otherwise need to be met with imported water. The City currently supplies over 10% of the municipal water service area demands with recycled water.

7.2 Reliability by Type of Year

In this section, the various supplies of water available to the Livermore Municipal Water system through Zone 7 and the City's LWRP are addressed, along with their respective reliability in a normal water year, a single dry year and multiple dry years. The base years vary for each Zone 7 source, depending on its watershed. Since the City's municipal water supply is directly related to Zone 7, much of the information below has been excerpted from Zone 7's 2015 UWMP.

7.2.1 Zone 7 Water Supply Evaluation

In early January 2014, Zone 7's Board of Directors learned that all pumping form the Delta could be stopped due to severe, persistent, and record drought conditions. California Governor Jerry Brown declared a Drought State of Emergency on January 17, 2014, and requested voluntary conservation of 20 percent. For the first time in its history, Zone 7 was facing a potential water supply crisis. Consequently, Zone 7's Board of Directors declared a local drought state of emergency on January 29, 2014, and requested the local water supply retailers and untreated customers reduce their water use by 25% under Stage 2 Actions defined in the Zone 7's 201- UWMP. Governor Brown subsequently mandated water use reductions in April 2015. Through an amazing effort by the entire Tri-Valley area, Zone 7 saw a 28.6% reduction in total water demand (treated and untreated) in 2014, and a 40% reduction in total water demand through November 2015.

As described previously in Chapter 6 System Supplies and in Chapter 7 of the Zone 7 UWMP, Zone 7's imported water supplies have decreased in reliability over the years as SWP reliability declined. Furthermore, Zone 7 expects continued growth in population. Zone 7's WSE Update includes updated and more conservative assumptions for SWP allocations, revised key assumptions for existing supplies from BBID and capacity of its Kern County groundwater banking programs, and evaluated a complete loss of the Delta due to earthquake or water quality. This evaluation also incorporated potential delays in transferring ownership of the Chain of Lakes to Zone 7 and for the first time, included an analysis of local climate change.

In addition, Zone 7 currently relies on incoming surface water supplies from contracts and local water rights, previously stored surface water in the local groundwater basin, and two non-local groundwater banking programs to meet its demands. Zone 7's WSE Update evaluated water supply alternatives and potential future water supply projects that could be used to make up for the decreased reliability from existing supplies and meet demands from growth.

Using the WSE Update, Zone 7 staff compared projected water supplies during normal, single dry, and multiple dry water years with its customers' demand scenarios. It should be noted that a portion of the water demand during the normal year includes the storage of water supply for use in dry years. Based on the existing and planned future water supply assumptions made by Zone 7, Zone 7 does not anticipate any difficulty in meeting projected water demands under normal conditions, single dry years, and multiple-dry years. However Zone 7 expects that a portfolio of future supply alternatives, including the California WaterFix, will be needed to meet future supply shortfalls. If the California WaterFix is delayed, alternative water supplies such as potable reuse or desalination will be needed to meet water supply needs.

Chapter 7 of the 2015 Zone 7 Water Agency Urban Water Management Plan discusses projected water supply analysis.

7.2.2 Basis of Water Year

The quantity of supply available from each of Zone 7's water supply sources varies from one year to the next depending on hydrologic conditions. Consequently, Zone 7 reviewed historical data and developed a projected yield for each water supply source under three conditions: (1) normal water year, (2) single-dry year, and (3) multiple-dry years. In accordance with DWR's 2015 UWMP Guidebook, each condition was defined as follows:

- Normal Water Year: The year in the historical sequence most closely representing average runoff or allocation levels and patterns.
- Single-Dry Year: The year with the lowest annual runoff or allocation in the historical sequence.
- Multiple-Dry Year: The lowest runoff or allocation for a consecutive three-year period in the historical sequence.

The Livermore Municipal Water system's potable water supply reliability and vulnerability is directly related to seasonal and climatic shortages that impact Zone 7's water supplies. Therefore, Zone 7's water supply reliability is used to represent the City's available supplies during the historic average, single driest year, and driest multi-year period. The projected yield of Zone 7's water sources under these three scenarios, as reported in Zone 7's 2015 UWMP, are discussed below.

DWR Table 7-1 is not compatible with Zone 7's bases of water year data because different water sources have different base years and volumes. As referred to in Table 7-1, Zone 7's bases of water year data are shown in Tables 7-2 and 7-3.

Table 7-1 Basis of Water Year Data (DWR Table 7-1)

Year Type	Base Year *If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 1999-2000, use 2000*	Available Supplies if Year Type Repeats	
		☑	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location: Table 7-2, Table 7-3
		☐	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	% of Average Supply
Average Year			100%
Single-Dry Year			
Multiple-Dry Years 1st Year			
Multiple-Dry Years 2nd Year			
Multiple-Dry Years 3rd Year			

Agency may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If an agency uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.

Table 7-2 lists the years that Zone 7 identifies as their historical average, single driest year, and driest multi year period, also known as the “Base Years.” Table 7-3 summarizes the volume of water supply expected, broken down by source and the total percentage of water supply expected if there was to be a repeat of the hydrology of that type of year. The water year basis varies depending on the water source; explanatory details are included in Section 7-2 of Zone 7’s 2015 UWMP, along with historical percentages of normal delivery.

Table 7-2 Basis of Water Year Data for Various Zone 7 Water Supplies

Water Source	Average Year	Single Dry Year	Multiple-Dry Year		
			Year 1	Year 2	Year 3
Arroyo del Valle	1919	1977	1988	1989	1990
SWP - Table A	1964	2014	1990	1991	1992
SWP - Carryover	1964	2014	1990	1991	1992
SWP - Yuba Accord	1964	2014	1990	1991	1992
BBID	1964	2015	1990	1991	1992
From Storage					
Main Basin	1964	2014	1990	1991	1992
Semitropic	1964	2014	1990	1991	1992
Cawelo	1964	2014	1990	1991	1992

Source: Zone 7 2015 UWMP, Tables 7-1 through 7-8.

Table 7-3 Zone 7's Water Supply Reliability, AFA

Water Source	Average Year	Single Dry Year	Multiple-Dry Year		
			Year 1	Year 2	Year 3
Arroyo del Valle	7,300-10,300	0	350	520	150
SWP - Table A	50,000	4,000	21,800	12,900	19,300
SWP - Carryover	10,000	10,000	10,000	10,000	10,000
SWP - Yuba Accord	145	676	676	676	676
BBID	2,000	0	2,000	2,000	2,000
From Storage					
Main Basin	9,200	28,000-34,400	12,400	16,100	13,500
Semitropic	0	7,200	10,400	9,100	9,100
Cawelo	0	7,800	10,000	10,000	10,000
Total (AFA)	78,645	57,676	67,626	61,296	64,726
Total (MGY)	25,627	18,794	22,036	19,973	21,091
Percent of Average Supply		73.3%	86.0%	77.9%	82.3%

Source: Zone 7 2015 UWMP, Tables 7-12, 7-13, 7-14a, 7-14b and 7-14c.

7.3 Supply Demand Assessment

The City's Livermore Municipal Water system's projected supply and demand for Normal Years, Single Dry Years and Multiple Dry Years are quantified and discussed below.

7.3.1 Normal (Average) Year

The City's Normal Year supplies are anticipated to be as follows:

- Purchased supplies from Zone 7 are assumed to provide 100% of the City's potable water demand, and
- About 875 MGY of recycled water within its service area by 2020 with a gradual increase to approximately 1,330 MGY by 2035.

The City's Normal Year demands have been projected based on the City's revised SB X7-7 per capita water use target of 192 GPCD for 2020 and subsequent years.

As shown in Table 7-4 (DWR Table 7 2), the City's Normal Year supplies are adequate to meet projected Normal Year demands.

Table 7-4 Normal Year Supply and Demand Comparison (DWR Table 7-2)

Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 *(Opt)*
Supply totals *(autofill from Table 6-9)*	2,925	3,228	3,427	3,600	
Demand totals *(autofill from Table 4-3)*	2,925	3,228	3,427	3,600	
Difference	0	0	0	0	
NOTES: Volumes are in MG					

7.3.2. Single-dry Year

Purchased supplies from Zone 7 in Single Dry Years are assumed to be 75% of Normal Year supplies. The City's Single Dry Year recycled water supplies are assumed to be the same as Normal Year supplies. The City's Single Dry Year supplies are summarized in Table 7-5.

Table 7-5 Single Dry Year Supplies, MGY

	2020	2025	2030	2035
Zone 7 Supplies	1,538	1,561	1,703	1,703
Recycled Water Supplies	875	1,006	1,157	1,330
Total Supply	2,413	2,567	2,860	3,033
Note: Zone 7 assumed a 15% reduction in retailer demands for a single dry year in their 2015 UWMP. Livermore Municipal Water assumed 25% reduction in retailer demands for a single dry year, making Zone 7's analysis more conservative and ensuring adequate supplies.				

The City's Single Dry Year potable water demands are assumed to be 75% of Normal Year demands (25% reduction in water use). It is assumed that the City would implement demand reduction measures as appropriate to reduce demands as necessary. Livermore Municipal Water customers recently demonstrated the ability to reduce demands by over 40% during the drought. Recycled water demands are assumed to be the same as Normal Year demands. The City's Single Dry Year demands are summarized in Table 7-6.

Table 7-6 Single Dry Year Demands, MGY

	2020	2025	2030	2035
Potable Water Demands	1,538	1,561	1,703	1,703
Recycled Water Demands	875	1,006	1,157	1,330
Total Demand	2,413	2,567	2,860	3,033

As shown in Table 7-7 (DWR Table 7-3), the City's Single Dry Year supplies are adequate to meet projected Single Dry Year demands.

Table 7-7 Single Dry Year Supply and Demand Comparison (DWR Table 7-3)

Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals	2,413	2,673	2,860	3,033	
Demand totals	2,413	2,673	2,860	3,033	
Difference	0	0	0	0	
NOTES: Assumes 25% demand reduction from Normal Year.					

7.3.3 Multiple-dry Year

Purchased supplies from Zone 7 in Multiple Dry Years are assumed to be 85% of Normal Year supplies. The Multiple Dry Year recycled water supplies for the first, second, and third years are assumed to be the same as Normal Year supplies. The City's Multiple Dry Year supplies are summarized in Table 7-8.

Table 7-8 Multiple Dry Year Supplies, MGY

	2020	2025	2030	2035
Zone 7 Supplies	1,743	1,769	1,930	1,930
Recycled Water Supplies	875	1,006	1,157	1,330
Total Supply	2,618	2,775	3,087	3,260
Note: Zone 7 did not include any conservation in retailer demands for multiple dry years. Livermore Municipal Water assumed 15% reduction in retailer demands for a multiple dry years, making Zone 7's analysis more conservative and ensuring adequate supplies.				

The City's Multiple Dry Year potable water demands are assumed to be 85% of Normal Year demands (15% reduction in water use). It is assumed that the City would implement demand reduction measures as appropriate to reduce demands as necessary. Again, as noted above Livermore Municipal Water customers have demonstrated their ability to significantly reduce demands in response to local or statewide water conditions. Recycled water demands are assumed to be the same as Normal Year demands. The City's Multiple Dry Year demands are summarized in Table 7-9.

Table 7-9 Multiple Dry Year Demands, MGY

	2020	2025	2030	2035
Potable Water Demands	1,743	1,769	1,930	1,930
Recycled Water Demands	875	1,006	1,157	1,330
Total Demand	2,618	2,775	3,087	3,260
Note: Zone 7 did not include any conservation in retailer demands for multiple dry years. Livermore Municipal Water assumed 15% reduction in retailer demands for a multiple dry years, making Zone 7's analysis more conservative and ensuring adequate supplies.				

As shown in Table 7-10 (DWR Table 7-4), the City's Multiple Dry Year supplies are adequate to meet projected Multiple Dry Year demands.

Table 7-10 Multiple Dry Years Supply and Demand Comparison (DWR Table 7-4)

Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	2,618	2,895	3,087	3,260	
	Demand totals	2,618	2,895	3,087	3,260	
	Difference	0	0	0	0	
Second year	Supply totals	2,618	2,895	3,087	3,260	
	Demand totals	2,618	2,895	3,087	3,260	
	Difference	0	0	0	0	
Third year	Supply totals	2,618	2,895	3,087	3,260	
	Demand totals	2,618	2,895	3,087	3,260	
	Difference	0	0	0	0	
NOTES: Assume 15% demand reduction of average supply available to Livermore Municipal Water for consecutive multiple years.						

7.4 Regional Supply Reliability

The City's Livermore Municipal Water system's potable water supply is from Zone 7, which contracts with a number of agencies for its water supplies and storage. The City's recycled water supply is treated at the LWRP. Zone 7 and the City's Livermore Municipal Water system's source is affected by limitations related to legal, environmental, water quality, and /or climatic issues. The City's recycled water supply is also limited by treatment facilities capacity and storage capacity. To minimize the need for imported water, the City implements the Demand Management Measures (DMMs) described in Section 9 of this Urban Water Management Plan, and plans to maintain its efforts to ensure that water resources are used wisely and to meet the requirements of the SB X7-7.

Because Zone 7 is the Livermore Municipal Water system's sole water supplier, its efforts to maximize resources and minimize imports are relevant to the City's water supply reliability. Zone 7 evaluates and pursues new water supply options, including

potable reuse, which would maximize reuse or locally-generated wastewater irrigation. Additional supplies from reuse would reduce the percentage of Zone 7's water supply derived from imported water supplies. Optimization and expansion of local storage options allow Zone 7 to minimize use of imported water supplies, when necessary, during droughts, sensitive fish periods, and other events. In addition, Zone 7 is a member of the Bay Area Regional Reliability Partnership (BARR), which brings together nine Bay Area water agencies aiming to improve regional supply reliability. The BARR partners have agreed to work cooperatively to address water supply reliability concerns and drought preparedness on a mutually beneficial and regionally focused basis. Near- and long-term joint water supply reliability projects may be evaluated through BARR, such as use of the capacity of existing facilities, changes to infrastructure including new interconnections, recycled water, water conservation, expanded treatment, regional desalination, water transfers and exchanges, and other projects or institutional arrangements that encourage a regional approach to achieving water supply reliability in the Bay Area.

Section 8: Water Shortage Contingency Planning

The City of Livermore first adopted a Water Shortage Contingency Plan (WSCP) in 1991 and updated the plan in 1996, 2005, and 2011. The Water Shortage Contingency Plan was last updated and adopted by the Livermore City Council in 2011 after the 2010 UWMP was submitted to the state. As part of the update of the Water Shortage Contingency Plan, the Water Conservation Plan originally developed in 1991 which specifies voluntary and mandatory conservation measures, had also been revised and incorporated into the Water Shortage Contingency Plan. The updated Water Shortage Contingency Plan replaced previous shortage contingency and conservation plans. Modifications to the Livermore Municipal Code updating the authority to implement expanded conservation measures were made after adoption of the updated Water Shortage Contingency Plan.

The updated 2011 Water Shortage Contingency Plan is included in Appendix C.

8.1 Stages of Action

In response to the recent drought, the City of Livermore Water, other Tri-Valley water retailers and Zone 7 met to discuss and align each agency's water shortage stages to improve communications and actions during water shortage events. The City's revised irrigation schedules during mandatory prohibitions. DWR Table 8-1 below shows the four stages of action in the WSCP. Stage 1 indicates a minimal reduction in supply, with a voluntary reduction of 0 - 20%. Stage 2 corresponds to a supply shortage of up to 20%, which equates to a reduction of about 297 million gallons per year based on a total 2015 City of Livermore Water system demand of about 1484 million gallons per year, and includes either voluntary or mandatory conservation measures. Stage 3 and 4 indicate supply reductions of 20-35% and 35-50% respectively, equaling reductions of up to 519 million gallons per year at Stage 3 and 742 million gallons per year at Stage 4. However, it must be noted that the 2015 demands discussed above already represent a reduction of approximately 30% from 2013 "normal" demand levels due to the drought.

The City relies on Zone 7 as the sole source of water. Each Stage in the WSCP is organized in the following manner:

- **Definition**: This is the condition of the water supply that would normally trigger this element of the Plan.
- **Message**: This is an example of the message that might be communicated to the public to describe the state of water availability.
- **Type**: This defines whether the stage is voluntary or mandatory on the part of the customer.
- **Expected Reduction**: This is an estimate of the range of reduction that may be required under each stage of the Plan. A specific goal will be defined when each stage of the Plan is activated.

Normal Supply

Inclusion of "Normal Supply" in the Plan is an important level and is in force at all times until the Livermore City Council enacts any stage of the WSCP by adopting a resolution in response to local or regional water supply conditions. The Water Conservation Bill of 2009 requires urban water suppliers to reduce per-capita water consumption by 20% by 2020. Implementing conservation during "Normal Supply" periods will play an important role in reaching the required 20% reduction in per-capita consumption.

- **Definition**: Water supplies are adequate to meet all the water demands of customers.
- **Message**: We can deliver all the water our customers need, recognizing that customers should practice wise water use at all times.
- **Type**: Voluntary.
- **Expected Reduction**: None targeted
- **Conservation**: Basic water conservation measures and public information promoting wise water use and Best Management Practices when using water for residential, commercial or irrigation uses.

Stage 1- Minimal Reduction

- **Definition**: There is sufficient uncertainty concerning water supplies for this year or in the next few years that it would be prudent to conserve local water supplies so that these supplies may be used to meet water demands in the future.
- **Message**: We think we can deliver all the water our customers want, but request their help to conserve water to be sure local and imported supplies are adequate to meet future years' water demands – please conserve.
- **Type**: Voluntary.
- **Expected Reduction**: Up to 20%

Stage 2- Moderate Reduction

- **Definition**: There are definable events that lead to a reasonable conclusion that in the current and/or upcoming water years, water supplies may not be adequate to meet all customer water demands.
- **Message**: We may not be able to deliver all the water our customers want and we need customers' help to conserve water.
- **Type**: Voluntary or Mandatory.
- **Expected Reduction**: Up to 20%

Stage 3- Severe Reduction

- **Definition**: There are definable events that lead to a firm conclusion that in the current water year, water supplies will not be adequate to meet customers' water demands.
- **Message**: We cannot deliver all the water our customers need and we are requiring our customers to use less water.
- **Type**: Mandatory.
- **Expected Reduction**: 20 to 35%

Stage 4- Critical Reduction

- **Definition**: A Stage 3 shortage has been in effect and the reduction goal is not being met or new definable events require increasing the reduction goal.
- **Message**: We cannot deliver all the water our customers need and we have not been able to achieve targeted reductions so we now have to enforce the use of less water.
- **Type**: Mandatory.
- **Expected Reduction**: 35 to 50%

Water Emergency

A water emergency is when a specific event causes a disruption in the water supply. The disruption may affect all or part of the local City of Livermore Water system or the wider Zone 7, or statewide distribution system. In the event of emergency conditions affecting the water supply, the Livermore City Manager may declare a Water Emergency.

- **Definition**: There is a major failure of a supply, storage or distribution facility.
- **Message**: A very serious problem has occurred and we are unable to deliver sufficient water for human consumption, sanitation and/or fire protection.
- **Type**: Mandatory.
- **Expected Reduction**: Varies by area in response to specific situation

Table 8-1 Stages of Water Shortage Contingency Plan (DWR Table 8-1)

Table 8-1 Retail Stages of Water Shortage Contingency Plan		
Stage	Complete Both	
	Percent Supply Reduction[1]	Water Supply Condition (*Narrative description)*
1	20%	Minimal Reductions
2	20%	Moderate Reductions
3	35%	Severe Reductions
4	50%	Critical Reductions
[1] *One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.*		

8.2 Mandatory Prohibitions During Shortages

The Livermore Municipal Code includes a variety of voluntary and mandatory management practices to conserve water. The majority of the mandatory conservation practices are triggered at the Stage 3 level, corresponding to an expected reduction of 20-35% below normal use.

Some of the mandatory prohibitions are described below and summarized in Table 8-2:

- The use of potable water for municipal activities such as street cleaning and sewer main flushing will be suspended at the Stage 3 level. Recycled water will be used for these needs in Stage 3, with the exception of water used for sewer line flushing in response to emergency sanitary sewer blockages or overflows.

- Implementation of odd/even irrigation, with no watering on Sunday of each week for residential and commercial uses is included in Stage 2 and was implemented as a mandatory prohibition by Ordinance 1998.

- The use of sprinkler irrigation will be prohibited and the requirement to irrigate by hand-watering only on Saturday or Sunday will become mandatory at the Stage 3 level.

- The use of potable water for compaction or dust control during construction activities will be prohibited at the Stage 3 level since recycled water is available for those uses.

- The use of potable water for filling swimming pools will become a mandatory prohibition at the Stage 4 level.

- The use of potable water for washing buildings, vehicles or boats except at facilities which capture and recycle the water will become a mandatory prohibition at the Stage 4 level.

Table 8-2 Restrictions and Prohibitions on End Uses (DWR Table 8-2)

Table 8-2 Retail Only: Restrictions and Prohibitions on End Uses			
Stage	Restrictions and Prohibitions on End Users ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? *Drop Down List*
Add additional rows as needed			
1	Landscape - Limit landscape irrigation to specific times	Minimal Conservation	No
1	Other - Require automatic shut of hoses	Minimal Conservation	No
2	Landscape - Limit landscape irrigation to specific times	Moderate Reduction	No
2	Other - Require automatic shut of hoses	Moderate Reduction	No
2	CII - Commercial kitchens required to use pre-rinse spray valves	Moderate Reduction	No
3	Landscape - Limit landscape irrigation to specific times	Severe Reductions	Yes
3	Landscape - Limit landscape irrigation to specific days	Severe Reductions	Yes
3	Landscape - Restrict or prohibit runoff from landscape irrigation	Severe Reductions	Yes
3	Other - Prohibit use of potable water for washing hard surfaces	Severe Reductions	Yes
3	Other - Require automatic shut of hoses	Severe Reductions	Yes
3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Severe Reductions	Yes
4	Landscape - Limit landscape irrigation to specific times	Critical Reductions	Yes
4	Landscape - Limit landscape irrigation to specific days	Critical Reductions	Yes
4	Landscape - Restrict or prohibit runoff from landscape irrigation	Critical Reductions	Yes
4	Landscape - Other landscape restriction or prohibition	Critical Reductions	Yes
4	Water Features - Restrict water use for decorative water features, such as fountains	Critical Reductions	Yes
4	CII - Restaurants may only serve water upon request	Critical Reductions	Yes
NOTES:			

8.3 Penalties Charges, Other Enforcement of Prohibitions

The City utilizes several financial disincentives or penalties to discourage excessive water use, both during normal water conditions and during shortage events.

The primary financial “penalty” for excessive use is the inverted tier water rates, with increasing rates for higher levels of use. Inverted tier rates are in place during normal and water shortage conditions. Details of the conservation rate structure are available in Appendix C and key points are summarized in Section 9.2.3 Conservation Rate Structures of this UWMP. In addition, the City also utilizes conservation rates during shortage events that have an ascending rate structure to further discourage excessive use.

The City also has the authority to implement a penalty for excessive use by individual customers. Staff develops conservation usage targets based on average per-capita consumption or a percentage of historic consumption in response to specific shortage events. These usage targets are used to evaluate customers for potential excessive use penalties. If customers use more than the allotted usage targets for three consecutive billing periods, the City may increase the water rates to the highest conservation tier for a period of three months.

Customers are provided with the ability to appeal excessive use penalties if they feel their use allocation was inappropriate due to factors such as:

- A higher than average number of people in residential units;
- Medical needs that demand water-consuming devices or uses;
- Water consumed in products or activities that cannot be reduced.

Customers also have an opportunity to appeal excessive use penalties based on economic hardship or other factors. Excessive use penalties would be implemented at either the Stage 3 or Stage 4 levels.

In addition to additional charges for excessive use through inverted tier rates and penalties for excessive use, the City may also issue penalties for violating mandatory prohibitions.

8.4 Consumption Reduction Methods

Section 10632(a)(5) of the California Water Code allows urban water suppliers to use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its service area, and have the ability to achieve a reduction consistent with up to a 50% reduction in water supply.

The City will use a variety of methods to achieve up to a 50% reduction in water demands in the event of serious supply shortages. One of the most important and earliest strategies will be an expanded public education and outreach campaign during

the initial stages of any water shortage. During the 2014/2015 drought, Livermore Municipal Water customers reduced demand by about 32%, with reductions as high as 42% in many months. City customers achieved this level of reduction based on outreach efforts and warning notices alone, and staff was not forced to issue fines or penalties to achieve compliance.

While continued “hardening” of water demand through building practices, toilet and washer rebates, rebates for landscape irrigation efficiency and other giveaway of plumbing fixtures and devices programs may further reduce conservation slightly, there will continue to be a significant reduction in demand through public education during critical shortage events. These recommended and mandatory conservation practices are projected to reduce consumption by an additional 10% during the highest stage of shortage.

The City has conservation rates that correspond to each Stage identified in the Water Shortage Contingency Plan. The use of Conservation Rates recovers necessary revenue based on the reduced volume of water during water shortages and has the added benefit of 5% to 10% reduced consumption of water as Conservation Rates increase. Stage 2 Conservation Rates do not increase dramatically for the lowest tiers. However, implementation of Stage 3 Conservation Rates increases across all rate tiers to send an economic message to conserve water. Stage 4 Conservation Rates encourage water users to minimize water use by increasing the water rates for Tiers 2 and 3 an average of 3 times of Normal Supply rates. The anticipated effects of Stage 3 and Stage 4 Conservation Rates to reduce consumption assume that the majority of non-critical irrigation and other uses have already been minimized by this point.

Based on a combination of public education/outreach, recommended and mandatory conservation practices, and the implementation of several levels of conservation rates, the projected reduction in water use is expected to be about 45-50%. The final measure to ensure a 50% reduction in demand during extreme and prolonged shortages would be to prohibit all outdoor irrigation other than hand-irrigation using a watering can or container. This is expected to reduce demand by another 5-10% or more and should ensure that the City is able to reduce City municipal water service area demand by up to 50% in combination with the other methods summarized below in Table 8-3 (DWR Table 8-3). However, this type of extreme measure would only be considered in extreme shortage conditions due to the impacts/damage to landscape infrastructure throughout the service area as noted in 2014/2015.

Table 8-3 Stages of Water Shortage Contingency Plan Consumption Reduction Methods (DWR Table 8-3)

Table 8-3 Retail Only: Stages of Water Shortage Contingency Plan - Consumption Reduction Methods		
Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
1	Offer Water Use Surveys	
1	Provide Rebates on Plumbing Fixtures and Devices	
2	Expand Public Information Campaign	Voluntary cutback requested.
2	Increase Frequency of Meter Reading	
2	Decrease Line Flushing	
2	Implement or Modify Drought Rate Structure or Surcharge	Implement Stage 2 water rates.
2	Other	Odd/Even irrigation. Only twice per week.
2	Other	Cover pools/spas when not in use.
2	Other	Use buckets to wash vehicles, boats, buildings no more than monthly. Encourage wash services that recycle.
2	Other	Require low-flow rinse nozzles at restaurants.
2		
3	Expand Public Information Campaign	Expanded outreach / Mandatory cutbacks requested
3	Increase Frequency of Meter Reading	Weekly reading of purchased water meters.
3	Decrease Line Flushing	Eliminate sewer flushing except when there are overflows or backups.
3	Increase Water Waste Patrols	Hand watering on Saturday or Sunday only.
3	Implement or Modify Drought Rate Structure or Surcharge	Implement Stage 3 water rates.
3	Other	Vehicle Wahing at Commercial establishments only
3	Other	Prohibit potable water for construction uses.
3	Other	Prohibit potable water use for street washing or flushing.
4	Expand Public Information Campaign	Aggressive outreach via Livermore Communicator. More mandatory cutbacks requested.
4	Increase Frequency of Meter Reading	Daily reading of purchased water meters.
4	Increase Water Waste Patrols	No turf irrigation; hand water Sat. or Sunday.
4	Implement or Modify Drought Rate Structure or Surcharge	Implement Stage 4 water rates.
4	Other	Prohibit draining/filling private swimming pools
4	Other	Prohibit potable water in fountains or ponds.
4	Other	Excessive use penalties in place as needed.
NOTES:		

8.5 Mechanisms for Determining Reductions

The City has developed monitoring procedures to determine water savings made from implementing Stages 1-4 of the WSCP, as well as during critical water emergency or disaster events.

Normal Monitoring Procedure:
In normal water supply conditions, purchase and sales data is checked monthly by Water Section staff and compiled by the Water Supervisor. These totals are reported to the Water Resources Division Manager or the Public Works Director as requested. The totals are also logged into the annual report to the Department of Water Resources.

Stage 1 Water Shortages:
During a Stage 1 water shortage, information is expanded along with offers of water use surveys and available water saving devices.

Stage 2 Water Shortages:
During a Stage 2 water shortage, weekly turnout readings are reported to the Water Supervisor. The Supervisor compares the weekly purchase records to the weekly target to verify that the reduction goal is being met. Weekly reports are forwarded to the Water Resources Division Manager and the Public Works Director. Monthly summary reports are also sent to the Public Works Director. If reduction goals are not met, the Water Supervisor will propose additional activities or conservation measures and advise the Water Resources Division Manager. The Manager will notify the Public Works Director that additional corrective actions or use-reduction measures will be implemented.

Stage 3 and 4 Water Shortages:
During a Stage 3 or 4 water shortage, the procedure listed above will be followed, with the addition of a daily water purchase report being submitted to the Water Resources Division Manager and Public Works Director.

Emergency Shortages:
During an Emergency Shortage, a major focus will be on monitoring water storage tanks to ensure adequate fire protection and emergency storage. Water Resources Division staff will review tank levels via the Supervisory Control and Data Acquisition (SCADA) system on an hourly or continuous basis to ensure tank levels are maintained at safe levels for as long as possible. Also, purchase meter readings can be reported to the Water Supervisor, Water Resources Division Manager or Public Works Director hourly, if needed.

8.6 Revenue and Expenditures Impacts

Section 10632 (a)(7) of the California Water Code requires an analysis of the impacts of each of the actions and conditions taken for conservation and water restriction on the revenue expenditures of the water supplier and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

The stages of action to be undertaken by the urban water supplier in response to water supply shortage have impacts on the City's water revenues and expenses. While expenses will be reduced through lower wholesale water purchases from Zone 7, the decline in expenses does not fully offset the loss in revenue from reduced sales. This is due, in part, to the fact that monthly water rates and charges do not fully recover all of the fixed costs on meter service charges, and instead allocate some fixed charges to the water rate component of the bill. This practice slightly inflates the consumption-based portion of the customer bill to encourage conservation during normal conditions. However, the downside of this practice is that net revenue can decline during water shortages or other periods of reduced water sales.

The impact to net water system revenues will vary with each stage of action and the corresponding level of water shortage and expected conservation. The 2011 Water Shortage Contingency Plan included in Appendix C provides a sample review of the impacts to water revenues and expenses based on the expected reductions in water sales.

To offset the impacts of water shortages, the City has developed conservation rates that may be enacted in response to water shortages. Conservation rates are updated and adopted by the Livermore City Council each time normal water rates and service charges are adjusted. By having previously-adopted conservation rates, the City can avoid the delays associated with Proposition 218 notification and ballot procedures prior to implementing conservation rates in response to a water shortage. These pre-approved rates were essential in maintaining revenues during the 2014/2015 drought, and placed the City in an excellent financial position compared to retailers without pre-approved rates in place.

The City has conservation rates that correspond to each Stage identified in the Water Shortage Contingency Plan, and are calculated to recover the necessary revenue based on the reduced volume of water expected to be sold and purchased in each Stage. For example, Stage 2 conservation rates are designed to recover the revenue lost from a 20% reduction in water sales while taking into account the reduced cost of purchasing 20% less water. The City does not use drought surcharges.

The City achieves and maintains a minimum unrestricted net assets balance of 12.5% of its operating expenses plus debt service transfers as the financial reserves. This amount represents 45 days' worth of working capital derived from the sale of water by the City's Livermore Municipal Water system and may be devoted to any lawful purpose at the sole discretion of the City Council.

Water customers also pay Zone 7 water rates as a pass-through on monthly bills. Zone 7 maintains a drought contingency fund, which is a rate stabilization fund that can be utilized during declared drought events to minimize impacts on water rates as a result of drought conditions. If Zone 7 implements an additional drought surcharge the City would also pass this cost on to ratepayers.

8.7 Water Shortage Contingency Ordinance

The updated 2011 Water Shortage Contingency Plan for City of Livermore Water will be adopted by resolution of the Livermore City Council with this UWMP rather than by specific ordinance. Legal authority to implement conservation measures, penalties or other administrative requirements of the Water Shortage Contingency or Water Use Reduction Plans have been contained in an expanded water conservation chapter of the Livermore Municipal Code addressing water system operations. In 2014, the Livermore City Council adopted an ordinance extending water conservation measures in the City's Water Shortage Contingency Plan into the California Water Service Company service area for consistent City-wide implementation.

Appendix C includes a resolution adopting the 2011 Water Shortage Contingency Plan. Additional proposed modifications to the Livermore Municipal Code addressing water conservation will be addressed in 2016.

8.8 Catastrophic Supply Interruptions

This section describes actions taken by City to prepare for and to be implemented during a catastrophic interruption of water supplies. Potential catastrophic supply interruptions include but are not limited to a regional power outage, earthquake, or other disaster causing a water supply outage such as a failure of the San Joaquin Delta levee system.

The City has developed a comprehensive Emergency Response Plan (ERP) that addresses a variety of potential emergency situations directly affecting the City's Livermore Municipal Water system. The goals of the ERP are to:

- Rapidly restore water service after an emergency;
- Ensure adequate water supply for fire suppression;
- Minimize water system damage;
- Minimize impacts and loss to customers;
- Minimize negative impacts on public health and employee safety;
- Provide emergency public information concerning customer service.

The ERP establishes "Action Plans" for different emergency conditions which outline the steps City staff will take to respond to, evaluate, and mitigate the emergency. Action Plans were developed for a variety of water supply interruptions including: power outages; earthquakes; flooding; and terrorist events. In addition to Action Plans, the City's Emergency Response Plan includes an inventory of emergency supplies, mutual aid contacts, and lists of potential vendors of emergency supplies.

The City's Livermore Municipal Water Emergency Response Plan was developed to comply with Section 1433(b) of the Safe Drinking Water Act (SDWA) as amended by the Public Health Security and Bioterrorism Preparedness and Response Act of 2002.

Due to the sensitive nature of the information contained in the Emergency Response Plan, the plan includes an Access Control section that limits distribution of the plan to "individuals directly involved in City of Livermore Municipal Water's emergency planning and response activities". Therefore, excerpts from the City's Livermore Municipal Water Emergency Response Plan are not included with this UWMP.

Below is a brief summary of some of the steps staff will implement in response to specific water supply interruptions:

Regional Power Outage – Four of the City's municipal water system's five pump stations have emergency generators in the event of regional or local power outage situations. The water telemetry center at the Livermore Water Reclamation Plant also has plans to implement emergency backup power during extended outages. Backup pump station power will allow City staff to maintain water service as long as Zone 7 has available water supplies.

In addition to maintaining pump station power, the Water Resources Division staff has access to the City of Livermore "Communicator" system which will allow staff to contact all residents via a reverse-911 system to inform them to immediately minimize water use. This will maximize the length of time that remaining supplies in the storage reservoirs will last.

Water Supply Outage – After notification by Zone 7 of a regional water supply outage, City staff will immediately put one of the emergency plans into action. If the South Bay Aqueduct (part of State Water Project) were damaged, it is possible that a limited amount of water would be available in the Patterson Pass Treatment Plant forebay and additional water could be taken from Lake Del Valle. If a Zone 7 pipeline were damaged, water could be networked around the Tri-Valley and around the leak through retailer interties. If a City municipal water system pipeline were damaged or leaking, the leak or damaged section could be isolated and an alternate supply path created through the supply network.

During short-term supply outages, City staff would implement similar procedures described above for power outages. For prolonged, regional outages, City staff would consider the need and feasibility of implementing progressively more aggressive strategies to extend local reservoir supplies. These might include restricting all uses except emergency fire-fighting, with staff distributing drinking water and portable toilets throughout the service area to meet sanitation and drinking needs. These types of measures would only be considered in the most extreme and prolonged emergency conditions.

Earthquake – The City of Livermore Municipal Water Emergency Response Plan includes specific Action Plans addressing earthquake-related impacts to the water system in a manner similar to power outages or service interruptions.

8.9 Minimum 3-Year Water Supply

The 2015 Zone 7 Urban Water Management Plan includes projections for the minimum water supply available during the next three years based on the driest three-year historic sequence for Zone 7's water supplies is presented in Table 8-4a (DWR Table 4a) from the 2015 Zone 7 UWMP is included below. These amounts are based on multiple-dry year scenarios evaluated in Section 7.3 of the 2015 Zone 7 UWMP but revised to account for currently available supplies and storage for 2016.

Table 8-4a Zone7 Three Year Estimated Minimum Water Supply AFA (DWR Table 4a)

Table 8-4a Zone7: Three Year Estimated Minimum Water Supply (Acre-Feet Annually)			
	2016	2017	2018
Available Water Supply (minimum)	60,000	48,000	51,000

Table 8-4b (DWR Table 4a) projects the minimum water supply available to the City's Livermore Municipal Water system during the next three years based on the driest three-year historic sequence of Zone 7's water supplies. These amounts are based on multiple-dry year scenarios evaluated in Section 7.3 of this UWMP but revised to account for currently available supplies and storage for 2016. The quantities in the table below do not include water available from local and non-local storage facilities. As noted previously, the minimum supply years vary between imported surface water and local runoff due to hydrologic conditions, water supply infrastructure, and other conditions.

Table 8-4b City of Livermore Water Minimum Supply Next Three Years MG (DWR Table 4a)

Table 8-4b City of Livermore Water: Minimum Supply Next Three Years			
	2016	2017	2018
Available Water Supply	1,650	1,665	1,682

Section 9: Demand Management Measures

The purpose of this chapter is to provide a comprehensive description of the water conservation programs the City of Livermore has implemented, is currently implementing, and plans to implement in the municipal water service area in order to promote conservation, reduce the demand on the water supply, and meet water use reduction targets (pursuant to Section 10608.20) set forth by SBX7-7.

The City is committed to reducing the demand for potable water through water conservation. The 2015 Interim Water Use Target is 216 GPCD and the Actual 2015 Water Use was 141 GPCD as detailed in *Chapter 5: Baseline and Targets* of this UWMP. The City's municipal water customers have responded positively to these demand management programs and 2014/2015 drought messaging, resulting in savings far exceeding the water use reductions goals.

In evaluating Demand Management Measures (DMM) implementation, staff considered the intent of the DMM as well as the size and complexity of the City's municipal water system. Staff has made a concerted effort to implement all measures in the most cost effective and practical way for a utility of the Livermore Municipal Water system's size. Also, the high reliability of the Zone 7 water supply has historically influenced the emphasis the staff has placed on implementing the Demand Management Measures prior to the 2009 Water Conservation Act.

In 2014, the California Water Code was significantly modified by Assembly Bill 2067 to simplify and update the demand management measure reporting requirements from 14 specific measures to seven more general requirements. This section discusses in detail the implementation as well as any planned enhancements for each of the DMMs to promote conservation and reduce the demand on the water supply. In general, planned enhancements will be steps necessary to formalize or better document and evaluate some of the existing efforts that staff has implemented on an informal basis. Funding for conservation programs are provided through water rates and capital improvement projects.

In January 2014, the Governor declared a State-wide drought emergency. The City's Municipal water system was required to achieve a conservation standard of 20% compared to a baseline usage in 2013. Through DMMs and significant public outreach, City municipal water customers achieved a 32% reduction of water use in 2015 as compared to the 2013 base-line water use.

The City will continue to monitor the overall effectiveness of its water conservation activities and may implement additional demand reduction programs, as appropriate based on cost-effectiveness and certainty of reduction, should it determine that further reductions are required to meet and maintain its 2020 urban water use target. Additional

water conservation activities that may be implemented include annual initiatives to promote a specific conservation practice or practices. For example, a “Re-think your landscaping” initiative may be used in 2016 to promote outdoor watering reductions.

In addition to programs planned and implemented by staff, the City of Livermore and the other three Tri-Valley water retailers, work together with water wholesaler Zone 7 Water Agency to plan and implement regional programs that promote water conservation and water efficiency. The four Tri-Valley water retailers provide funding and participate in regional programs that are administered or coordinated by wholesaler Zone 7. The City of Livermore is not a member California Urban Water Conservation Council.

The City of Livermore Municipal Water is a retail supplier, and does not provide supplies as a wholesaler. Each of the DMMs is discussed individually below; including a summary of the implementation over the past five years and planned implementation to achieve water use targets.

9.1 Water Waste Prevention Ordinance(s)

There are two water retailers serving the City of Livermore, City of Livermore’s Livermore Municipal Water and the California Water Service Company. Both water retailers purchase a majority of their water from the Zone 7 Water Agency, which receives a majority of its water supply from the State Water Project, operated by the State Department of Water Resources. A detailed description of the City of Livermore’s water waste prohibition plans and ordinances are provided below. Copies of the Mandatory Drought Conservation Measures Ordinance, Water Shortage Contingency Plan, Water Conservation Ordinance, Water Efficient Landscape Ordinance, and Civic Bay-Friendly Landscaping Ordinance are included in Appendix C.

9.1.1 Water Shortage Contingency Plan

Comprehensive Description
The City first adopted a Water Shortage Contingency Plan in 1991 and updated the plan in 1996, 2005, and 2011. The Water Shortage Contingency Plan underwent a more comprehensive revision as part of the 2010 Urban Water Management Plan update to incorporate more consistent regional requirements. In March 2009, the Committee of Valley Water Retailers, comprised of council members, board of directors, and management-level representatives from each of the four Tri-Valley water retailers, approved a model Tri-Valley Water Retailers Water Shortage Contingency Plan to allow for consistent implementation of requirements within the Tri-Valley during water shortage events. The revised Water Shortage Contingency Plan was adopted in July 2011. The Tri-Valley water retailers met again in February 2015 to review and realign minor inconsistencies that had developed over the previous years to improve coordinated outreach efforts within the Tri-Valley during water shortage events. The Water Shortage Contingency Plan is activated by Livermore City Council resolution following Plan guidelines, and establishes the stage of action necessary to address the supply shortage as well as estimate the duration of the water shortage.

The City has developed its latest Water Shortage Contingency Plan for the City's municipal water system in accordance to California Water Code Section 10632(a). The Plan describes the following required elements for all water users in the service area:

- Water conservation stages of action in response to shortages up to 50%;
- Estimates of the minimum 3-year water supply available;
- Actions taken to prepare for and implement during catastrophic supply interruptions;
- Mandatory prohibitions and consumption reduction methods;
- Penalties and charges for excessive use;
- Analysis of potential revenue impacts from Shortage Plan implementation;
- Mechanisms for determining water use reductions.

Implementation Over the Past Five Years
Council adopted a Water Conservation Plan in 1991 which specified voluntary and mandatory conservation measures. The requirements in the 1991 Conservation Plan have been updated and incorporated into the updated Water Shortage Contingency Plan and the Water Conservation ordinance.

The Livermore City Council adopted the Water Shortage Contingency Plan in 2011. In September 2011, Chapter 13.26 Water Conservation Ordinance was adopted into the Livermore Municipal Code to establish voluntary and mandatory water conservation practices, best management practices, and use of penalties to encourage wise water use, minimize the effect of shortages on City's customers, and to address water supply shortages and required demand reductions. (ORD, 1946, 2011). In 2014, Chapter 13.27 Mandatory Drought Conservation was adopted into the Livermore Municipal Code to prohibit wasteful water practices of all water users in the City and to maximize the beneficial use of water (ORD1997, 2014 and ORD 1995, 2014). A periodic review and update of the Water Shortage Contingency Plan will be completed at least every five years as part of the Urban Water Management Plan update.

The updated Water Shortage Contingency Plan supersedes the previous Water Shortage Contingency Plan and Water Conservation Plan.

Planned Implementation to Achieve Water Use Targets
The Ordinance has been implemented and is currently in effect. A post-incident review will be conducted following water-shortage events resulting in activation of the Water Shortage Contingency Plan to evaluate whether the plan was able to reduce water demands to the required levels. The Water Shortage Contingency Plan will be reviewed, evaluated, and updated periodically as necessary to ensure effectiveness as well as conformance with California Water Code requirements.

The measures identified in the plan are designed to be capable of reducing water demands by up to 50% during shortage events. No estimates of the conservation savings from having a Water Shortage Contingency Plan are available. However, in

response to Governor Jerry Brown's declaration of a drought State of Emergency and 2014 State Water Project allocation reductions, elements of the Water Shortage Contingency Plan were activated, resulting in significant reductions in water use by City of Livermore Water customers, exceeding State required reductions in water demands by almost double in some months.

9.1.2 Water Conservation Ordinance

Comprehensive Description

The City first adopted a Water Conservation Ordinance in September 2011 adding new Chapter 13.26, Water Conservation to the Livermore Municipal Code to enact conservation measure to address the 20% reduction in per capita water use required by the Water Conservation Bill of 2009. The Water Conservation Ordinance established voluntary and mandatory water conservation practices, best management practices, and use of penalties to encourage wise water use, minimize the effect of shortages on City's customers, and to address water supply shortages and required demand reductions. The Water Conservation Ordinance specifies that water waste prohibition is in effect at all times and provides the legal authority to implement water conservation measures and best management practices included in the Water Shortage Contingency Plan. A copy of the City's Water Conservation Ordinance is included in Appendix C.

Implementation Over the Past Five Years

The Water Conservation Ordinance was first adopted in September 2011. In June 2014 the Ordinance amended the lawn watering and landscape irrigation restrictions for a Stage 2 Water Shortage from odd/even numbered addresses assigned watering days per month to watering no more than twice per week on alternating days of the week for convenient reprogramming of automatic irrigation controllers. The updated Water Conservation Ordinance is intended to supersede previous Water Conservation Ordinance.

Planned Implementation to Achieve Water Use Targets

The Ordinance has been implemented and is currently in effect. A post-incident review will be conducted following water-shortage events resulting in adoption of the revised Water Conservation Ordinance to evaluate whether the Ordinance was able to reduce water demands to the required levels. The Water Conservation Ordinance will be reviewed, evaluated, and updated periodically as necessary to ensure effectiveness as well as conformance with California Water Code requirements. No estimates of the conservation savings from having a revised Water Conservation Ordinance are available. However, in response to Governor Jerry Brown's declaration of a drought State of Emergency and 2014 State Water Project allocation reductions, elements of the Water Shortage Contingency Plan were activated, resulting in significant reductions in water use by City of Livermore Water customers, exceeding State required reductions in water demand. The Ordinance will be modified in 2016 to increase the allowed watering days from twice to three times per week for consistence with other Tri-Valley retailers.

9.1.3 Mandatory Drought Conservation Measures Ordinance Comprehensive Description

The City first adopted Mandatory Drought Conservation Measures Urgency Ordinance May 2014 adding new Chapter 13.27, Mandatory Drought Conservation Measures to the Livermore Municipal Code to prohibit wasteful water practices and maximize the beneficial use of water for citizens within the City. The Ordinance acknowledged that there are two water retailers in Livermore, the City's Livermore Municipal Water and the California Water Service Company, both retailers receive a majority of their water from wholesaler Zone 7 Water Agency, and 80% of Zone 7's water comes from the State Water Project, and there was a period of unprecedented reduction in normal water deliveries to Zone 7 from the State Water Project. City Council determined and found that wasteful water practices were a threat to the public health, safety, and welfare, and based upon the reduction of available water in Livermore due to drought conditions, it was necessary to take immediate action to adopt, implement, and enforce mandatory drought conservation measures for all water users in the City of Livermore regardless of retailer. In June 2014, the prior Urgency Ordinance was adopted and added the Mandatory Drought Conservation Measures Ordinance to the Livermore Municipal Code by way of the usual, non-urgency procedures set forth in Government Code Sections 36934 and 36937(b). A copy of the City's Mandatory Drought Conservation Measures Ordinance is included in Appendix C.

Implementation Over the Past Five Years

The Mandatory Drought Conservation Measures Ordinance was adopted in 2014 and is already in effect. In 2015, the City of Livermore and the other Tri-Valley water retailers met to review and discuss aligning minor drought conservation inconsistencies amongst the Retailers to improve coordinated outreach efforts in the Tri-Valley area. Each agency agreed to take changes to respective boards and councils for adoption in 2016. City of Livermore Water plans to bring updates to Council in May 2016.

Planned Implementation to Achieve Water Use Targets

The Ordinance has been implemented and is currently in effect. A post-incident review will be conducted following water-shortage events resulting in activation of the Water Shortage Contingency Plan to evaluate whether the plan was able to reduce water demands to the required levels. The Mandatory Drought Conservation Measures Ordinance will be reviewed, evaluated, and updated periodically as necessary to ensure effectiveness as well as conformance with California Water Code requirements. The measures identified in the plan are designed to prohibit wasteful water practices and maximize the beneficial use of water for citizens within the City during shortage events. No estimates of the conservation savings from having a Mandatory Drought Conservation Measures Ordinance are available. However, in response to Governor Jerry Brown's declaration of a drought State of Emergency and 2014 State Water Project allocation reductions, elements of the Water Shortage Contingency Plan were activated, resulting in significant reductions in water use by City of Livermore Water customers, exceeding State required reductions in water demand.

9.1.4 Water Efficient Landscape Ordinance (WELO) / Civic Bay-Friendly Landscaping Ordinance

Comprehensive Description
The City adopted a Water Efficient Landscape Ordinance (WELO) in 1992 adding new Chapter 13.25 Water Efficient Landscape to the Livermore Municipal Code establishing standards and specifications for all landscaping and landscape irrigation to encourage conservation and limit water use. The WELO was updated in December 2010 to exceed the standards in the state's Model WELO. In 2012, the WELO was amended to include additional water conservation measures. In 2015, Executive Order B-29-15 directed the California Department of Water Resources to update the MWELO and required California cities and counties to adopt an ordinance as effective as the State MWELO in conserving water. The City of Livermore has not yet adopted a revised WELO, and the revised state MWELO is the default landscape ordinance. A copy of the State WELO is included in Appendix C.

In 2009 the City adopted a Civic Bay-Friendly Landscaping Ordinance adding new Chapter 15.80 Civic Bay-Friendly Landscaping to the Livermore Municipal Code requiring civic projects to incorporate guidelines to achieve the benefits of Bay-friendly landscaping, including the promotion of water and resource efficiency. A copy of the Civic Bay-Friendly Landscaping Ordinance is included in Appendix C.

Implementation Over Past Five Years
The Civic Bay-Friendly Landscaping Ordinance has already been adopted and is already in effect.

The WELO was implemented in 1992 and has been updated in 2010 and 2012. The City of Livermore's 2012 WELO is not far off current State standards. The City's WELO is currently being updated. Unit it is adopted, the State MWELO is the default WELO.

Planned Implementation to Achieve Water Use Targets
The State MWELO is the default landscape ordinance and is currently in effect. Methods of evaluation, conservation savings estimates and demand reduction estimates are included in the State WELO and Civic Bay-Friendly Landscaping Ordinance; copies are included in Appendix C.

9.2 Metering

Comprehensive Description
All City municipal water connections are fully metered. Water service in the City's municipal water service area is not allowed without a water meter. This requirement is further strengthened by water wholesaler rules that also do not allow service connections without a meter. All customer sectors are billed by volume of use at tiered rates. Original tiers had a declining cost structure with higher use. In 1991, the City implemented inverted tiered rates for all accounts as a means of encouraging water use efficiency. The inverted tiered rates can be found in Resolution 2009-087 in Appendix C.

Metering and commodity rates are discussed below.

Meter replacement and/or recalibration are evaluated regularly via billing software. Unusual consumption is flagged and checked for accuracy. Meters that are stuck or do not meet accuracy specifications are immediately replaced. Billing accounts with meter failures are assessed an estimated consumption rate that reflects their average usage during the period. Meters that are 3-inches and larger are proactively tested annually and recalibrated, repaired or replaced as needed. Additionally, meters are replaced within the system based on their service length with the oldest meters receiving replacement priority as funding allows.

Implementation Over the Past Five Years
All City landscapes and Landscape Maintenance Districts are on dedicated water meters. In August 2015, the City completed the first phase replacing 50 stand-alone manual irrigation controllers with wireless central weather based irrigation controllers for irrigation systems to allow staff to remotely monitor, adjust, and evaluate water use on a daily basis. The EvapoTranspiration (ETo) controllers are estimated to save $15,000 annually in staff and time and approximately $9,000 annually in water savings. The second phase for the remaining 40 Landscape Maintenance Districts and City landscapes is expected to be completed by September 2017. These projects add master valves which shut the system down when a leak is detected.

The City's Livermore Municipal Water system is currently upgrading the existing water distribution system from legacy Touch Read water metering to an Automated Metering System. The purpose of the project is to obtain water savings by providing customers web access to their real time water use, working with them to identify conservation opportunities, such as ET Controllers, and better evaluating the conservation benefit from these measures.

This project is expected to be completed in December 2016. This project uses Advanced Metering Infrastructure (AMI) to collect real-time demand data from customer meters, which is then made available to customers via a secure website. This project uses fixed network AMI technology where the meter reading transmissions will be picked up by collector towers located within the vicinity of the meters, which will then transmit the meter reads to a centrally located computer server. The water usage data collected from the meter reads can then be accessed in graphical format via a City supported Intranet connection where it will be shared with customers for their use in identifying water conservation opportunities. Water conservation staff will then work with these customers to identify water conservation strategies, such as fixing leaks, alternative irrigation techniques, and replacing older appliances with new higher efficiency models.

Planned Implementation to Achieve Water Use Targets
The use of metering and commodity rates has already been implemented. All water sales in the City's municipal water service area are metered. Water customers are charged a flat monthly meter service charge, and charged for water use based on an

inverted tiered rate schedule. Meters are read monthly and bills are issued to customers on a monthly basis. Since the City has always charged its customers for water based on metered usage, and has had inverted tiered rates in place since 1991, it would be difficult to provide accurate savings estimates. It is widely recognized that billing customers based on metered water use and inverted tiered rates is an effective means of encouraging water use efficiency. However, AMI may assist in evaluating reductions in water use by water customers following water-shortage events resulting in activation of the Water Shortage Contingency Plan to evaluate whether the Plan was able to reduce water demands to the required levels. Funding for AMI is available through water rates. No additional activities are necessary or planned at this time.

9.3 Conservation Pricing

Comprehensive Description

The City has had tiered water rates since its inception in 1963 setting the metric to one hundred cubic foot of water per unit in the monthly billing. However, between 1963 and1989 the tiered rates were not set to encourage conservation, but instead offered lower rates for higher consumption. During the 1989-92 droughts, the City instituted inverted tiered rates (a declining block water rate structure) where low water use is priced in a lower priced tier, and higher water use is in progressively higher priced tiers. This conservation pricing structure is always in place and is not dependent upon a water shortage for implementation, although a drought / conservation rate structure (Conservation Rate) is included in the rate structure to support drought and supply shortage reductions for implementation as needed. All connections are metered to meet the necessary condition of conservation pricing. Potable water rates provide at least 99% of the revenue for the water system and are laid out in rate tiers which account for variable and fixed costs and supplemented by financial projections establishing a nexus between volume-related system costs and volumetric commodity rates. Water customers are charged a flat monthly meter service charge, and charged for water use based on an inverted tiered rate schedule. Meters are read monthly and bills are issued to customers on a monthly basis. Service connection charges are designed to recover the separable costs of adding new customers to the water distribution system, monthly meter service charges recover costs unrelated to the volume of water delivered or new service connections to ensure system revenue sufficiency. Additional special rates and charges for temporary service, fire protection service, and other irregular services are also included in the rates schedule. Monthly billings display water use by unit usage with gallon conversion data per 100 cubic feet and provide information on water use trends to customer via water bill including customers' water use compared to a standard or benchmark. The conservation pricing provides economic incentives to customers to use water efficiently. The City is not a wholesale supplier. The inverted tiered rates and Conservation Rate structure can be found in Resolution 2009-087 in Appendix C.

The residential water rates are laid out in three rate tiers. The first tier is labeled as the lifeline rate. This tier is the least expensive and is only for a residential customer with consumption levels between 0 Hundred Cubic Feet (HCF) and 5 HCF of water. The second tier is for between 5 HCF and 35 HCF of water use. The third and most

expensive tier includes all water use over 35 HCF.

The rates for commercial and industrial customers are laid out in two tiers. The first tier has a range of 0 HCF to 50 HCF and is equivalent in price to the second residential tier rate. The second commercial/industrial tier applies to all consumption over 50 HCF. This tier is the same rate as the third residential tier. These rates apply to all commercial /industrial customers in the City of Livermore Water service area.

There is a single rate for recycled water that is set by City Council resolution at 80% of the residential second tier rate. This recycled water rate is generally adopted with the normal rate approval process. Sewer rates for residential users (Single-Family, Condominium, Multi-Family) are based on a flat rate and there is no conservation incentive. However, commercial and industrial sewer charges are based on metered water usage. While there are minimum charges for commercial/industrial customers, increased water usage can result in elevated sewer charges and therefore serve as an incentive to reduce water usage

The City also provides wastewater services within the city limits and for the Ruby Hill development in the City of Pleasanton.

Implementation over the past five years
The City implemented Conservation Pricing in 1991, instituting inverted tiered rates (a declining block water rate structure) with higher rates for larger volumes of water used to encourage more efficient water use. The rates are set to achieve and maintain staffing, funding, and priority activities necessary to achieve the level of water service standards and to optimize savings from implementing best management practices.

There have been no changes to the adopted rates since 2013. In February 2014, Livermore City Council implemented Stage 1, 20% voluntary Conservation Rates in response to Governor Jerry Brown's declaration of a drought State of Emergency, and the 2014 State Water Project allocation being reduced to zero. On April 15, 2014, the City Manager implemented mandatory Stage 2 conservation measures at the 30% level. On April 29, 2014, Livermore City Council implemented Stage 3 Water Conservation Rates to send an economic signal for customers to conserve water. Conservation rates were initially enacted at the Stage 3, 35% level to encourage conservation to meet the 30% conservation target. Livermore City Council later reduced this to Stage 1 Water Conservation Rates in December 1, 2014 due to significant reductions in water use by the City's municipal water customers, and projections for needing slightly lower levels of expected conservation.

Planned Implementation to Achieve Water Use Targets
In 2015, the City's municipal water customers achieved a 32% reduction of water use compared to the 2013 baseline use during the drought. However, no methods of evaluating or quantifying the effect of tiered rates on water conservation have been identified as a response separate from public outreach from the State, City of Livermore, other Tri-Valley organizations, and various other news outlets. The City will

continue to review water usage at the higher tiers and recommend adjusting water rates as needed to discourage water waste and encourage water conservation. The City will continue to use inverted tiered rates and recommend Conservation Rates as necessary to reduce water usage 20% by 2020 and meet significant reductions in water use targets as necessary. No additional activities are planned at this time.

Table 9-1 Tiered Conservation Pricing

Residential	**Rate Structure**	**Year Current Rate Effective**
Water	Three tier conservation pricing.	2013
Commercial/Industrial		
Water	Two tier conservation pricing.	2013
Public Agency		
Water	One tier pricing for all water	2013
Irrigation	Pricing same as Public Agency and Commercial Rates	2013

9.4 Public Education and Outreach

9.4.1. Residential Ultra-Low Flush Toilet (ULFT) and High-Efficiency Toilet (HET) Rebate Program

Comprehensive Description

The City of Livermore Water and other Tri-Valley water retailers have participated in the Ultra-Low Flush Toilet Replacement Program administered by Zone 7 since 1994. In July 2008 the program was upgraded to a High-Efficiency Toilet (HET) replacement program. The HET program reflects technical advancements and the availability of toilets that use 1.28 gallons per flush (gpf) or less instead of the 1.6 gpf ultra-low flush toilets. The program was expanded to include commercial and multi-family residential customers in 2010. The toilet replacement programs are administered by Zone 7 staff. There is no toilet-retrofit-upon-resale ordinance in the Tri-Valley, including the City's Livermore Municipal Water service area.

The HET program offers a rebate of up to $100 for each faulty toilet or toilet of 3.5 gpf or more that is replaced with a high efficiency 1.28 gpf toilet. The program initially started with residential rebates only, but progressed to include commercial and industrial customers.

A rebate application packet is provided to the City's municipal water customer. The customer submits the completed application to Zone 7. After the rebate application is processed and the old toilet is properly disposed of or recycled, the applicant receives either a rebate check or a credit on their water bill. Zone 7 reimburses the City monthly

for all toilets processed during the month. As part of this program, the City partners with a local Boy Scout troop to collect and recycle toilets from the Tri-Valley that are dropped off at the Livermore Water Reclamation Plant site.

Implementation Over the Past Five Years
The City of Livermore and other Tri-Valley water retailers have participated in the Ultra-Low Flush Toilet Replacement Program administered by Zone 7 since 1994. In July 2008 the program was upgraded to a High-Efficiency Toilet (HET) replacement program. In 2010, the program was expanded to include commercial and multi-family residential customers. In 2013, the maximum rebate was reduced from $150 to $100 per unit installed. Zone 7, with funding and support from the Tri-Valley water retailers, regularly reviews the toilet replacement programs to ensure the program aligns with developing standards and other rebate offers.

Planned Implementation to Achieve Water Use Targets
In 2015, the DWR announced its own program for toilet rebates. Conservation Coordinators participating in the Tri-Valley program and Zone 7 will be viewing the number of rebates issued as an indicator of market saturation and considering revising the program to require 0.8 gpf high-efficiency toilets to meet the highest water conservation standards to achieve water use targets. This revision may also limit double-dipping of DWR and local rebates. Some program resources may be reallocated to other Zone 7 administered Demand Management Measures accordingly. City staff will continue to participate in this program. No additional activities are planned at this time.

Estimated water savings are listed in Table 9-4-1 below.

Table 9-4-1 Toilet Rebate Program Summary

	2011	2012	2013	2014	2015
No. of Applicants	54	48	40	67	84
No. of HET Rebates	83	75	52	99	121
Total $ Amount Rebate	$8865	$7356	$5098	$9983	$12049
Estimated Water Savings[1] AF/Year	1.447	1.3	0.907	1.8	2.1

Notes:
[1] The water savings is based on 2 persons and two HETs per household. 1 acre foot = 325,851 gallons.

9.4.2 Direct Install Toilet and Urinal Replacement Program

Comprehensive Description
City of Livermore and the other Tri-Valley water retailer's supported and funded the two-

year Direct Install Toilet and Urinal Replacement Program for low income residential, commercial and industrial customers who cannot afford to replace or install a new fixture, targeting properties 30 years or older. The program was administered by water wholesaler Zone 7. The intent of the program was to encourage owners to install certain types of water-efficient plumbing fixtures in order to reduce water consumption and wastewater flows. Customers participating in the program were provided free installation of high efficiency units to replace water-wasting models. The non-residential component replaced inefficient urinals using 1.5 gallons per flush or higher with high-efficiency urinal flush valves with 0.125 or 0.5 gpf. The residential program included the replacement of older high volume toilets using 3.5 gallon per flush (gpf) or more with High Efficiency Toilets that use 1.28 gpf or less.

The primary goal of the program was to reduce potable water demand by approximately 41 AF annually. The average cost per unit is $361, of which $225 is reimbursed from a Proposition 84 grant, reducing costs to $136 per unit. Zone 7 Water Agency, with funding from the Tri-Valley water retailers, reimbursed pre-qualified plumbing companies a fixed amount for the cost of purchasing and installing the qualified fixtures. Zone 7 staff review and confirm the applicant meets program eligibility.

Southwest Environmental was contracted to perform licensed installations and procured replacement units carrying the WaterSense label for the initial phase of the program. All replaced units were disposed of with the Boy Scouts toilet recycling program, where toilets end up as alternative road base. The first three months of the program resulted in 376 toilet installations for single-family low income and senior residences expending the full contracted budget. A second agreement in the amount of $350,000 was authorized to expand the program.

Implementation Over The Past Five Years

The program planning began in 2011. City staff worked with Zone 7 and other Tri-Valley water retailers on the implementation of this program, and encouraged customer participation with various marketing strategies that included, but were not limited to, placing links to information on the City's website; placing banners in strategic locations; including a message on monthly billings; advertising; and supplying postcards to local hardware stores or at local workshops, and to residents in the City's municipal water service area as deemed appropriate. The City of Livermore, other Tri-Valley water retailers, and Zone 7 developed and provided a pre-qualifying application to their respective water customers by mail, and also provided a downloadable application from the agencies' websites. City staff reviewed and approved completed, qualifying applications for the City's municipal water service area.

Zone 7 was responsible for the overall implementation of this program in cooperation with the Tri-Valley Water Retailers, which includes the City of Livermore. In April 2012, as a result of a Request for Proposals, Zone 7 contracted with Southwest Environmental to perform licensed low-flow toilet installations and to procure replacement units carrying the WaterSense label for March 2012 to December 2013.

The first three months of the program resulted in 376 toilet installations for Tri-Valley single-family low income and senior residences expending the full contracted budget. In September 2012, the Zone 7 Board authorized additional funds in the amount of $350,000 to expand the program. The program was partially funded by a Proposition 84 grant in the amount of $218,025; the Tri-Valley Water Retailers funded $131,975.

A customer satisfaction survey was conducted to initial program participants in July 2012 to rate the overall experience with the program on a scale of 1 to 5 where 1 was poor and 5 was excellent. Over 97% of responses gave the program either a good (4) or excellent (5) rating for their overall experience. Based on survey feedback and lessons learned, the brochure was updated.

In October 2012, City staff sent 1,800 low income mailers for phase two of the program to potential participants of which 132 participated in the program. The end use of water for toilet flushing is approximately 25% of indoor household usage. The program goal was to replace approximately 1,500 fixtures (urinals and toilets) in the Tri-Valley over two years. Based on the replacement of the approximately 1,500 fixtures, Zone 7 has estimated a total water savings of 119 million gallons over the lifespan of the fixtures.

Planned Implementation to Achieve Water Use Targets

The goal was to replace approximately 1,500 fixtures (urinals and toilets) in the Tri-Valley over two years. Based on the replacement of the approximately 1,500 fixtures, Zone 7 has estimated a total water savings of 119 million gallons over the lifespan of the fixtures. Estimated water savings and program results for City's municipal water service area are listed in Table 9-4-2 below. This was a planned two-year program that has been completed, and funding expended. No additional activities are planned at this time.

Table 9-4-2 Direct Install Toilet and Urinal Replacement Program Summary

City of Livermore Water	2012	2013
Direct Install Toilet Count	173	11
Conservation Savings Estimates over the lifetime of the fixtures	1.37 million gallons/year	.09 million gallons/year

9.4.3 High Efficiency Washing Machine Rebate Program

Comprehensive Description

The City of Livermore and the other Tri-Valley water retailer's support and fund the High-Efficiency Washing Machine Rebate Program that is administered by water wholesaler Zone 7. This program is available to single-family residences. In 2008, Zone 7 partnered with other San Francisco Bay Area water agencies and Pacific Gas and Electric (PG&E) on a regional strategy to increase water and energy efficiency. Rebate amounts have ranged from $50 to $200 for the water portion of the rebate, with the processing costs are shared between PG&E and the participating agencies

($10/rebate). The amount of the rebate is dependent on many factors, including water efficiency level and eligibility of the washer model. This program is implemented on an annual basis, and agreements are negotiated with PG&E annually. The participating Tri-Valley water retailers and Zone 7 review and discuss the Zone 7-administered programs annually.

Implementation Over the Past Five Years

This program is implemented on an annual basis. Over the last five years rebate amounts have ranged from $50 to $200 for the water agency portion of the rebate. The agreement with PG&E is negotiated annually, and the participating Tri-Valley water retailers review all Zone 7 administered programs and discuss the appropriate rebate amount annually. Over the past five years, the Tri-Valley water retailers have maintained $150 contribution to the PG&E rebate. PG&E's share has ranged from $50 to $75 annually. In December 2013, PG&E no longer offered to rebate Tier 3 or Energy Star clothes washers. Beginning January 1, 2014, PG&E only offered rebates for Energy Star Most Efficient (ESME) clothes washers - a dual energy and water rebate. The water agencies continued to offer Tier 3 rebate in the amount of $75. A review of the cost of rebate re-submittal in 2013 resulted in changes to the review process for cost containment purposes allowing more rebates to be authorized. Implementation of this program resulted in 325,851 gallons of water saved over the past five years. This savings is determined by multiplying 7,798 gallons by the number of units replaced.

Planned Implementation to Achieve Water Use Targets

HEW water savings calculations changed in 2006. For the period of 2011 through 2015 implementation of the program is based on number of rebates x 7,978 gallons per year, due to newer water saving technology. The City of Livermore, Zone 7, and the other Tri-Valley water retailers have discussed rebates targeting laundromats, CII (hotels, multifamily, etc.) and to focus on the biggest water users. Additional research is needed to determine how redirecting funds from the residential program and re-directing funds to proposed targets will affect the water use target. City of Livermore must also consider if proposed customers are in its service area, or primarily in Cal Water service area, to support such a program change. In 2015, Cal Water began facilitating their own rebate programs and no longer participates in Zone 7-administered programs. City staff continues to work with Zone 7 to encourage participation through various marketing avenues. As the agency that administers the program for the Tri-Valley water retailers, Zone 7 tracks participation results (data below). The method used to evaluate the amount of water conserved, the cost per million gallons of savings, and the relative ease of implementation is evaluated annually. Staff will continue to work with the other Tri-Valley water retailers and wholesaler Zone 7 to examine the cost of the program against the total water savings and effect of program on water use consumption. No other changes are planned at this time.

Table 9-4-3 Summary of High-Efficiency Washing Machine Rebates

Year[1]	2011	2012	2013	2014	2015
CLW Rebate amount ($)	50 or 100	50 or 100	50 or 100	75 or 100	75 or 100
No. of rebates paid	335	270	273	252	148
CLW Rebate Expenditure ($)	$28,325	$20,025	$20,475	$22,400	$14,772
Water Savings MG/Year [2]	8.2	6.61	6.68	6.68	2.1

[1] Information contained in this table provided by Zone 7. The HEW water savings calculations are based on number of rebates x 365 days per year x 26.60 gallons per day, due to newer water saving technology.
[2] Million gallons per year.

9.4.4 Rising Sun Energy Center – California Youth Energy Services Green House Call

Comprehensive Description

Since 2009, the Green House Call program has been implemented as a partnership between the City of Livermore Housing and Human Services Division and Water Resources Division, and the Rising Sun Energy Center – California Youth Energy Services. The City continued participation through 2012. The City's Housing and Human Services Division contracted with the Rising Sun Energy Center and California Youth Energy Services (CYES) to offer Livermore residents a free CYES Green House Call. This house call provided renters and homeowners with a free energy and water conservation assessment, education and mini-retrofit. Table 9-4-4 below shows the number of customers in the City's municipal water service area that have participated in the program, the type of water conservation service performed, and estimated savings.

Table 9-4-4 Summary of CYES Green House Call Program Results

Description	2009	Estimated Average Savings in GPM*	2010	Estimated Average Savings in GPM*
No. of Customers Reached through program	77		18	
Efficient-flow showerheads installed	13	1.0	2	0.8
Faucet aerators installed	61	0.11	19	1.8
Toilet Inspections	15		44	
Washing Machine Inspections	48		17	
Irrigation Inspections	17		15	

Source: Rising Sun Energy Center-CYES Water Report for 2009 and 2010.
*GPM= Gallons per Minute saved across all new installations

Implementation Over the Past Five Years

Implementation of the program began in 2009. In the summer of 2011, the City's

Housing and Human Services Division worked with the contractor to market the program. Marketing strategies included, but were not limited to, advertising and distribution of flyers. The City's Water Resources Division provided partial funding for the cost of the flyers, and provided the low-flow showerheads and faucet aerators that were distributed by CYES personnel. The program also benefitted from word–of-mouth to bring in additional participants. At the end of each program year, the City's Water Resources Division received a detailed report from CYES/ Housing and Human Services Division detailing water components performed for the City's municipal water customers to evaluate water savings and cost-effectiveness. The agreement with CYES expired in 2012.

Planned Implementation to Achieve Water Use Targets

Prior to the end of the contracted program in 2012, staff compared annual water consumption for households before and after participating in the program. Water conservation estimates provided by CYES are included in Table 9-2 above. Based on CYES reports, a total of 50.9 gallons per minute was saved across all installations for 2009 and 16 gallons per minute for 2010. Based on an analysis by the Pacific Institute in the report "California's Next Million Acre-Feet: Saving Water, Energy, and Money", the potential savings of replacing a 2.5 gallon per minute (gpm) showerhead with a 1.5 gpm showerhead is approximately 4,422 gallons per year[9]. This savings is based on the average person taking 4.9 showers per week with a duration of 9 minutes each, and an average of 2.87 people per residence. Based on this projected savings, replacing 15 showerheads through the Green House Call program saves approximately 66,330 gallons per year. With an estimated useful life of 8 years, the total savings from these replacements will be approximately 530,640 gallons. The Pacific Institute also noted that faucet aerators save about 629 gallons per year and have an expected useful-life of 5 years. Based on this savings and lifespan, the 80 aerators replaced by the Green House Call program will save about 50,320 gallons per year and a total of 251,600 over their lifespan.

Based on information from follow-up reports provided by CYES, phone calls and surveys, it was determined that customer participation declined over the two-year period indicating interest saturation. A new contract was not initiated for 2013, 2014, or 2015. However, Housing and Human Services Division and the Water Resources Division are currently evaluating the program strategy for future use.

9.4.5 Residential Water Survey and Conservation Check-up Program

Comprehensive Description (programmatic-residential)

The City of Livermore Water Residential Water Survey and Conservation Check-up Program is performed by customer service staff and water meter readers on a daily basis. The program is initiated either by a call from the customer or when staff notices an unusual increase in historic usage or a consistent pattern of excessively high usage

[9] Pacific Institute report "California's Next Million Acre-Feet: Saving Water, Energy, and Money." http://www.pacinst.org/reports/next_million_acre_feet/TechnicalDocumentation.pdf

in their daily activities through meter reading or utility billing and usage reports. The customer is contacted to alert them of the elevated usage and to assist the customer in identifying areas of water savings and potential leaks with a site-specific water conservation and water efficiency survey. The goal of the program is to provide leak detection assistance to an average of 1.5% per year of single-family accounts and 1.5% per year Multi-family accounts for 5 years

The following are components of the formal Residential Water Survey and Conservation Check-up Program:

1. Review the top 5% of residential water users on a periodic basis, but at least twice per year; once during the irrigation season to identify outdoor use issues, and once during the winter to identify indoor use issues. This review may be conducted more frequently or expanded to a larger percentage of customers during periods of water shortage.

2. Contact residential customers in the top 5% of usage and send water usage survey by mail or email.

3. Based on survey responses, set-up appointments with residents to conduct a Conservation Check-up.

4. Staff discusses the problem(s) with the resident, reviews the most common causes of water loss in a residence, including the information contained in the Residential Water Survey. An inspection of Interior fixtures are checked for leaks, showerhead and aerator flow rates are checked.

5. Staff checks irrigation systems and timers are checked if available and reviews and suggests customer irrigation schedules, provides irrigation ordinance information, and provides applicable water conservation literature as appropriate.

6. Discussion always includes the most wasteful fixture, the toilet. The toilet's adjustment is checked along with the flapper. Toilet flappers are targeted as the chloramines used by water wholesaler Zone 7 as a primary disinfectant can cause deterioration of rubber. Chemical resistant flappers are recommended to combat toilet leaks. Staff makes recommendations for toilet replacement as necessary and advises of current available rebate programs.

7. Other common mechanisms (aerators, faucets, sprinkler systems) are also discussed and the customer is given the free water conservation kit consisting of water conservation literature and household water saving devices such as showerheads and faucet-aerators that meet the current water efficiency standard as stipulated in the WaterSense Specifications as needed.

8. Follow-up phone calls and surveys are used to track results, participation and to plan future strategies.

While many customer service calls are initiated by staff, a majority of the customer service appointments are driven by calls from customers. The program includes documentation of customer service calls, including standardized reports on leak repairs or recommendations, but does not include documentation and follow-up to determine if conservation measures were implemented to reduce consumption.

Implementation Over the Past Five Years

The program was initiated in 2011. In 2012, staff reviewed and improved standard reporting from the City's utility billing software as necessary to better identify the highest usage customers to target for surveys and check-ups. Customized outreach materials and a Water Survey Checklist for single family residences were developed and replaced conservation materials and checklists from other sources. In 2014 staff produced mail, email and online survey forms specific to the City's Livermore Municipal Water. The online form was implemented in the same year and allowed customers to self-select the desired water efficient mechanisms.

Planned Implementation to Achieve Water Use Targets

Staff will develop a database or other method of tracking the number of surveys completed, the time spent on survey activities, and the water use before and after surveys. Consumption history will be for twelve months before and after participation in Residential Water Survey and Conservation Check-up. Program expenditures and water savings will be reviewed annually to be plan future strategies. After achieving the goal of the program is to provide leak detection assistance to an average of 1.5% per year of single-family accounts and 1.5% per year Multi-family accounts for 5 years, or the equivalent average of 5 years, the program will be maintained at the level of high-bill complaints or not less than 0.75% per year of current single-family accounts and 0.75% per year of current multi-family units. Showerhead distribution will be considered complete when 75% market saturation is achieved. City of Livermore Water staff will continue this program until market saturation is achieved or the program is no longer cost efficient to me target use goals. No additional activities are planned at this time.

Table 9-4-5 below includes potential savings from some of the conservation methods recommended during Residential Water Surveys and Water Conservation Check-ups.

Table 9-4-5 Average Estimated Savings

Water Conservation Method	Average Estimated Savings in Gallons Per Household Per Year
Install a high efficiency clothes washer	5,000
Install faucet aerators	220
Minimize Leaks	5,500
Install low-flow shower heads	2,500
Install water-efficient toilets	8,800
Total Estimated Savings	**22,020**

Source: American Water Works Association, 1997.
Gallons saved per year based on household averages. Actual savings may vary.

9.4.6 Utility Billing Software

Comprehensive Description
The City implemented utility billing software in the 1980's to increase the ability to identify high irrigation consumption and to assist customers in curbing water waste and usage. The billing software establishes and maintains monthly billing intervals for all customers (all customers are metered) using volumetric billing by type of metered customer. As of April 2015, there are 10,179 metered connections (residential, multi-family, commercial, irrigation, and institutional). Water bills are made available to customers in paper and electronically. Customers are also able to set up a profile to pay bills online. The City began outsourcing bill printing and communication stuffers to Infosend in 2006.

Implementation Over the Past Five Years
The City will continue to use utility billing software to identify high irrigation consumption, increase water use efficiency opportunities and economic valuation of water losses to support water loss control activities. The legacy utility billing system has received many software updates over the years. In 2010, the ability to pay bills online and manage the customer account was added, and manually meter reading were changed to touch readings reducing meter reading resources and saving time.

Planned Implementation to Achieve Water Use Targets
Tracking of water savings identified through use of the utility billing software has not been conducted to date. The database to be developed as part of the Water Survey Program will be used to track savings from leaks or other use-issues identified through the billing software. Automatic meter reading (AMR) is expected to be online by the end of 2017. Replacement of the current billing system is expected to be completed four years after AMR is online. The effectiveness of using the utility billing system to target high-use customers for conservation efforts will be evaluated under the Water Use Survey program. No additional activities are planned at this time.

9.4.7 Monthly Billings

Comprehensive Description
The use of monthly bills to reach out to customers about their water consumption began in 1991. Monthly bills provide another method for the City to reach out to its water customers with information about their water use and to promote water conservation. The monthly bills show, in graph form, the current year's monthly water consumption compared to the previous year's consumption. Reminders are placed on customer's bills that include, but are not limited to, notices about re-setting sprinklers in the winter or simply turning off all outdoor irrigation. Monthly billings, along with tiered rates (see DMM – Metering with Commodity Rates), are an effective way to encourage water conservation. Customers have the ability to see the impact of wasted water much sooner with monthly billings than bi-monthly or flat rate billings and act more swiftly to identify and correct any problems.

Implementation Over the Past Five Years
In 2010, the ability for all customers to review and manage monthly bills online was added.

Planned Implementation to Achieve Water Use Targets
There are no planned implementations for this measure. No methods to evaluate this measure have been identified. No conservation savings estimates are available for this measure.

9.4.8 Large Landscape Conservation - Recycled Water

Comprehensive Description
The City has encouraged use of recycled water for irrigation since 1963. In February 2003, the City designated a Recycled Water Service Area in the General Plan Amendment Livermore Downtown Specific Plan (Resolution 2003-252) and again in 2007 for the El Charro Specific Plan Area (Resolution 2007-143) requiring recycled water to be used for all outdoor landscape irrigation, including commercial, public agency, and select residential systems installed after that date. Recycled water rates are set by the Livermore City Council at 80% of the potable water rate to encourage conversion of potable irrigation systems to recycled water use. Extremely low connection fees compared to potable system connection costs are another incentive for recycled water use.

In 2013, the City completed a Recycled Water Master Plan Feasibility Study (Study) to evaluate options for expanding recycled water use.

The RWMP goals were to:

- Offset potable water use by supplying recycled water when and where appropriate.
- Expand and fully subscribe the existing recycled water system.
- Optimize the existing and future system configuration.

A copy of the RWMP Executive Summary can be found in Appendix D.

Implementation Over the Past Five Years
In 2013, the City completed the Recycled Water Master Plan Feasibility Study evaluate options for expanding recycled water use. The Study recommended implementing a recycled water policy that maximizes the sale of recycled water through the build-out of the Zone 1 area and pursuing an agreement to supply recycled water to the City of Pleasanton, and reserving recycled water production capacity beyond that needed to supply Zone 1 and the City of Pleasanton for future water supply needs as contemplated in the Zone 7 Water Supply Evaluation.

In 2013, the City of Pleasanton conducted a Recycled Water Feasibility Study which developed in much greater detail Pleasanton's plans for its recycled water treatment and distribution. Pleasanton is mainly planning to use a separate recycled water source,

emanating from its own DSRSD WWTP supply, for the majority of its supply, but did include the potential option for eventually interconnecting the Pleasanton and Livermore recycled water distribution systems. Pleasanton is also using a limited amount of Livermore's available recycled water supply in the east side of Pleasanton due to ease of access and availability.

Planned Implementation to Achieve Water Use Targets
The City currently offsets over 10% of the potable water use in its municipal water service area with recycled water. Additional capacity exists to supply additional recycled water to equal or exceed the entire volume of potable water used in the LMW system if sufficient customers were identified. Staff will continue to evaluate the Large Landscape Conservation - Recycled Water program, monitor the sale of recycled water, and identifying and establishing new recycled water customers. Staff will also monitor any potable water offsets obtained as the recycled water system expands.

9.4.9 Large Landscape Irrigation Survey

Comprehensive Description
In 2009, City of Livermore Water partnered with Zone 7 and the other Tri-Valley water retailers to focus public education efforts on large landscape water efficient irrigation practices. The City of Livermore and the other Tri-Valley water retailer's support and fund the Large Landscape Irrigation Program that is administered by water wholesaler Zone 7. Landscape irrigation accounts for a substantial amount of water used each year. Based on the water consumption data provided to Zone 7 by the Tri-Valley water retailers, the highest 20% of non-residential water users are identified and offered a free irrigation survey of their existing landscaping. The surveys are conducted according to the State Model Water Efficient Landscape Ordinance guidelines, codified in Title 23 of the California Code of Regulations (Sections 490-492), as required by the Water Conservation in Landscaping Act (Government Code, Section 65591 et seq.). Landscape plans, including irrigation system layout and scheduling, soil, precipitation, evapotranspiration (ETo), and plant hydrology are reviewed for efficiency. A list of recommended improvements appropriate to local seasonal conditions is provided to the customer, along with an offer of up to $5,000 in matching funds as an incentive to implement the recommendations.

The program assigns ETo-based water use budgets equal to no more than an average of 70% of ETo of annual average local ETo per square foot of landscape area in accordance with the schedule below. Customer participants are provided a notice of consumption data compared to average water budget on each billing cycle. All non-residential customers' large landscapes in the City's municipal water service area have dedicated irrigation meters. Recreational areas (portions of parks, playgrounds, sports fields, golf courses, or school yards in public and private projects where turf provides a playing surface or serves other high-use recreational purposes) and areas permanently and solely dedicated to edible plants, such as orchards and vegetable gardens, may require water in addition to the water use budget. The survey provides a statement designating those portions of the landscape to be used for such purposes and

specifying any additional water needed above the water use budget, which may not exceed 100% of ETo on an annual basis.

The goal of the program is to provide an average rate of 9% of the highest 20% of non-residential water users' assistance with the free irrigation survey on their existing landscaping until at 90% of the highest 20% of non-residential water users over 10 years have received assistance. This program not only offers an incentive for the customer to implement the recommendations, it also helps to foster customer relations by providing the customer with a direct point of contact with water retailer staff. For surveys conducted through 2010, it was determined that most water customers believed their systems to be efficient. However, the summary report of the surveys concluded that the current irrigation systems had many deficiencies.

Implementation Over The Past Five Years

In 2011 an additional component was added to the program to provide education and information to the customers through a free commercial landscape irrigation workshop for landscapers, contractors and contract managers. Large landscape surveys will be conducted for more City of Livermore municipal water service area customers, including the Livermore Area Recreation and Park District and the Springtown Home Owners Association. The City works with Zone 7 to identify more customers based on the highest non-residential irrigation water users in the municipal water service area for participation in the program and contacts large irrigation use customers regarding participation in the program. Zone 7 sends a contractor out to conduct survey and City staff participates in the site visits. Customers are provided with a list of recommended improvements, accompanied by an incentive program to assist the customer in implementing the recommendations. Water usage reports for the participating large irrigation use customers are compared pre- and post-survey to determine water savings and effectiveness of program and include the number of dedicated irrigations meter accounts, the number of those with water budgets, aggregate acreage assigned water budgets, average ETo, number of accounts 20% over-budget, number offered technical assistance, number accepting technical assistance, dollar value of incentives, and number of surveys estimated annual water savings due to program; these records will be preserved at least four years. The water savings assumption is the program will result in 15% to 20% reduction in demand for landscape irrigation by affected customers that implemented most of the survey recommendations. Conservation savings will vary depending on survey findings, adherence by participants to recommendations, size and type of large landscape area, and responses to other factors such as drought. Water consumption use will be monitored up to three years post-survey.

Planned Implementation to Achieve Water Use Targets

Funding for staff is available and maintained through Water Rates. City staff will continue to partner with Zone 7 to identify and encourage participation in this program as economically feasible. No additional activities are planned at this time.

9.4.10 Water Suppliers Council Nursery Outreach Committee/ Bay-Friendly Landscaping and Gardening

Comprehensive Description

The Water Suppliers Council Nursery Outreach Committee was formed by Stopwaste.org. in 2010. The members include representatives from the Alameda County Water District, City of Hayward, City of Livermore, City of Pleasanton, Dublin San Ramon Services District, East Bay Municipal Utility District, Zone 7 Water Agency, and California Water Service Company. The goal of the group is to encourage residential water conservation by expanding point-of-purchase awareness of comprehensive Bay-Friendly practices and related products, and to expand recycled content supply channels for compost and mulch. This is done in part by providing lawn conversion education, fact sheets, nursery displays, rebates, and signage for residents who have converted their yards. Stopwaste.org will provide content and/or resource links for water agencies to upload onto their respective websites and/or to print in newsletters and utility bills. Stopwaste.org also provides Home Gardener Workshops.

The program goal is to reach up to 3,500 nursery customers program-wide with the Bay-Friendly message of converting lawn to Bay-Friendly garden using the practice of sheet mulching, with involvement from all participating agencies to increase awareness of lawn conversion benefits; have up to a total of 90 customers from all participating agencies successfully convert their lawns; and provide information regarding recycled mulch and expand relationships with Alameda County nurseries.

Implementation Over the Past Five Years

The Water Suppliers Council Nursery Outreach Committee's had a Press Event Kickoff in March 2011 and launched the Bay-Friendly Lawn Conversion Showcase. City staff successfully piloted co-promotion with StopWaste.org and water agencies through nursery outreach. The Committee determined which certifications would be acceptable to nurseries and their customers for the program and provided recycled mulch rebates. The program now includes seven "Rethink Your Lawn" themed talks to be provided at nurseries throughout Alameda County, at least one per water district annually. In addition, the program includes StopWaste hosting a series of Lawn to Garden Parties. These one-day events provide residents hands-on experience on how to replace lawns with sheet mulch. Every participant receives a 40% discount coupon for sheet mulch materials and be eligible for additional assistance from StopWaste, including a one hour FREE design consult.

The Water Suppliers Council Nursery Outreach Committee's evaluates the program using the following methods:

1. Summarize participant evaluations at lawn talks, workshops, tour
2. Measure attendance at talks
3. Measure number of pledges for posting pictures
4. Measure number of 'sheet mulching' education signs distributed

5. Survey Bay-Friendly list in summer 2011 to measure number of people who converted lawns
6. Measure amount of recycled mulch sold at nurseries

According to the Bay-Friendly Landscaping and Gardening program, homeowners who replace their lawn can save anywhere between 6,000 and 13,000 gallons per 500 square feet per year. This translates to a possible savings of up to 87%, depending on size of lawn replaced, type of irrigation system, and types of plants used.

Planned Implementation to Achieve Water Use Targets
The program goals have been met and the Water Supplier Nursery Council now meets on an as needed basis. The City of Livermore and other Tri-Valley water retailers continue to collaborate with StopWaste's Bay-Friendly Coalition. The program rebates are funded through water retailers' water rates and Zone 7 monitors and administers the rebate program. City of Livermore will continue to participate in the Bay-Friendly Landscaping and Gardening program, encourage participation in this program, and will meet with the Water Supplier Nursery Council on an as needed basis. No additional activities are planned at this time.

9.4.11 Water-Wise Gardening

Comprehensive Description
The City of Livermore and the other Tri-Valley water retailer's support and fund the Water-Wise Gardening Program that is administered by water wholesaler Zone 7. In 2005, the Tri-Valley Water Conservation Group worked with a software firm to develop a CD-ROM that provides Tri-Valley-specific information on "Water-Wise Gardening." The CD-ROM was financed by the Tri-Valley water retailers through Zone 7. The CD-ROM, distributed by Zone 7 and the Tri-Valley water retailers, provided homeowners with information on how to establish landscaping that is water efficient based on climate and other factors specific to the Tri-Valley region. The CD-ROM was available to all customers upon request.

In 2008, instead of continuing to hand out CD-ROMs, the City supported the Tri-Valley Water Conservation Group's decision to go to a web-based format of the "Water-Wise Gardening" information as a means of reducing program costs and maintaining updated information as available. The site additionally helps visitors to design a landscape, includes photographs, a searchable plant database, and water saving tips. Water customers can access the recently updated "Water-Wise Gardening" information through the City of Livermore website at no cost. The program is measure by hits to the Water-Wise website. No particular goal for number of hits has been set. Instead the hits to the Water-Wise Gardening program site are monitored to evaluate its service over time. While it is not possible to estimate conservation savings, "Water Wise Gardening" provides guidelines to customers that, when followed, will result in water-wise plant and landscape choices, significantly decreasing their demand for potable water. Estimates for Alameda County indicate that customers could save approximately 13 gallons per

year for each square foot of lawn converted to water-efficient landscaping[10].

Implementation Over the Past Five Years
The website continues to remain active and is updated as information becomes available. In 2012, the City began promoting the website as a great tool to take advantage of water efficient landscape rebate and planning tools in designing water efficient gardens. In 2014, the Water-Wise Gardening Tri-Valley website was added as a design and irrigation resource to local nursery websites. In 2015, a link was added to the DWR California 2015 Turf Replacement Initiative website. In addition, the Tri-Valley water retailers and Zone 7 continue to promote the website at regular, annual water conservation sessions as a great resource on design and irrigation. No additional activities are planned at this time. City staff will continue to provide access to the "Water-Wise Gardening" information through the City of Livermore website. No additional activities are planned at this time.

Planned Implementation to Achieve Water Use Targets
The Water-Wise three-year contract is expiring and will be renewed for another three-year period. Participating agencies will have the opportunity to provide website input. City staff will continue to partner with Zone 7 and the other Tri-Valley water retailers to identify and encourage participation in this program as economically feasible. No additional activities are planned at this time.

9.4.12 Public Information Programs

Comprehensive Description
The City of Livermore provides water conservation information and education to the general public using a variety of methods. These efforts include staffing a booth at local special events including Earth Day and, the Livermore Wine Country Festival, and conducting Livermore Water Reclamation Plant tours. Staff also conducts outreach through paid advertising, bill inserts, brochures, notices, and dedicated water conservation web pages on the City's website. Staff also participates in several committees that focus on water conservation efforts. Details on the Water Resources Division's public information and outreach efforts are provided below.

Implementation of the Past Five Years
In January 2014, the Governor declared a State-wide drought emergency, and requested voluntary statewide conservation of 20%. In March, staff determined that voluntary conservation measures lacked effectiveness to reach the mandated goal. In March 2014, the City developed a more robust drought action and messaging plan including drought messaging goals, community engagement plans, direct community information plans, press releases, and development of all related materials. During this time, the Tri-Valley region experienced an unprecedented drought-related water supply shortage. Consequently, water agencies in the region needed quick and dramatic water

[10] Table 8, Pacific Institute report "California's Next Million Acre-Feet: Saving Water, Energy, and Money."

consumption reductions to avoid a public health and safety emergency.

Tri-Valley Collaborative Emergency Water Conservation Messaging
In January 2014, the Governor declared a State-wide drought emergency, and requested voluntary statewide conservation of 20%. The Tri-Valley water agencies promptly announced a 20% voluntary water conservation target for all water customers compared to 2013 use levels. By April, it became clear that voluntary conservation measures lacked effectiveness. In most cases, water use reductions approached less than 5%, and some areas experienced a small increase in water use. With State Water Project allocations at zero percent, the Tri-Valley water retailers were notified by water wholesaler Zone 7 that without a 25% reduction in annual water use compared to 2013 use levels, surface water supplies would be inadequate. The Tri-Valley water retailers and Zone 7 developed a joint water conservation messaging campaign to maintain adequate water supplies through the summer. In May 2014, the Tri-Valley water retailers and Zone 7 pooled resources to implement a common public outreach strategy spanning multiple communication channels to provide clear information regarding the specifics of the Tri-Valley's water-supply situation during on-going heavy media coverage of differing water conditions across the state. To ensure maximum effectiveness, project staff developed five themes for inclusion in all outreach messages and materials:

1. State Water Project cuts severely impacted the Tri-Valley water supply causing a local crisis unseen in other regions of the state.
2. All Tri-Valley residents and businesses must immediately engage in mandatory water conservation efforts.
3. All Tri-Valley residents and businesses must immediately reduce outdoor irrigation more than 50% and indoor water use by 5%. (Together, these simple to understand goals would achieve the needed 25% annual reduction.)
4. A sufficient 2014 Tri-Valley water supply existed if all Tri-Valley residents and business achieved the conservation targets.
5. Everyone was in the drought crisis together, so each individual represented part of the solution. Everyone needed to cooperate immediately for the benefit of the entire Tri-Valley.

Materials reminded the community that all the Tri-Valley water suppliers partnered on these efforts. The water agencies' public information and operations staff met weekly throughout the summer to refine and adapt the public communications messages. Messaging platforms included: media outreach, newspaper and Facebook advertisements, social media postings, direct resident contact, automatic resident phone messages, conservation signs across the region, community meetings, mailers and water bill inserts, and newsletter items. The agencies created a new, joint website and Facebook Page: TriValleyDrought.org. Jointly, approximately $28,500 was spent on print ads; $16,500 on TV ads; $1,800 on Facebook ads; $5,300 on the drought website, and $4,100 on print ads. Due to the technical and occasionally esoteric nature of water policy, direct-touch contact with residents comprised a substantial portion of outreach and messaging efforts. Staff often fielded questions via phone calls and direct

response via social media. In addition to local newspaper advertisements, nearly 2,000 announcements hit the radio airwaves from May through October along with 5,500 television ads. The Tri-Valley Drought Facebook campaign tallied 43,209 views and frequent social media postings encouraged participation in several community meetings to explain the water problem and conservation solution for the Tri-Valley community. The community response was immediate and significant reduction in water use.

One month after the joint public outreach campaign began, all of the water retailers saw water reductions climb from less than 5% to the 20%-25% range. By June, all Tri-Valley water retailers calculated water use cutbacks in the 30%-35% range. This higher level of conservation continued throughout the summer. By the end of 2014, the entire annual water demand in the Tri-Valley was approximately 25% lower than in 2013, and the Tri-Valley continued to achieve these results through 2015.

Planned Implementation to Achieve Water Use Targets

The Tri-Valley water retailers and Zone 7 continue to coordinate water conservation outreach and messaging. At this time, all of the Tri-Valley water agencies have significantly exceeded required conservation levels. Therefore, no expansion of public outreach efforts is necessary to achieve use targets. Should future public outreach be necessary to meet use targets, staff believes the water use reductions experienced during the ongoing drought demonstrates that Livermore has an excellent and effective outreach process in place.

Tables 9-4-12 and 9-4-13 below summarize the City's outreach methods to encourage water conservation in the City municipal water system.

Table 9-4-12 Summary of Public Information and Outreach

Actual	2010	2011	2012	2013	2014	2015
Paid Advertising	Yes	Yes	Yes	Yes	Yes	Yes
Public Service Announcement	No	No	No	Yes	Yes	Yes
Bill Inserts/Newsletters	Yes	Yes	Yes	Yes	Yes	Yes
Bill comparing previous water usage	Yes	Yes	Yes	Yes	Yes	Yes
Demonstration Gardens	No	No	No	No	No	No
Special Events, Media Events	Yes	Yes	Yes	Yes	Yes	Yes
Speaker's Bureau	Yes	Yes	Yes	Yes	Yes	Yes
Program to coordinate with other govt	Yes	Yes	Yes	Yes	Yes	Yes

Table 9-4-13 Planned Public Information and Outreach

Planned	2010	2011	2012	2013	2014	2015
Paid Advertising	Yes	Yes	Yes	Yes	Yes	Yes
Public Service Announcement	No	No	No	No	Yes	Yes
Bill Inserts/Newsletters	Yes	Yes	Yes	Yes	Yes	Yes
Bill comparing previous water usage	Yes	Yes	Yes	Yes	Yes	Yes
Demonstration Gardens	No	No	No	No	No	No
Special Events, Media Events	Yes	Yes	Yes	Yes	Yes	Yes
Speaker's Bureau	Yes	Yes	Yes	Yes	Yes	Yes
Program to coordinate with other govt	Yes	Yes	Yes	Yes	Yes	Yes

9.4.13 Tri-Valley Water Conservation Group

Comprehensive Description
City staff actively participates in the Tri-Valley Water Conservation Group, which consists of staff from all four Tri-Valley water retailers and water wholesaler Zone 7. The Tri-Valley Water Conservation Group (Group) was formed in the late 1980's. This group meets monthly to coordinate regional outreach for a variety of regional public outreach efforts. Some of these efforts include periodic advertising, general water conservation information, landscape water conservation media campaigns, water conservation rebate programs, website resources, social media campaigns, coordination of booths and displays at public events and public service announcements. The majority of the advertising and materials is prepared and distributed by Zone 7 after Group review and comment. Funding is provided by the Tri-Valley water retailers

Implementation Over the Past Five Years
City staff has participated in all public outreach projects planned by the Tri-Valley Water Conservation Group (Group). In February 2015, the Group planned an outreach event at the Livermore Home Depot. Participating agencies included the City of Livermore, Cal Water, Zone 7, Bay Friendly Gardeners, California Urban Water Conservation Council, Stopwaste, California Landscape Contractors Association, and Bringing Back the Natives. The local radio station KKIQ conducted an onsite broadcast, and made 60 public service announcements leading up to the event. Home Depot held a "How well do you know your water?" contest, promoted bay friendly drought resistant material with sale prices, and provided web ordering of other water-wise plants not in stock. Participating agencies provided conservation giveaways, irrigation and controller-sprinkler to drip conversion demonstrations. Other annual outreach projects include the Fix-a-Leak program, Bringing Back the Natives Garden Tour, Green Plumbers USA training, Large Landscape Irrigation Survey, High Efficiency Toilet, High Efficiency Washing Machine, School Indoor and Outdoor Audit Support Services and Bay-Friendly Landscaping and Gardening as previously described in individual demand management measures of the UWMP. Participating agencies staff are also invited to free Qualified Water Efficient Landscape training, Rainbird irrigation and controller training for a small fee.

Planned Implementation to Achieve Water Use Targets
The Group evaluates new programs and services for possible implementation. No new programs have been adopted at this time. Staff will continue to work with Zone 7 and the other water retailers to examine the cost of the programs against the total water savings and effect of program on water use and consumption. Staff will continue to attend Tri-Valley Water Conservation Group meetings and participate in the planning and implementation of public outreach efforts and programs as economically feasible. Conservation savings estimates and effects on ability to further reduce demand are provided in the descriptions of the individual programs in this section of the UWMP.

Quantifiable conservation savings or results of Staff's participation in the Tri-Valley Water Conservation Group are not available. However, participation does facilitate the

success of the regional programs supported by the Tri-Valley water retailers and coordinated by Zone 7 which do provide quantifiable results. No additional activities are planned at this time.

9.4.14 Outreach and Outreach Events

Comprehensive Description
City staff develop or obtain advertising, educational, social marketing elements and informational water conservation materials for children and adults for various outreach events and programs designed to change attitudes to influence behavior. The materials are promoted and distributed at several local festivals or events each year, including the Livermore Wine Country Festival, Earth Day, and Safety Day. Staff also provides a conservation program for senior citizens at the Livermore Area Recreation and Park District Community Center, and conducts water conservation classes for children in local schools, nursery schools and for the YMCA East Bay Outdoor School at Camp Arroyo.

Staff provides Livermore Water Reclamation Plant tours that include a water conservation component to various groups and individuals on a regular basis, including the Local Government Academy. Staff provides a “behind-the-scenes” look at what it takes to keep drinking water, wastewater, storm water, and recycled water flowing in the City of Livermore. The Water Section hands out water conservation information, and displays various types of water meters, a typical service connection, and how to decipher hydrant colors. An actively maintained website is regularly updated with events, conservation messaging, conservation actions monthly but no less than quarterly. The website includes links to Bay Friendly Landscaping and Gardening website with qualified landscape professionals and other helpful websites. Social media and billing messages are scheduled no less than quarterly throughout the year to coincide with seasonal conservation tips such as checking frozen pipes in the winter. Staff maintains an inventory of flyers and brochures for outreach events and participates in the Zone 7 administered landscape water conservation media campaigns. A dedicated phone line for water conservation is provided for neighbor reports of runoff and public questions, and media outreach is developed and disseminated to newspaper and local radio stations as economically feasible.

Implementation Over the Past Five Years
Over the past five years, City of Livermore Water staff has provided conservation materials at the events listed below. Funding for staff and $50,000 for outreach is available and maintained through Water Rates.

Table 9-4-14 Public Outreach and Outreach Events

Description	Staff/Materials Provided	Fiscal Year			
		11/12	12/13	13/14	14/15
COL & Cal Water Landscape Class	staff/materials		9/2012		
Creeks to Bay Day	staff/materials	annually	annually	annually	annually
CYES (Rising Sun Energy Center - California Youth Energy Services)	materials	March-July	March-July		
Earth Day		4/21/12	4/24/13	4/26/14	4/25/15
Farmer's Market	staff/materials	6/2012		7/2013	
Livermore Gardener's Unite Event	materials		6/9/2013		
Orville Wright Summer Program	materials	6/4/2012			
Residential Water-Wise pamphlet	staff/materials	Annually Various	Annually Various	Annually Various	Annually Various
Safety & Health Fair-City of Livermore	staff/materials	6/14/12	6/19/2013	6/12/14	6/11/15
Science Odyssey	staff/materials	5/14/12	5/13/2013	5/12/14	2/20/2015
Water Awareness Poster Contest	staff/materials	5/14/12	5/13/2013	5/12/15	5/10/16
Water Bill Messages	staff				monthly
Water Conservation door hangars		As needed	As needed	As needed	As needed
Wine Festival	staff/materials	5/4 & 5/5	5/3 & 5/4	4/30 & 4/31	4/30 & 5/1
LARPD Senior Services	staff/materials	April Annually	April	April	April

In 2014, the City of Livermore, Tri-Valley water retailers and Zone 7 coordinated outreach efforts to create a unified message regarding the drought. A shared website was developed and maintained by the City staff. Social media, radio advertisements and newspaper outreach material were developed and distributed over an 18 month period. The City of Livermore website was updated regularly with new information, programs, and results, and the City home page includes a link directly to drought outreach communications. During the drought, City of Livermore Water provided recycled water during warm months at no charge to Livermore residents who were interested in supplementing watering trees, gardens and lawns at their homes. The program was promoted via web, social media, water bills, and local newspapers. All City vehicles had large “The Drought is Real” magnets applied to doors or tailgates.

In 2015, the City of Livermore, with other Tri-Valley water agencies and Zone 7 initiated a jointly-funded phone survey on Potable Reuse. The City of Pleasanton contracted with a consulting firm and the consultant completed the survey, which found that 63% of Tri-Valley residents surveyed would be willing to drink tap water that had been augmented by purified recycled water.

Planned Implementation to Achieve Water Use Targets
In February 2016, members of the Water Policy Roundtable, a group of 2 elected officials and staff from each of the Tri-Valley water agencies, accepted Zone 7's updated Water Supply Evaluation, which included the preferred water supply options of the Delta Fix, Local Potable Reuse projects, and Regional Desalination and recommended moving forward with a Potable Reuse Feasibility Study and Public Outreach Program for the Tri-Valley. Staff is currently discussing the scope of work, budget and consultant selection process with the other agencies and will bring an item to the full Livermore City Council in Spring 2016 to approve these preferred water supply options as well as Livermore's participation in the Feasibility Study and Public Outreach Program.

It is difficult to accurately estimate conservation savings for the outreach program. City staff continues to provide water conservation outreach to give the community an opportunity to learn about water conservation, and to bring that knowledge home to influence their family's water conservation behavior. Therefore staff uses the following criteria to measure the effectiveness of public information and public outreach events include:

- Number of events and participants served
- Number of residents visiting event booths
- Event survey results
- Cost of outreach
- Results of opinion studies

Funding for staff is available and maintained through Water Rates. City staff will continue to partner with the other Tri-Valley water retailers and Zone 7 as appropriate to identify and encourage participation in outreach and outreach events as economically feasible and look for other cost effective ways to increase outreach. No additional activities are planned at this time.

9.4.15 School Education Program

Comprehensive Description
The City of Livermore and the other Tri-Valley water retailers' support and fund the regional School Education Program that is administered by water wholesaler Zone 7 or their contractors. The regional School Education Program was implemented in 2002 and is offered to the schools in the City's municipal water service area. Educational materials and course outlines used by Zone 7 in classroom presentations have been developed in accordance with the state of California curriculum standards and

framework, and are age and grade appropriate.

In addition to the regional program, City staff conducts additional classroom presentations on a variety of topics, including water conservation, and provides tours of the City of Livermore Water Reclamation Plant. The City's school education program offers presentations to day care classrooms and to every grade level from kindergarten through grade12. The program includes 16 different topics on water, storm water, and sewer science. Each grade level is covered by one or more elements of this overall education program. The number of tours and classroom presentations presented by staff that included a water conservation segment is shown in Table 9.14.15 below. A copy of the school education program brochure is included in the Appendix D.

Table 9-4-15 Summary of Classroom Presentations

	Number of Classroom Presentations Performed by Livermore Water Resources Division staff**					
Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Day Care	4	3	4	4	9	3
Grades K-8th	10	9	0	3	8	5
High School	6	3	5	0	2	0
Total	2030	2026	2021	2020	2033	8

** All classroom presentations listed included a water conservation segment.

In addition to classroom presentations, City staff and the California Water Service Company conduct an annual Water Awareness Poster Contest. The poster contest is open to 3rd and 4th grade students in all Livermore Schools. There is a 3rd and 4th grade winner chosen from each school that submits posters. The winners from each school compete to be one of three city-wide winners in each grade level. The city-wide winners receive gift certificates and T-shirts with their winning poster printed on them, have their posters displayed at the Livermore Wine Country Festival, and are recognized by the Livermore City Council.

Implementation Over the Past Five Years

City of Livermore staff continues to participate and provide education as described above. Staff measures the effectiveness of its school education program and each presentation with the following criteria:

- Number of classroom presentations and students attending
- Number of teachers and tour group leaders requesting repeat presentations or tours
- Pre- and post-tests to evaluate classroom presentations

Staff uses event survey results, teacher and group leader evaluations and student pre- and post-test results to measure the effectiveness of the education programs. Staff utilizes results from the teacher and group leader evaluations to improve and adjust the curriculum. The classroom presentation pre- and post-tests are used to ascertain the audience knowledge base, determine subject matter needing clarification, or curriculum

improvement, and determine if participants will continue to use what they learned in the program. The survey results suggest the program is effective in improving students' knowledge of water conservation.

Planned Implementation to Achieve Water Use Targets
It is not possible to assess the quantitative water savings generated from the program. The City believes it is important to educate children in water conservation, and that students exposed to water conservation education are more likely to make a difference through their actions which may result in behavioral changes that reduce water use as a result of key conservation messages. Funding for staff is available and maintained through Water Rates. City staff will continue to partner with Zone 7 to provide water conservation school education programs to give children the opportunity to learn about water conservation, and to bring that knowledge home to influence their family's water conservation behavior. No additional activities are planned at this time.

9.4.16 School Indoor and Outdoor Audit Support Services

Comprehensive Description
The School Indoor and Outdoor Audit Support Services were implemented in 2010. The City of Livermore and other Tri-Valley water retailers support and fund the School Indoor and Outdoor Audit Support Services Program that is administered by water wholesaler Zone 7. The funding provides 100 percent funding for large landscape surveys, irrigation hardware replacement, indoor water use surveys, and plumbing fixture replacement for schools in the Tri-Valley water retailers' service areas. While schools are eligible for all commercial, industrial and institutional programs, this is a comprehensive program specifically targeting schools. The program provides additional financial support to achieve potential indoor and outdoor water savings through services and limited hardware replacement. Zone 7 tracks and provides the City of Livermore with data for this program including customers participating in the program and pre- and post-participation usage reports to determine water savings and effectiveness of program. According to Zone 7, the potential indoor and outdoor water savings for schools from water audits and subsidized indoor/outdoor equipment retrofits range from 20 to 38 percent. In addition to water savings, high efficiency irrigation equipment upgrades can result in energy savings, reduced run-off and increased turf quality.

Through this program, administered by Zone 7, potentially up to 100% of water conservation measures that are implemented will be subsidized. This program also presents an outreach opportunity. The City, Tri-Valley water retailers, and water wholesaler Zone 7 believe that public agencies should be role models of water use efficiency. This program provides goodwill for participating agencies.

Implementation Over the Past Five Years
In 2010, one outdoor audit was performed for a school in the City's municipal water service area. The final Irrigation Audit Report identified and addressed issues with the existing irrigation system contributing to higher water use and made recommendation of

improvements. The report found the average annual water usage to be higher than the total water budget with an estimated savings of $9,200 per year if the site stayed within the water budget. Primary recommended repairs included repairing one broken sprinkler, leveling heads, upgrading to a weather-based irrigation controller, and replacing landscaping with water efficient landscaping at a total estimate of $10,000. The school has not taken part in the subsidy portion of the program, but completed repairs. Recommended repairs resulted in 2.6 AF water savings annually.

Planned Implementation to Achieve Water Use Targets
Funding for staff is available and maintained through Water Rates. City staff will continue to partner with Zone 7 to identify and encourage participation in this program as economically feasible. No additional activities are planned at this time.

9.5 Programs to assess and manage distribution system real loss Water System Audits, Leak Detection, and Repair

Comprehensive Description
The goal of water loss control methods includes an increase in water use efficiency and proper economic valuation of water losses to support water loss control activities. City of Livermore conducts water audits of its municipal water system monthly to determine water loss that may be due to distribution system leaks. Since 1990, staff has routinely monitored the monthly water purchases and the monthly water sales in order to quickly detect any system irregularities or excessive water loss. Staff also tracks un-accounted for water from activities such as system flushing, fire flow testing, and water quality corrections. Over the last 20 years, staff has contracted two leak surveys. The most recent survey was completed in 2013. Each survey found no water leaks in the areas surveyed. The average amount of unaccounted for water for the 2005 through 2009 period equaled only 7.40 percent. The Department of Water Resources water audit and leak detection program of 47 California water utilities found an average of 10 percent loss of water due to leaks. City of Livermore Water uses 10% as a benchmark performance indicator in terms of water loss standards.

All customers in the City's municipal water service area are metered and charged based on an inverted tiered water rate schedule. Leaks are costly to customers and therefore are typically noticed quickly. All City water customers are reminded routinely through public outreach and messaging on bills to review water usage several times per year for water leaks, advise of water audit services, and to contact the City if there is a suspected leak. Staff revises contracts every three years for an outside vendor to provide routine maintenance and emergency repairs to the water system with a maximum response time of 24 hours for making emergency repairs. Smaller leaks are assessed on a case by case basis and are repaired by City staff.

Implementation Over the Past Five Years
In May 2009 the American Water Works Association (AWWA) published the 3rd Edition M36 Manual Water Audits and Loss Control Programs. City staff currently uses the AWWA Water Audit software (software) to complete the standard water audit and water

balance to quantify current volume of apparent, real water loss, and the cost impact of these losses on utility operations annually. The economic value of real loss recovery is also reported using the AWWA software. The City has a goal of completing a component analysis once every four years to analyze apparent and real losses and their causes by quantity and type to support the economic analysis and selection of intervention tools.

In August 2015, the City completed the first phase replacing 50 stand-alone manual irrigation controllers with wireless central weather based irrigation controllers for irrigation systems to allow staff to remotely monitor, adjust, and evaluate water use on a daily basis. The second phase for the remaining 40 Landscape Maintenance Districts and City landscapes is expected to be completed by September 2017. These projects add master valves which shut the system down when a leak is detected reducing the water loss.

All customers in the City's municipal water service area are metered and charged based on an inverted tiered water rate schedule. Leaks are costly to customers and therefore are typically noticed quickly. As noted previously, the City will be implementing Automated Meter Reading (AMR) and Automated Meter Intelligence (AMI) systems in 2016/2017 that should improve leak reporting by customers. All City water customers will continue to be reminded routinely through public outreach and messaging on bills to review water usage several times per year for water leaks, advise of water audit services, and to contact the City of Livermore Water if there is a suspected leak. Staff will continue to seek on-call routine maintenance and emergency repairs agreements every three years to ensure competitive practices and costs are achieved.

City staff continues to closely monitor and audit water purchased and water sold to identify any continuous losses. In addition, staff also performs or contracts more detailed leak audits and an area-wide leak survey on an as needed basis to identify and eliminate the source of any significant increase in unaccounted for water that could represent a continuous water loss.

Planned Implementation to Achieve Water Use Targets

Funding for staff is available and maintained through Water Rates. Water system audits, leak detection, and repairs are high priority as demonstrated by the reduction of water loss since 1990. The City is actively working on implementing an Asset Management Plan that will be used to proactively identify end of life sections of the water system for replacement to achieve water use targets. Additional activities are not planned at this time due to the reductions in water loss achieved through improved tracking, as well as the low occurrence of system leaks, and the failure of the two previous leak detection surveys to locate any leaks. Further reductions in leaks and conservation savings estimates will vary based on water system audits, repairs as needed and area-wide leak surveys as needed. The goal is to bring unaccounted for water percentage below five percent.

Table 9-5 Apparent and Real Water Loss Volume in MG

	2011	2012	2013	2014	2015
Volume apparent water loss	27.249	29.173	30.321	24.832	22.336
Volume real water loss	278.363	232.952	171.267	49.543	94.114

9.6 Water Conservation Program Coordination and Staff Support

Comprehensive Description

The Water Conservation Coordinator is responsible for the City's conservation program management, planning, tracking, implementation, and evaluation. The Water Conservation Coordinator duties include enacting, enforcing, supporting legislation, regulations, ordinances, or terms of service related to water waste prevention including landscape and irrigation inefficiencies, non-recirculating decorative water fountains, water shortage measures for new development and existing users. Additional duties include coordination and oversight of conservation programs, joint programs with Zone 7, Tri-Valley water retailers, and other outside agencies, communication of water conservation issues to the public, preparation and submittal of reports to various parties, and preparation and updates of water conservation plan. These activities are supported through coordination and execution of the Demand Management Measures.

Several City Resources Division employees play key roles in the City's conservation efforts as follows. The Water Resources Division has designated the Water Supervisor to serve as a part-time Water Conservation Coordinator key to water waste prevention. The current Water Supervisor is Dave Lennier. He spends between 5 and 10% of his time as Conservation Coordinator. The time spent varies during the year, and from year to year. Mr. Lennier has been the City's liaison for water conservation activities since 2014. The water conservation duties became more formalized during the 1989 to 1992 drought even though some of the same activities took place during the 1977-78 drought. The Water Supervisor has extensive experience in water conservation issues and enhances knowledge through numerous statewide conservation seminars, Bay Area seminars, and from being an active participant in the Tri-Valley Water Conservation Group which consists of staff from all four Tri-Valley water retailers and water wholesale Zone 7.

The Water Resources Division has designated the Water Coordinator to serve as a part-time Water Conservation Coordinator. As a part-time Conservation Coordinator, Jim Loberg spends between an estimated 10 to 15% of his time in this capacity. Based on need and availability, the percentage of time spent varies. Mr. Loberg has been a Water Resources Division liaison for water conservation activities since 2005. Mr. Loberg holds an AWWA Water Conservation Practitioner Grade 1 Certificate and has attended numerous statewide conservation seminars, Bay Area seminars, and participates in the Tri-Valley Water Conservation Group.

Dana d'Angelo, Management Analyst in the Water Resources Division since 2015, assists the Water Supervisor and Water Coordinator with various water conservation efforts. The previously Management Analyst in the Water Resources Division supported these efforts beginning in July 2010. The Management Analyst has attended the two-day AWWA water conservation practitioner course and participated in a variety of water conservation related webinars. The Management Analyst is an active member of the Tri-Valley Water Conservation Group and the Water Suppliers Council Nursery Outreach Committee.

Additional City support is provided by Utility Billing staff in providing general water conservation program information to customers requesting information, application of rebate programs, providing utility billing, applying metering with commodity rates, and data.

Table 9-6a Actual Staff Dedicated to Water Conservation

Actual	2006	2007	2008	2009	2010
Number of part-time staff	2	2	2	2	3

Table 9-6b Planned Staff Dedicated to Water Conservation

Planned	2010	2011	2012	2013	2014
Number of part-time staff	3	3	3	3	3

Implementation Over the Past Five Years
The City has designated and budgeted one or more staff to meet the functions of Conservation Coordinator for all its customers since 1988. The water savings generated from conservation programs developed and integrated by the water conservation coordinator is difficult to assess as activities serve a variety of demand management measures. The City's Actual 2015 GPCD of 141 GPCD has surpassed its 2015 Interim Water Use Target of 216 GPCD and plans to continue Conservation Coordination activities as an effective tool to continue to manage the service area's future water demand; no additional activities are planned at this time.

Planned Implementation to Achieve Water Use Targets
Funding for staff is available and maintained through Water Rates. City staff will continue to provide staff time to meet the function of a Conservation Coordinator. Future water rates may provide additional resources to fund dedicated staff to conduct administrative tracking and evaluation of conservation coordination activities. Effectiveness of the individuals in planning and implementing programs will be evaluated on an ongoing basis, with consideration to the success of the programs that are planned and implemented. No additional activities are planned at this time.

9.7 Other Demand Management Measures

In addition to the DMMs described above, the City of Livermore implemented the Residential Recycled Water Program.

In 2014, Livermore implemented a temporary Residential Recycled Water Program. Recycled water was made available so Livermore residents could supplement their potable water landscape irrigation to keep plants alive if needed during the warm summer months. In 2014, Livermore provided 73 permittees approximately 1 AF of recycled water. In 2015, interest in the Residential Recycled Water Program increased more than 1,200% from the previous year resulting in Livermore providing 15 AF of recycled water to 898 permittees.

Section 10: Plan Adoption, Submittal, and Implementation

Plan Adoption, Submittal, and Implementation

Plan Adoption

The 2015 Urban Water Management Plan for Livermore Municipal Water was adopted following the requirements of the California Water Code and California Government Code as noted below and is described following the 2015 DWR Guidebook format.

10.1 Inclusion of All 2015 Data

2015 is the first compliance year for SB X7-7, and UWMPs must include the water use and planning data through to the end of 2015. As indicated in Chapter 1, the City is reporting water use and planning data for the calendar, and includes data through December 2015.

10.2 Notice of Public Hearing

The City provided a 60-day notice of the preparation of the 2015 UWMP, and notice of the 2015 UWMP Public Hearing to the cities and counties which are part of the City's municipal water service area. These are listed in Table 10-1 (DWR Table 10-1) below.

Table 10-1 Notification to Cities and Counties (DWR Table 10-1)

Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
City of Pleasanton	☑	☑
City of Dublin	☑	☑
Cal Water	☑	☐
County Name	60 Day Notice	Notice of Public Hearing
Alameda County	☑	☑

Public hearing notifications for adoption of the UWMP were published in the local newspaper East Bay Times) twice (June 1, 2016 and June 8, 2016), posted at City Hall and the Civic Center Library, and on the City's website. Publication in the above listed newspapers complies with the jurisdiction requirements contained in Government Code Section 6066. Copies of the public notices are included in Appendix B. Notification of

the public hearing was also provided to Alameda County as required under Section10642 of the California Water Code.

10.3 Public Hearing and Adoption

The City has encouraged community and public interest and involvement in the UWMP update through the use of mailings, public meetings, and web-based communication. Copies of the outreach efforts are included in Appendix B.

A public hearing to discuss the Draft 2015 UWMP was held on June 13, 2016. The public hearing provided an opportunity for water customers and the general public to become familiar with the UWMP and ask question about its water supply, continuing plans for providing a reliable, safe, and high-quality water supply. Copies of the Draft UWMP were made available for public inspection starting on June 1, 2016 at the City of Livermore Water Resources Division offices, the Livermore Main (Civic Center) Library, Rincon Library, Springtown Library, and the City of Livermore website.

As required by Section 10642 of the California Water Code, this 2015 Urban Water Management Plan was adopted through a formal Public Hearing process that included the adoption of any comments by the Livermore City Council on June 13, 2016. Appendix B includes a copy of Resolution 2016-xxx adopting the UWMP.

10.4 Plan Submittal

A copy of the final adopted version of this 2015 UWMP will be submitted to the Department of Water Resources (DWR) within 30 days of adoption and by July 1, 2016. The adopted 2015 UWMP will be submitted electronically to DWR using the WUEdata submittal tool. A CD or hardcopy of the adopted 2015 UWMP will also be submitted to the California State Library in Sacramento and to the Alameda County Department of Public Works. Copies of transmittal letters to DWR, the California State Library and Alameda County are included in Appendix B.

The City's Livermore Municipal Water system does not distribute potable water in any other city; therefore no other notifications were required under Section 10635(b).

10.5 Public Availability

A copy of the 2015 Urban Water Management Plan for the City of Livermore, Livermore Municipal Water, was made available at the Water Resources Division offices within 30 days of adoption by the Livermore City Council. Copies of the final, approved 2015 UWMP were also placed on file with the Livermore Main (Civic Center) Library, Rincon Library, and Springtown Library.

An electronic copy of the 2015 Urban Water Management Plan will also be available for review and download on the City website (www.cityoflivermore.net).

10.6 Plan Implementation

The 2015 Urban Water Management Plan for City of Livermore, Livermore Municipal Water, will be implemented by the City's Water Section staff with administrative oversight and support from Water Resources Division staff. One of the primary focus areas for implementation will be the Demand Management Measures (DMMs) and other Water Use Reduction Plan elements necessary to meet the requirements of the Water Conservation Act of 2009.

In addition to more emphasis on implementing the DMMs, staff will also focus additional efforts on improving data quality and collection to ensure accurate tracking of daily per capita water use. The current water billing system records will be reviewed to ensure the system is capturing the data necessary for tracking compliance with the Water Conservation Act of 2009 and for updating the Urban Water Management Plan in the future.

10.7 Amending an Adopted UWMP

Any subsequent amendments to the 2015 Urban Water Management Plan will be adopted at a duly noticed public hearing following the same process outlined above and submitted to the Department of Water Resources, Alameda County, and filed for public review as required by Article 3 of the California Water Code (commencing with Section 10640).

List of Appendices

Appendix A: Completed UWMP Checklist
Appendix B: Required Notices
Appendix C: Resolutions and Ordinances
Appendix D: Supporting Documents
Appendix E: DWR 2015 UWMP Tables

Appendix A: Completed UWMP Checklist

Checklist Arranged by Subject

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location *(Optional Column for Agency Use)*
10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1	**Page 8**
10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.5.2	**Pages 10-12**
10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	Plan Preparation	Section 2.5.2	**Pages 10-12**
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	**Page 13**
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	**Pages 14-15**
10631(a)	Provide population projections for 2020, 2025, 2030, and 2035.	System Description	Section 3.4	**Page 16**
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	**Pages 16-18**
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4	**Page 16 and Page 27**
10631(e)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2	**Pages 20-21**
10631(e)(3)(A)	Report the distribution system water loss for the most recent 12-month period available.	System Water Use	Section 4.3	**Pages 23-24**

10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.5	**Pages 24-25**
10608.20(b)	Retail suppliers shall adopt a 2020 water use target using one of four methods.	Baselines and Targets	Section 5.7 and Appx E	**Pages 29-30 DWR Table 5-1**
10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Chapter 5 and App E	**Pages 28-30 DWR Table 5-1 SB X 7-7 Table 5**
10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.7.2	**Page 29**
10608.24(a)	Retail suppliers shall meet their interim target by December 31, 2015.	Baselines and Targets	Section 5.8 and App E	**Page 30 DWR Table 5-1**
10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Section 5.8.2	**Page 30 DWR Table 5-1**
10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	Section 5.1	**Page 30 Table 5-7**
10608.40	Retail suppliers shall report on their progress in meeting their water use targets. The data shall be reported using a standardized form.	Baselines and Targets	Section 5.8 and App E	**Page 30 DWR Table 5-1**
10631(b)	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, 2030, and 2035.	System Supplies	Chapter 6	**Pages 31-33 Tables 6-1,6-2**
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	**Page 33**
10631(b)(1)	Indicate whether a groundwater management plan has been adopted	System Supplies	Section 6.2.2	**Page 33**

	by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.			
10631(b)(2)	Describe the groundwater basin.	System Supplies	Section 6.2.1	**Page 33**
10631(b)(2)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2.2	**Page 33**
10631(b)(2)	For unadjudicated basins, indicate whether or not the department has identified the basin as overdrafted, or projected to become overdrafted. Describe efforts by the supplier to eliminate the long-term overdraft condition.	System Supplies	Section 6.2.3	**Page 33**
10631(b)(3)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	Section 6.2.4	**Page 33**
10631(b)(4)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Sections 6.2 and 6.9	**Page 33** **Page 43**
10631(d)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	System Supplies	Section 6.7	**Page 41**
10631(g)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years.	System Supplies	Section 6.8	**Pages 41-43**
10631(h)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6	**Page 41**
10631(j)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) – if any - with water use projections from that source.	System Supplies	Section 2.5.1	**Page 23** **Pages 10-12**
10631(j)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	Section 2.5.1	**Page 10**

10633	For wastewater and recycled water, coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.1	**Pages 33-35**
10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area. Include quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	System Supplies (Recycled Water)	Section 6.5.2	**Pages 35-36**
10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	Section 6.5.2.2	**Pages 35-36 Table 6-6**
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3 and 6.5.4	**Pages 36-39**
10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.5.4	**Page 36-39**
10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 6.5.4	**Pages 38-39 Table 6-7**
10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	Section 6.5.5	**Pages 39-40**
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.5	**Pages 39-40**
10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.4	**Pages 53-54**
10631(c)(1)	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage.	Water Supply Reliability Assessment	Section 7.1	**Pages 44-46 Zone 7 WSE**
10631(c)(1)	Provide data for an average water year, a single dry water year, and	Water Supply Reliability	Section 7.2	**Page 47-50**

	multiple dry water years	Assessment		**Tables 7-2 & 7-3**
10631(c)(2)	For any water source that may not be available at a consistent level of use, describe plans to supplement or replace that source.	Water Supply Reliability Assessment	Section 7.1	**Pages 44-46 Zone 7 WSE**
10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 7.1	**Pages 44-47**
10635(a)	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.3	**Pages 50 – 54 Tables 7-4 to 7-10**
10632(a) and 10632(a)(1)	Provide an urban water shortage contingency analysis that specifies stages of action and an outline of specific water supply conditions at each stage.	Water Shortage Contingency Planning	Section 8.1	**Page 55-58 Table 8-1**
10632(a)(2)	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency.	Water Shortage Contingency Planning	Section 8.9	**Page 67 Tables 8-4a & 8-4b**
10632(a)(3)	Identify actions to be undertaken by the urban water supplier in case of a catastrophic interruption of water supplies.	Water Shortage Contingency Planning	Section 8.8	**Pages 65-66**
10632(a)(4)	Identify mandatory prohibitions against specific water use practices during water shortages.	Water Shortage Contingency Planning	Section 8.2	**Pages 58 – 59 Table 8-2**
10632(a)(5)	Specify consumption reduction methods in the most restrictive stages.	Water Shortage Contingency Planning	Section 8.4	**Pages 60 – 62 Table 8-3**
10632(a)(6)	Indicated penalties or charges for excessive use, where applicable.	Water Shortage Contingency Planning	Section 8.3	**Page 60**
10632(a)(7)	Provide an analysis of the impacts of each of the actions and conditions in the water shortage contingency analysis on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts.	Water Shortage Contingency Planning	Section 8.6	**Pages 63 - 64**

10632(a)(8)	Provide a draft water shortage contingency resolution or ordinance.	Water Shortage Contingency Planning	Section 8.7	**Page 65 Appendix C**
10632(a)(9)	Indicate a mechanism for determining actual reductions in water use pursuant to the water shortage contingency analysis.	Water Shortage Contingency Planning	Section 8.5	**Page 63**
10631(f)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Sections 9.2 and 9.3	**Pages 68 - 105**
10631(f)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Sections 9.1 and 9.3	**Pages 69 & 75**
10631(i)	CUWCC members may submit their 2013-2014 CUWCC BMP annual reports in lieu of, or in addition to, describing the DMM implementation in their UWMPs. This option is only allowable if the supplier has been found to be in full compliance with the CUWCC MOU.	Demand Management Measures	Section 9.5	**Page 69**
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Plan Adoption, Submittal, and Implementation	Section 10.3	**Page 107 Appendix B**
10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.	Plan Adoption, Submittal, and Implementation	Section 10.2.1	**Page 106 Table 10-1 Attachment**
10621(d)	Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.	Plan Adoption, Submittal, and Implementation	Sections 10.3.1 and 10.4	**Appendix B**
10635(b)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 60 days	Plan Adoption, Submittal, and Implementati	Section 10.4.4	**Page 107**

	after the submission of the plan to DWR.	on		
10642	Provide supporting documentation that the urban water supplier made the plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan.	Plan Adoption, Submittal, and Implementation	Sections 10.2.2, 10.3, and 10.5	**Appendix B**
10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Sections 10.2.1	**Appendix B Page 106 Table 10-1**
10642	Provide supporting documentation that the plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.1	**Appendix C Reso 2016-66**
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4.3	**Appendix B**
10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4.4	**Appendix B Page 107**
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2	**Page 107**
10645	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5	**Page 107**

Appendix B: Required Notices

1. 2015 Urban Water Management Plan Preparation Notice
2. Notification Letter to Alameda County Public Works, dated April 4, 2016
3. Public Notices
4. Transmittal Letter to California State Library

LIVERMORE
CALIFORNIA

PREPARATION OF 2015 URBAN WATER MANAGEMENT PLAN

In accordance with the California Urban Water Management Planning Act (UWMP Act) and the Water Conservation Act of 2009, Livermore Municipal Water is preparing its 2015 Urban Water Management Plan (UWMP). The UWMP is a guide used to ensure adequate water supplies are available to meet existing and future water demands.

This notice is to inform and encourage your agency participation in the preparation of Livermore Municipal Water's 2015 UWMP.

The UWMP will report, describe, and evaluate Livermore Municipal Water's water deliveries and uses, water supply sources, demand management measures, and the state mandated plan to achieve a reduction of potable water use of 20% by 2020.

A draft of Livermore Municipal Water's 2015 UWMP is expected to be released for public review in April. The status of the 2015 UWMP will be posted on the City of Livermore's website at www.cityoflivermore.net City of Livermore Municipal Water will notice the date and time of the public hearing to provide opportunity for comments on the draft.

Questions or comments regarding Livermore Municipal Water's UWMP should be sent to: wrd_info@cityoflivermore.net.

LIVERMORE
CALIFORNIA

NOTICE OF AVAILABILITY
DRAFT 2015 URBAN WATER MANAGEMENT PLAN

The Draft Livermore Municipal Water 2015 Urban Water Management Plan (UWMP) is now available for public comment. A copy of the Draft 2015 UWMP can be found on our website in the Water Service & Rates section at http://www.cityoflivermore.net/civicax/filebank/documents/14536/

The City of Livermore City Council will conduct a public hearing to provide an opportunity for public comment on the draft 2015 UWMP and consider adoption of the City's draft 2015 UWMP at its regularly scheduled meeting on June 13, 2016, at 7:00 p.m. The hearing will be held at the City Council Chambers, at 3575 Pacific Avenue, City of Livermore, California, 94550.

The draft 2015 UWMP will be available for review beginning May 31, 2016 at the following locations located within the City of Livermore, California:

Water Resources Division, 101 W. Jack London Blvd.
City Hall, 1052 South Livermore Avenue
Civic Center Library, 1188 South Livermore Avenue
Rincon Library, 725 Rincon Avenue

This notice is to inform and encourage your agency participation and comment on the Draft Livermore Municipal Water's 2015 UWMP.

Questions or comments regarding Livermore Municipal Water's UWMP should be sent to: dkdangelo@cityoflivermore.net.

LIVERMORE
CALIFORNIA

April 4, 2016

Albert V. Lopez, Planning Director
Alameda County Planning Department
224 W. Winton Avenue, Room 111
Hayward, CA 94544-1215

Re: 2015 Update – Urban Water Management Plan – Livermore Municipal Water

Dear Mr. Lopez:

As required by California Water code section 10621 (b), this is notification of the 2015 update of Livermore Municipal Water's Urban Water Management Plan (UWMP). The Public Hearing to receive comments on the proposed update is scheduled for **Monday, June 13, 2016** at the City of Livermore Council Chambers, 3575 Pacific Avenue, Livermore, CA 94550.

California Water Code, Part 2.6 Chapters 1 through 4 (Sections 10610 through 10656), are known and may be cited as the "Urban Water Management Planning Act". These California Water Code sections require all urban water suppliers that provide water for municipal purposes either directly or indirectly to more than 3,000 customers, or supply more than 3,000 acre-feet of water annually to prepare an UWMP as outlined and identified in those sections. This requirement applies to public and privately owned water utilities. The plan must describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation, and demand management activities. The plan must also address measures for residential, commercial, governmental, and industrial water demand management.

The act requires urban water suppliers to update their Urban Water Management Plans at least once every five years, and to file updated plans with the Department of Water Resources, the California State Library, and any city or county served by the supplier no later than 30 days after adoption.

Livermore Municipal Water is a public water utility in Alameda County, and serves approximately 35% of the incorporated City of Livermore.

As a defined urban water supplier, Livermore Municipal Water is preparing the 2015 update to its UWMP that will address water service conditions. It is Livermore Municipal Water's intent to adopt the plan and file the plan as required.

A key focus of the UWMP update is the conservation requirement set forth in Senate Bill 7 (SBX7-7) as passed in November 2009. SBX7-7 mandates a statewide 20% reduction in per capita urban water use by 2020. In order to quantify the objectives and identify the means of achieving this mandated demand reduction. Livermore Municipal Water has prepared a for this demand reduction within this year's UWMP.

Livermore Municipal Water is in the process of expanding current conservation programs and developing new programs. Over the next five years, Livermore Municipal Water's conservation program expenditures are likely to increase due in large measure to recently adopted state policies, including the SBX7-7, requiring future reductions in per capita urban water use.

SCHEDULE OF UPCOMING ACTIONS:

On or about May 24, 2016, a copy of the Proposed UWMP will be available for review during normal business hours. If you would like to view the Proposed UWMP, it would be appreciated if you schedule an appointment. To schedule an appointment, please call (925) 960-8100, and someone will assist you.

As an alternative to coming into the office, we can send an electronic copy of the Proposed UWMP. This will be available on or about May 24, 2016. Livermore Municipal Water is also planning to place a copy on the City website at www.cityoflivermore.net. The UWMP will become available on or about May 24, 2016 through June 13, 2016.

Livermore Municipal Water will receive comments on the proposed UWMP from May 24, 2016 through June 13, 2016.

If you are unable to attend the scheduled public meeting, but want to provide comments regarding the proposed UWMP, you may send your comments in writing via email to:

Dana d'Angelo, Management Analyst
Livermore Municipal Water
dkdangelo@cityoflivermore.net

If you have any questions, please call me at (925) 960-8100.

Yours truly,

Dana d'Angelo

Dana d'Angelo
Management Analyst
Livermore Municipal Water

7015 1520 0001 7684 5150

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- ☐ Adult Signature Restricted Delivery $ _____

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Alameda County Planning Department
City, State, ZIP+4®
224 W. Winton Avenue, Room 111
Hayward, CA 94544-1215

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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- ☐ Certified Mail Restricted Delivery $ _____
- ☐ Adult Signature Required $ _____
- ☐ Adult Signature Restricted Delivery $ _____

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Department of Water Resources
Street and Apt. No., or PO Box No.
Statewide Integrated Water Management
City, State, ZIP+4®
Water Use and Efficiency Branch
P.O. Box 942836
Sacramento, CA 94236-001

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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- ☐ Return Receipt (electronic) $ _____
- ☐ Certified Mail Restricted Delivery $ _____
- ☐ Adult Signature Required $ _____
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Sacramento, CA 94237-0001

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Albert V. Lopez, Planning Director
Alameda County Planning Department
224 W. Winton Avenue, Room 11
Hayward, CA 94544-1215

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) [illegible] C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7015 1520 0001 7684 5150

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Department of Water Resources
Statewide Integrated Water Management
Water Use and Efficiency Branch
P.O. Box 942836
Sacramento, CA 94236-001

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X DWR ☐ Agent ☐ Addressee

B. Received by (Printed Name) DWR C. Date of Delivery 4-8

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7015 1520 0001 7684 5167

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

B-3: Published Notices: BayAreaNewsGroup 06/01/2016

al Advertising and Public Notices

Legal Notice

TT UNIFIED SCHOOL DISTRICT
OF PUBLIC HEARING AND OF
OSAL FOR IMPLEMENTING
ULITIES FEES AS AUTHORIZED BY
ON CODE SECTION 17620 AND
VERNMENT CODES 65995

NOTICE that immediately follow-
learing on the matter, a proposed
will be considered by the Govern-
John Swett Unified School Distrigt
t at its regular meeting on June 8,
p.m., at the John Swett Unified
t Office, 400 Parker Avenue, Ro-
2, which if adopted by the Board
t development fees established
t against residential construction
ction at $3.48 per square foot and
ommercial or industrial construc-
square foot. Education Code Sec-
d Government Code Section 65995
proposed fees. Data pertaining
chool facilities is available for in-
g regular business hours at the
inistrative offices. The fee, if ap-
Governing Board, will become ef-
ust 8, 2016, which is 60 days after
adoption of the resolution levying
e Governing Board.

34399 May 25/June 1, 2016

ICE OF PUBLIC HEARING
ION OF WEST CONTRA COSTA
IED SCHOOL DISTRICT
SIDER ENTERING INTO AN
ERVATION SERVICES CONTRACT
n PURSUANT TO GOVERNMENT
SECTION 4217.10, ET SEQ.

REBY GIVEN of the intention of
Board of the West Contra Costa
District ("District"), pursuant to
overnment Code section 4217.12,
ntering into an energy conserva-
contract in the form of an energy
services design, installation, and
u contract with Ke[illegible]
[illegible] private sale to the highest and
r on the terms and conditions
tioned at right, title, and inter-
in the real property located in
unty, California, as follows:
ract 2445 in the City of Antioch,
tra Costa, State of California,
956 in Book 65, Page 8, Contra
ecords.
s commonly referred to as 4
ntioch, California.
subject to current taxe
nditions, restrictions, reserva
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encumbrances of record, to b
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Lee, Esq., Barulich Dugoni La
orney for the trustee, at 400 S.
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Jamay Lee, Esq. personally, b
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Trustee
46425 June 1, 6, 10, 2016

E OF PUBLIC HEARING

REBY GIVEN that on Tuesda
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, Martinez, California, a public
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504 within County Service Are
area.

8, the Contra Costa County D
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he for Subdivision 9367 (Prope
Parker Avenue; Assessor's Pa
6) within County Service Area
dvised of the following:

to form a new zone is mad
Article 8 of Chapter 2.3 of Part
of Title 3 of the California Go
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ription of the area to be inclu
one and detailed maps of th
file and can be found at the fo
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ontra Costa County
Department of
vation and Development
30 Muir Road
Martinez, CA 94553

ion of the zone is proposed
County of Contra Costa ado
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overnment Code Section 25217
earing, the Board shall hear and
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the hearing or delivered to the
ess:

the Board of Supervisors
Administration Building
Zone 2804 Formation
Pine Street, Room 107
Martinez, CA 94553

Dated: _____

ard of Supervisors and
istrator

n, Deputy Clerk
#5743625; Jun. 1, 2016

Legal Notice

Xinhua Xu, Petitioner In Pro Per
SUPERIOR COURT OF CALIFORNIA,
COUNTY OF CONTRA COSTA
Wakefield Taylor Courthouse
725 Court St.
Martinez, CA 94553-1201
PETITION OF: XINHUA XU FOR CHANGE OF NAME
Case No. N16-0801
ORDER TO SHOW CAUSE FOR CHANGE OF NAME
TO ALL INTERESTED PERSONS:
1. Petitioner XINHUA XU filed a petition with this court for a decree changing names as follows:
(Present Name) XINHUA XU to (Proposed Name) AMY XINHUA XU.
2. THE COURT ORDERS: That all persons interested in this matter appear before this court at the hearing indicated below to show cause, if any, why the petition for change of name should not be granted. Any person objecting to the name changes described above must file a written objection that includes the reasons for the objection at least two court days before the matter is scheduled to be heard and must appear at the hearing to show cause why the petition should not be granted. If no written objection is timely filed, the court may grant the petition without a hearing.
NOTICE OF HEARING
Date: 07/01/2016 Time: 9:00 AM
Dept.: 14 Rm.: 212
The address of the court is: 725 Court St., Martinez, CA 94553
A copy of this Order to Show Cause shall be published at least once each week for four successive weeks prior to the date set for hearing on the petition in the following newspaper of general circulation, printed in this County: CONTRA COSTA TIMES
Date: MAY 06, 2016 /s/ John H. Sugiyama
JUDGE OF THE SUPERIOR COURT
CCT #5729212; May 11, 18, 25; Jun. 1, 2016

NOTICE OF PETITION
TO ADMINISTER ESTATE OF
[illegible] available from the court clerk.

Attorney for Petitioner
Ryan J. Szczepanik
Hartog, Baer & Hand, APC
4 Orinda Way, Suite 250-B
Orinda, CA 94563
925-253-1717

WCT 5742971 May 30/June 1, 8, 2016

PUBLIC HEARING

This is to advise that the Livermore City Council will conduct a public hearing at its meeting of June 13, 2016 to consider the following matters. Hearings begin at 7:00 p.m. in the Council Chambers, 3575 Pacific Avenue.

Hearing to consider approval of the issuance by the City of qualified residential rental project bonds, notes or other obligations in one or more series (the "Obligations") in a principal amount not to exceed Twenty Six Million Dollars ($26,000,000). The proceeds of the Obligations will be used to assist in the financing of the acquisition and rehabilitation of 70 units of multifamily rental housing located at 5896 East Avenue, Livermore, California and known as Stoney Creek Apartments (the "Project"). All or a portion of the units in the Project will be occupied by persons or families of lower or very low income.

The owner of the Project is expected to be Stoney Creek Two, L.P. or another limited partnership or limited liability company of which Eden Housing Inc., a California not-for-profit corporation, or an affiliate thereof, is expected to be a partner or a member (the "Borrower").

The Obligations will not constitute an indebtedness or obligation, or a pledge of the faith and credit, of the City. Neither the faith and credit nor any taxing power of the City will be pledged to the payment of the principal of or premium, if any, or interest on the Obligations, nor shall the City be liable or obligated to pay the principal of or premium, if any, or interest on the Obligations. The Obligations will be special, limited obligations of the City, payable solely from the loan repayments made by the Borrower. The public hearing referred to above is required by Section 147(f) of the Internal Revenue Code of 1986, as amended.

2015 Urban Water Management Plan
Public Hearing Notice

As required by the Urban Water Management Planning Act, California Water Code, section 10610, et. seq.("UWMP Act"), this is to notify the public that at its meeting to begin at 7 p.m. on June 13, 2016, the City Council of the City of Livermore plans to conduct a public hearing on, and consider adoption of, the City's draft 2015 updated Urban Water Management Plan, Water Use Reduction Plan, and Water Shortage Contingency Plan ("2015 UWMP"). The hearing will be held at the City Council Chambers, at 3575 Pacific Avenue, City of Livermore, California, 94550.

The draft 2015 UWMP was prepared pursuant to the requirements of the UWMP Act and City of Livermore Municipal Code, chapter 13.26 and updates the City's 2010 Urban Water Management Plan adopted pursuant to City Resolution No. 2011-095.

The draft 2015 UWMP will be available for review beginning May 31, 2016 on the City website www.cityoflivermore.net and at the following locations located within the City of Livermore, California:

Water Resources Division,
101 W. Jack London Blvd.
City Hall, 1052 South Livermore Avenue
Civic Center Library,
1188 South Livermore Avenue
Rincon Library, 725 Rincon Avenue

The staff report and recommendation will be available for review in the City Council agenda packet for the meeting of June 3, 2016, in the City Clerk's office, 1052 South Livermore Avenue, in the Civic Center Library, 1188 South Livermore Avenue as well as on the City of Livermore website at www.cityoflivermore.net. Written information regarding these agenda items must be received in the City Clerk's office by 5:00 pm on Thursday, June 2, 2016, to be included in the agenda packet. Written information received after this deadline will be submitted to the City Council on June 13, 2016 prior to the start of the public hearing.

If you challenge these items in court, you may be limited to raising only those issues you or someone else raised at the public hearing, or in written correspondence delivered at, or prior to, the public hearing. Note: If these actions are subject to the Code of Civil Procedure, Section 1094.5, and you choose to challenge these actions in court, you must seek judicial review within the time specified in the Code of Civil Procedure, Section 1094.6.

All interested persons are invited to attend the public hearing.

Dated: May 26, 2016 Susan Neer, City Clerk
Publish: June 1, 2016
PT/VT #5743918; June 1, 2016

Legal Notice

NOTICE OF PUBLIC HEARING
OF THE FISCAL YEAR 2016-17
AND FISCAL YEAR 2017-18 REVENUE,
OPERATING AND CAPITAL BUDGETS

Notice is hereby given in accordance with California Government Code section 61110 that the Board of Directors of the Town of Discovery Bay Community Services District (CSD) has received for adoption a proposed final Revenue, Operating and Capital Budget for Fiscal Year 2016-17 and Fiscal Year 2017-18 and will hold a public hearing on June 15, 2016, at the Discovery Bay Community Center, 1601 Discovery Bay Boulevard, Discovery Bay, at 7:00 p.m. to consider adopting the final budget. Any person may appear and be heard regarding any item in the budget or regarding the addition of other items.

A copy of the draft budget(s) can be reviewed at the District Office, 1800 Willow Lake Road, Discovery Bay, after June 1, 2016 during normal office hours.
ECT# 5740896 June 1, 2016

NOTICE OF PUBLIC HEARING
BEFORE THE
SAN JOAQUIN REGIONAL RAIL COMMISSION

NOTICE IS GIVEN that beginning at 8:00 a.m., on June 8, 2016 (or as soon as the matter can be heard thereafter) at the Robert J. Cabral Station, Headquarters of the San Joaquin Regional Rail Commission, South Hall Meeting Room, 949 E. Channel St. Stockton, CA 95202, a public hearing will be held to receive oral and written statements regarding the Adoption of an FY 2016/2017 Budget. All persons interested in this matter are invited to be present. If you have any questions about this matter, please contact the San Joaquin Regional Rail Commission. Phone (209) 944-6220.

DATE: May 25, 26, 27, 28, 29, 30, 31, June 1, 2, 3, 2016
BY: Stacey Mortensen, Executive Director
An [illegible] document on the Internet [illegible] California. Introduced and on May 25, 2016, adopted an Ordinance entitled:

ORDINANCE NO. 262 OF THE
TOWN OF MORAGA, CA
Amending Moraga Municipal Code Chapter 8.140: Park Dedications and Chapter 17.24: Park Development Impact Fee

The Ordinance will amend Chapter 8.140: Park Dedications and Chapter 17.24: Park Development Impact Fee. These amendments are necessary to ensure conformance between these two chapters, which implement provisions related to payment of impact fees for new development; and the 2016 Comprehensive Development Impact Fee Update, which was adopted on May 11, 2016.

by the following vote:
AYES: Mayor Metcalf, Vice Mayor Trotter, Councilmembers Arth and Onoda
NOES: None
ABSTAIN: None
ABSENT: Councilmember Wykle

A certified copy of the full text of the proposed ordinance may be read in the Town Clerk's office, 329 Rheem Blvd, Moraga, California, and/or a copy may be obtained from the office at a nominal rate.
Dated this 1st day of June, 2016
Marty C. McInturf, Town Clerk
CCT #5743830; Jun. 1, 2016

Aziza Shafi, Petitioner
CONTRA COSTA COUNTY
SUPERIOR COURT
725 Court St.
P.O. Box 911
Martinez, CA 94553
PETITION OF: AZIZA SHAFI FOR CHANGE OF NAME
Case No. N16-0621
ORDER TO SHOW CAUSE FOR CHANGE OF NAME
TO ALL INTERESTED PERSONS:
1. Petitioner AZIZA SHAFI filed a petition with this court for a decree changing names as follows:
(Present Name) WHEED SHAFI to (Proposed Name) WAHID SHAFI.
2. THE COURT ORDERS: That all persons interested in this matter appear before this court at the hearing indicated below to show cause, if any, why the petition for change of name should not be granted. Any person objecting to the name changes described above must file a written objection that includes the reasons for the objection at least two court days before the matter is scheduled to be heard and must appear at the hearing to show cause why the petition should not be granted. If no written objection is timely filed, the court may grant the petition without a hearing.
NOTICE OF HEARING
Date: 07/07/2016 Time: 9:00 AM
Dept.: 14 Rm.: 212
The address of the court is: 725 Court St., Martinez, CA 94553
A copy of this Order to Show Cause shall be published at least once each week for four successive weeks prior to the date set for hearing on the petition in the following newspaper of general circulation, printed in this County: CONTRA COSTA TIMES
Date: 5-11-16 /s/ John H. Sugiyama
JUDGE OF THE SUPERIOR COURT
CCT #5743791; Jun. 1, 8, 15, 22, 2016

Rufina Adams, Petitioner
CONTRA COSTA COUNTY
SUPERIOR COURT
725 Court St.
P.O. Box 911
Martinez, CA 94553
PETITION OF: RUFINA ADAMS and KEVIN ADAMS FOR CHANGE OF NAME
Case No. N16-0877
ORDER TO SHOW CAUSE FOR CHANGE OF NAME
TO ALL INTERESTED PERSONS:
1. Petitioner RUFINA ADAMS and KEVIN ADAMS filed a petition with this court for a decree changing names as follows:
(Present Name) ANNA NATALIE ADAMS to (Proposed Name) DASHA NATALIE ADAMS.
2. THE COURT ORDERS: That all persons interested in this matter appear before this court at the hearing indicated below to show cause, if any, why the petition for change of name should not be granted. Any person objecting to the name changes described above must file a written objection that includes the reasons for the objection at least two court days before the matter is scheduled to be heard and must appear at the hearing to show cause why the petition should not be granted. If no written objection is timely filed, the court may grant the petition without a hearing.
NOTICE OF HEARING
Date: 07/11/2016 Time: 9:00 AM
Dept.: 14 Rm.: 212
The address of the court is: 725 Court St., Martinez, CA 94553
A copy of this Order to Show Cause shall be published at least once each week for four successive weeks prior to the date set for hearing on the petition in the following newspaper of general circulation, printed in this County: CONTRA COSTA TIMES
Date: MAY 13, 2016 /s/ John H. Sugiyama
JUDGE OF THE SUPERIOR COURT
CCT #5734109; May 18, 25; Jun. 1, 8, 2016

Legal Notice

Notice of Public Hearing

Proposed 2016-17
Orinda Union School District Budget

Notice is hereby given that on Monday, 13, 2016, at 6:00 p.m. at the Orinda U School District Office, Conference Room Altarinda Road, Orinda, CA, the Gover board of the Orinda Union School Distric conduct a Public Hearing to review the posed 2016-17 District budget.
Notice is hereby further given, that co of the Orinda Union School District prepo budget for the Fiscal Year 2016-17 will be a able for public inspection on June 8, 2016, f 8:00a.m. until 4:00 p.m., at the Orinda U School District Office, Conference Room Altarinda Road, Orinda, CA.
All parties having an interest in the proposed budget shall be heard by the Boar the Public Hearing.

/s/ _____
Karen Sakata
Superintendent of Scho
Contra Costa County
CCT #5732867; Jun. 1, 2016

ORINDA

CITY OF ORINDA
ORINDA STREET LIGHTING AND LANDSCAPIN
ASSESSMENT DISTRICT NO. 1986-1

Notice is hereby given that the City Counc of the City of Orinda at a meeting to be held TUESDAY JUNE 21, AT 7:00 P.M. in the Orinda brary Auditorium, 26 Orinda Way, Orinda, Ca fornia, will consider the levy of assessment for the above referenced district in accord-

WITH SUNPOWER PURSUANT TO
GOVERNMENT CODE SECTION 4217.10, ET SEQ

NOTICE IS HEREBY GIVEN of the intention the Governing Board of the West Contra Co Unified School District ("District"), pursuant the terms of Government Code section 4217. to consider entering into an energy conser tion services contract with Sunpower for design, installation, operation and main nance of photovoltaic systems for the deliv of photovoltaic energy for onsite, net meter use at District facilities.

The Board will consider facts and testimony determine whether the Contract is in the b interests of the District and whether the anti pated cost of the thermal, electrical, or oth energy that would have been consumed unc the Contract will be less than the anticipat cost of the thermal, electrical, or other ener that would have been consumed without t Contract.

The time and place set for the public heari on the intention of the Governing Board of t District to consider entering into the Contr is June 15, 2016, at 6:30 p.m., or as soon the after as practicable, at the Lovonya DeJe Middle School Multipurpose Room, located 3400 Macdonald Ave. Richmond, CA.

Testimony of all interested persons for against the proposed Contract will be hea Protests may be made orally or in writing. A protest pertaining to the regularity or su ciency of the proceedings shall be in writ and shall clearly set forth the irregulariti and defects to which the objection is ma All written protests shall be filed with the D trict on or before the time set for the heari The District may waive any irregularities in t form or content of any written notice and the hearing may correct minor defects in t proceedings. Written protests may be wi drawn, in writing, at any time before the c clusion of the hearing.

DATED: May 27, 2016

Lisa LeBlanc
Associate Superintendent for Operations
West Contra Costa Unified School District
WCT #5744388; Jun. 1, 8, 2016

STEVEN P. RETTIG (SBN 178477)
Assistant County Counsel
COUNTY OF CONTRA COSTA
P.O. Box 69, Admin. Bldg.
Martinez, CA 94553-0116
Tel: (925) 335-1830
Fax: (925) 646-2461

Attorney for Petitioner

SUPERIOR COURT OF CALIFORNIA,
CONTRA COSTA COUNTY

In the Matter of	No(s). J15-01314
FREDERICK ASBERRY	CITATION
Minor(s).	(Welfare & Institutions Code §§ 366.23, 366.26

TO: FATHER, MOTHER, OR ALL PERSO CLAIMING TO BE THE FATHER OR MOTH OF SAID MINOR:

YOU ARE HEREBY NOTIFIED that the Ju nile Court of the State of California, County Contra Costa, has ordered that a hearing held pursuant to Welfare and Institutions C section 366.26 to determine whether adopti guardianship or long term foster care is most appropriate plan for the above-nam minor, a dependent child of said Court. deems that the minor should be adopted, Court may sever the parental rights of the rent or parents of the minor.
The said minor is described as follows minor male under the age of 18 born Decemi 27, 2015.
YOU ARE FURTHER NOTIFIED that the he ing will be on July 27, 2016, at 8:30a.m. in Su rior Court, Department 8 or whichever Depu ment to be assigned, located at the Co House, 725 Court Street, Martinez, Califor 94553, or as soon thereafter as the matter m be heard.
YOU ARE HEREBY ADVISED that you are quired to appear before this Court at the t and place stated above to state your inter in the said minor, the parent(s) and mi and each of them, have the right to be rep sented by counsel in this case and the Juc shall advise the minor and the parent(s) of right to counsel. The Judge may appo counsel to represent the minor whether or the minor is able to afford counsel. If any rent appears and is unable to afford coun the Court shall appoint counsel to repres said parent, unless said parent knowingly intelligently waives counsel. The Court m continue the proceeding to make an appoi ment of counsel, or to enable counsel to qualnt himself with the case or to determ whether the parent(s) are unable to aff counsel at their own expense.

Dated: 05/05/16

(SEAL) CLERK OF THE SUPERIOR COU
By: /s/ _____, Depu
CCT #5729287; May 18, 25; Jun. 1, 2016

B-3 Published Notices: BayAreaNewsGroup 06/08/2016

Legal Advertising and Public Notices

Legal Notice

FILED
June 1, 2016
ALAMEDA COUNTY
STEVE MANNING
County Clerk
ALAMEDA COUNTY
By Amorer, Deputy
File No. 518867
FICTITIOUS BUSINESS NAME STATEMENT
Pursuant To Business and Professions Code Sections 17900-17930
The name of the business: Gridlock Brewing Company
located at 1191 Canton Ave., Livermore, Alameda County, CA 94550 is hereby registered by the following owner(s):
Christopher Bozzo
1191 Canton Ave, Livermore, CA 94550
This business is conducted by: an individual
Registrant has not yet commenced to transact business
Expires 6/1/2021
Christopher Bozzo
WB3117865
TVH
June 8, 15, 22, 29 2016

Call Now!
1-800-595-9595
Place Your Ad
Mon-Fri
8:00 am to 5:00 pm

Legal Notice

FILED
April 20, 2016
CONTRA COSTA COUNTY
Joseph E. Canciamilla
County Clerk
CONTRA COSTA COUNTY
By ----, Deputy
File No. F-0002956-00
FICTITIOUS BUSINESS NAME STATEMENT
Pursuant To Business and Professions Code Sections 17900-17930
The name of the business: Peace of Mind Mobile Wellness Centers
located at 15501 San Pablo Avenue, #G309, Richmond, Contra Costa County, CA 94806 is hereby registered by the following owner(s):
Dima Said
15501 San Pablo Avenue, #G309, Richmond, CA 94806
Zeaad Handoush
15501 San Pablo Avenue, #G309, Richmond, CA 94806
This business is conducted by: a married couple
Business commenced on April 20, 2016
Registrant has not yet commenced to transact business
Expires April 20, 2017
/s/ Dima Said
WB0215886
ECT
May 18, 25, June 1, 8 2016

CONTRA COSTA COUNTY
Flood Control and Water Conservation District

NOTICE OF A PUBLIC HEARING

NOTICE IS HEREBY GIVEN that the Board of Supervisors of Contra Costa County will meet in the Board Chambers, Room 107, at 651 Pine Street, Martinez, California, to hold a public hearing on June 21, 2016, at 9:30 a.m., to consider comments of any interested person, either written or oral, on the proposed annual assessments for Stormwater Utility Areas 1-18 to fund the National Pollutant Discharge Elimination System (NPDES) programs for 17 cities and the Unincorporated County; and if approved, to adopt the assessments for placement on the FY 2016/17 property tax rolls, Countywide. A copy of the Engineer's Report and a report of proposed stormwater fees to be borne by each property in each Stormwater Utility Area are on file with the Clerk of the Board of Supervisors, 651 Pine Street, Room 106, Martinez, California.

By June McHuen, Deputy Clerk
CCT #5732126; May 25; Jun. 8, 2016

PUBLIC HEARING

This is to advise that the Livermore City Council will conduct a Public Hearing at its meeting of July 11, 2016 to consider the following matter. Hearings begin at 7:00 p.m. in the Council Chambers, 3575 Pacific Avenue.

Hearing to receive protests related to the non-payment of solid waste, recycling, and organics handling services provided by Livermore Sanitation for collection on the County assessor tax roll.

The staff report and recommendation will be available for review in the City Council agenda packet from the evening of July 1, 2016, at the City Library, 1188 South Livermore Ave-

Rufina Adams, Petitioner
CONTRA COSTA COUNTY
SUPERIOR COURT
725 Court St.
P.O. Box 911
Martinez, CA 94553
PETITION OF: RUFINA ADAMS and KEVIN ADAMS FOR CHANGE OF NAME
Case No. MS16-0877
ORDER TO SHOW CAUSE FOR CHANGE OF NAME
TO ALL INTERESTED PERSONS:
1. Petitioner RUFINA ADAMS and KEVIN ADAMS filed a petition with this court for a decree changing names as follows:
(Present Name) ANNA NATALIE ADAMS to (Proposed Name) DASHA NATALIE ADAMS.
2. THE COURT ORDERS: That all persons interested in this matter appear before this court at the hearing indicated below to show cause, if any, why the petition for change of name should not be granted. Any person objecting to the name changes described above must file a written objection that includes the reasons for the objection at least two court days before the matter is scheduled to be heard and must appear at the hearing to show cause why the petition should not be granted. If no written objection is timely filed, the court may grant the petition without a hearing.
NOTICE OF HEARING
Date: **07/11/2016** Time: **9:00 AM**
Dept: **14** Rm.: **212**
The address of the court is: **725 Court St., Martinez, CA 94553.**
A copy of this Order to Show Cause shall be published at least once each week for four successive weeks prior to the date set for hearing on the petition in the following newspaper of general circulation, printed in this County: CONTRA COSTA TIMES
Date: MAY 13, 2016 /s/ John H. Sugiyama
JUDGE OF THE SUPERIOR COURT
CCT #5734109; May 18, 25; Jun. 1, 8, 2016

NOTICE OF PUBLIC HEARING ON INTENTION OF WEST CONTRA COSTA UNIFIED SCHOOL DISTRICT TO CONSIDER ENTERING INTO AN ENERGY CONSERVATION SERVICES CONTRACT WITH ReGreen PURSUANT TO GOVERNMENT CODE SECTION 4217.10, ET SEQ.

NOTICE IS HEREBY GIVEN of the intention of the Governing Board of the West Contra Costa Unified School District ("District"), pursuant to the terms of Government Code section 4217.12, to consider entering into an energy conservation services contract in the form of an energy conservation services design, installation, and commissioning contract with ReGreen ("Contractor") at Verde Elementary School.

The Board will consider facts and testimony to determine whether the Contract is in the best interests of the District and whether the anticipated cost of the thermal, electrical, or other energy that would have been consumed under the Contract will be less than the anticipated cost of the thermal, electrical, or other energy that would have been consumed without the Contract.

The time and place set for the public hearing on the intention of the Governing Board of the District to consider entering into the Contract is **June 15, 2016 at 5:30p.m.**, or as soon thereafter as practicable, at the Lovonya DeJean Middle School Multipurpose Room, located at 3400 Macdonald Ave. Richmond, CA.

Testimony of all interested persons for or against the proposed Contract will be heard. Protests may be made orally or in writing. Any protest pertaining to the regularity or sufficiency of the proceedings shall be in writing and shall clearly set forth the irregularities and defects to which the objection is made. All written protests shall be filed with the District on or before the time set for the hearing. The District may waive any irregularities in the form or content of any written notice and at the hearing may correct minor defects in the proceedings. Written protests may be withdrawn, in writing, at any time before the conclusion of the hearing.

DATED: May 27, 2016

CALIFORNIA AUCTION
NOTICE IS HEREBY GIVEN THAT THE CONTENTS of the following storage units will be offered for sale by public auction to the highest bidder for enforcement of the storage lien.
The auction will be held on June 22nd 2016
Location: 1850 Solano Way, Concord, CA 94520
Terms: Cash; Abba Self & RV Storage reserves the right to refuse any bid or cancel auction.
Auctioneer: A Ward Auction / California Bonded Auctioneer - State Bond #7580952 & MS2519786

The following units are scheduled for auction:
Nichols, Brigitte / Arias, Jose / Koelker, Jacob /McCormack, Tami / Mercedes, Scott
All units may contain household item, tools electronics, furniture, clothes, boxes and miscellaneous items.
Abba Self & RV Storage

PUBLIC HEARING

This is to advise that the Livermore City Council will conduct a public hearing at its meeting of June 13, 2016 to consider the following matters. Hearings begin at 7:00 p.m. in the Council Chambers, 3575 Pacific Avenue.

2015 Urban Water Management Plan
Public Hearing Notice

As required by the Urban Water Management Planning Act, California Water Code, section 10610, et. seq.("UWMP Act"), this is to notify the public that at its meeting to begin at 7 p.m. on June 13, 2016, the City Council of the City of Livermore plans to conduct a public hearing on, and consider adoption of, the City's draft 2015 updated Urban Water Management Plan, Water Use Reduction Plan, and Water Shortage Contingency Plan ("2015 UWMP"). The hearing will be held at the City Council Chambers, at 3575 Pacific Avenue, City of Livermore, California, 94550.

The draft 2015 UWMP was prepared pursuant to the requirements of the UWMP Act and City of Livermore Municipal Code, chapter 13.26 and updates the City's 2010 Urban Water Management Plan adopted pursuant to City Resolution No. 2011-006.

The draft 2015 UWMP will be available for review beginning May 31, 2016 on the City website www.cityoflivermore.net and at the following locations located within the City of Livermore, California:

Water Resources Division,
101 W. Jack London Blvd.
City Hall, 1052 South Livermore Avenue
Civic Center Library,
1188 South Livermore Avenue
Rincon Library, 725 Rincon Avenue

The staff report and recommendation will be available for review in the City Council agenda packet from the evening of June 3, 2016, in the City Clerk's office, 1052 South Livermore Avenue, in the Civic Center Library, 1188 South Livermore Avenue as well as on the City of Livermore website at www.cityoflivermore.net. Written information regarding these agenda items must be received in the City Clerk's office by 5:00 pm on Thursday, June 2, 2016, to be included in the agenda packet. Written information received after this deadline will be submitted to the City Council on June 13, 2016 prior to the start of the public hearing.

If you challenge these items in court, you may be limited to raising only those issues you or someone else raised at the public hearing, or in written correspondence delivered at, or prior to, the public hearing. Note: if these actions are subject to the Code of Civil Procedure, Section 1094.5, and you choose to challenge these actions in court, you must seek judicial review within the time specified in the Code of Civil Procedure, Section 1094.6.

All interested persons are invited to attend the public hearing.

Dated: May 25, 2016 Susan Neer, City Clerk
PT/VT #5745356; June 8, 2016

NOTICE TO CONTRACTORS
INVITING SEALED BIDS

B-3: Published Notices: The Independent 06/09/2016

PUBLIC HEARING

This is to advise that the Livermore City Council will conduct a public hearing at its meeting of June 13, 2016 to consider the following matter. Hearings begin at 7:00 p.m. in the Council Chambers, 3575 Pacific Avenue.

2015 Urban Water Management Plan

As required by the Urban Water Management Planning Act, California Water Code, section 10610, et. seq. ("UWMP Act"), this is to notify the public that at its meeting to begin at 7 p.m. on June 13, 2016, the City Council of the City of Livermore plans to conduct a public hearing on, and consider adoption of, the City's draft 2015 updated Urban Water Management Plan, Water Use Reduction Plan, and Water Shortage Contingency Plan ("2015 UWMP"). The hearing will be held at the City Council Chambers, at 3575 Pacific Avenue, City of Livermore, California, 94550.

The draft 2015 UWMP was prepared pursuant to the requirements of the UWMP Act and City of Livermore Municipal Code, chapter 13.26 and updates the City's 2010 Urban Water Management Plan adopted pursuant to City Resolution No. 2011-095.

The draft 2015 UWMP will be available for review beginning May 31, 2016 on the City website www.cityoflivermore.net and at the following locations located within the City of Livermore, California:

Water Resources Division, 101 W. Jack London Blvd.
City Hall, 1052 South Livermore Avenue
Civic Center Library, 1188 South Livermore Avenue
Rincon Library, 725 Rincon Avenue

The staff report and recommendation will be available for review in the City Council agenda packet from the evening of June 3, 2016, in the City Clerk's office, 1052 South Livermore Avenue, in the Civic Center Library, 1188 South Livermore Avenue as well as on the City of Livermore website at www.cityoflivermore.net. Written information regarding these agenda items must be received in the City Clerk's office by 5:00 pm on Thursday, June 2, 2016, to be included in the agenda packet. Written information received after this deadline will be submitted to the City Council on June 13, 2016 prior to the start of the public hearing.

If you challenge these items in court, you may be limited to raising only those issues you or someone else raised at the public hearing, or in written correspondence delivered at, or prior to, the public hearing. Note: If these actions are subject to the Code of Civil Procedure, Section 1094.5, and you choose to challenge these actions in court, you must seek judicial review within the time specified in the Code of Civil Procedure, Section 1094.6.

All interested persons are invited to attend the public hearing.

Dated: May 26, 2016
Publish: June 2, 2016 and June 9, 2016
Susan Neer, City Clerk

LIVERMORE
CALIFORNIA

July 1, 2016

California State Library
Government Publications Section
P.O. Box 942837
Sacramento, CA 94237-0001

Attention: Coordinator, Urban Water Management Plans

Enclosed is a copy of the 2015 Update of the Urban Water Management Plan for Livermore Municipal Water as required by the Urban Water Management Planning Act.

If you have any questions regarding Livermore's Urban Water Management Plan, please call Dana d'Angelo or Helen Ling at (925) 960-8100.

Sincerely,

Helen Ling
Water Resource Division Manager
Water Resources Division, Public Works Department
(925) 960-8100
(925) 960-8105

cc: Darren Greenwood, Director of Public Works
Dana d'Angelo, Management Analyst

Enclosures
1. 2015 Urban Water Management Plan

Appendix C: Resolutions and Ordinances

1. Resolution 2016-066 adopting 2015 UWMP, Water Shortage Contingency Plan, and Water Use Plan
2. Water Shortage Contingency Plan (1996, 2005, 2011)
3. Resolution 2011-097 adopting the 2011 Water Shortage Contingency Plan
4. Chapter 13.26 Water Conservation Ordinance (ORD, 1946, 2011).
5. Chapter 13.27 Mandatory Drought Conservation Ordinance (ORD1997, 2014 and ORD 1995, 2014).
6. Water Rates (Inverted Tiered Rate and Conservation Rates) Resolution 2009-087
7. Chapter 15.80 Civic Bay-Friendly Landscaping Ordinance 1876
8. State WELO

IN THE CITY COUNCIL OF THE CITY OF LIVERMORE, CALIFORNIA

A RESOLUTION APPROVING THE 2015 URBAN WATER MANAGEMENT PLAN UPDATE FOR THE LIVERMORE MUNICIPAL WATER SYSTEM

The California Urban Water Management Planning Act, California Water Code sections 10610 *et. seq.*, ("Act") requires each urban water supplier, such as the City of Livermore through its Municipal Water System, to adopt an Urban Water Management Plan ("UWMP") and to update the UWMP at least once every five years. The UWMP supports an urban retail water supplier's long-term water resource planning, and ensures adequate water supplies are available to meet existing and future water demands. The reliability and efficient use of water supplies are assessed over a 20-year planning horizon during normal, dry and multiple dry year conditions.

A draft 2015 Urban Water Management Plan for the Livermore Municipal Water System has been prepared to meet all of the requirements of the Act and has been made available to the public for review and comment prior to today as required by the Act ("2015 UWMP"). Following the requirements of the Act, a public hearing concerning the 2015 UWMP was noticed for today, has been held, and public comments about it have been taken.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Livermore, that public comments have been taken and considered concerning the draft 2015 Urban Water Management Plan for the City of Livermore Municipal Water System, prepared in conformance with the requirements of the California Urban Water Management Planning Act, California Water Code sections 10610 *et. seq.* ("Act"), a copy of which plan is on file in the Office of the City Clerk ("2015 UWMP").

BE IT FURTHER RESOLVED, by the City Council of the City of Livermore, that the 2015 UWMP is approved and adopted.

BE IT FURTHER RESOLVED, by the City Council of the City of Livermore, that the City Clerk is directed to file a copy of the adopted 2015 UWMP with the California Department of Water Resources in conformance with the requirements of the Act.

On motion of Council Member Spedowfski, seconded by Council Member Woerner, the foregoing resolution was passed and adopted on June 13, 2016, by the following vote:

AYES: Council Members Spedowfski, Turner, Woerner, Vice Mayor Gary, Mayor Marchand
NOES: None
ABSENT: None
ABSTAIN: None

ATTEST:

Susan Neer
City Clerk

APPROVED AS TO FORM:

Robert Mahlowitz
Assistant City Attorney

Dated: June 16, 2016

Appendix C2

Livermore Municipal Water
Water Shortage Contingency Plan

Introduction

The City of Livermore has developed this Water Shortage Contingency Plan for the Livermore Municipal Water System as required by California Water Code Section 10632(a). The Plan describes the following required elements:

- Water conservation stages of action in response to shortages up to 50%;
- Estimates of the minimum 3-year water supply available;
- Actions taken to prepare for and implement during catastrophic supply interruptions;
- Mandatory prohibitions and consumption reduction methods;
- Penalties and charges for excessive use;
- Analysis of potential revenue impacts from Shortage Plan implementation;
- Mechanisms for determining water use reductions.

Background

The City first adopted a Water Shortage Contingency Plan in 1991 and updated the plan in 1996 and 2005. The Water Shortage Contingency Plan has undergone a more comprehensive revision as part of the 2010 Urban Water Management Plan update to incorporate more consistent regional requirements. In March 2009, the Committee of Valley Water Retailers; comprised of Council Members, Board of Directors, or Management-level representatives from each of the four urban water retailers; approved a model Tri-Valley Retailers Water Shortage Contingency Plan to allow consistent implementation of requirements within the Zone 7 service area during water shortage events.

Also, the Livermore City Council adopted a Water Conservation Plan in 1991 which specified voluntary and mandatory conservation measures. The requirements in the 1991 Conservation Plan have been updated and incorporated into the Water Shortage Contingency Plan. Modifications to the Livermore Municipal Code updating the legal authority to implement expanded conservation measures will be made after adoption of the updated Shortage Plan. This updated Water Shortage Contingency Plan is intended to supersede the previous Water Shortage Contingency Plan and Water Conservation Plan.

The Water Shortage Contingency Plan will be reviewed and updated periodically as necessary to ensure conformance with California Water Code requirements; but at least every five years as part of the Urban Water Management Plan update process.

Activation

The Livermore City Council may enact any stage of the Water Shortage Contingency Plan by adopting a resolution in response to local or regional water supply conditions. The Plan may be enacted based on a number of conditions, including:

- A formal water supply shortage notification by the Zone 7 Water Agency;
- A collective recommendation of the Tri-Valley Water Retailers Group;
- An actual or potential local water supply restriction or emergency affecting the Livermore Municipal Water system;

The Livermore City Council may also enact Stage I or Stage II water restrictions and conservation rates as necessary to meet the requirements of the Water Conservation Bill of 2009, which requires a reduction in baseline per capita water usage of 20% by 2020.

The Conservation Stages will normally be implemented in a progressive manner; however it may be necessary for the City to skip Stages in the use reduction plan in response to catastrophic supply reductions. In general, conservation/use reduction levels will be set according to the anticipated reduction in available water supplies.

Stages of Action / Conservation Stages

Each Stage in the Plan is organized in the following manner:

- **Definition**: This is the condition of the water supply that would normally trigger this element of the Plan.
- **Message**: This is an example of the message that might be communicated to the public to describe the state of water availability.
- **Type**: This defines whether the stage is voluntary or mandatory on the part of the customer.
- **Expected Reduction**: This is an estimate of the range of reduction that may be required under each stage of the Plan. A specific goal will be defined when each stage of the Plan is activated.

Normal Supply

Inclusion of “Normal Supply” in the Plan is an important level. The Water Conservation Bill of 2009 requires urban water suppliers to reduce per-capita water consumption by 20 percent by 2020. Implementing conservation during “Normal Supply” periods will play an important role in reaching the required twenty percent reduction in per-capita consumption.

- **Definition**: Water supplies are adequate to meet all the water demands of customers.
- **Message**: We can deliver all the water our customers need, recognizing that customers should practice wise water use at all times.
- **Type**: Voluntary.
- **Expected Reduction**: None targeted
- **Conservation**: Basic water conservation measures and public information promoting wise water use and Best Management Practices when using water for residential, commercial or irrigation uses.

Stage 1- Minimal Reduction

- **Definition**: There is sufficient uncertainty concerning water supplies for this year or in the next few years that it would be prudent to conserve local water supplies so that these supplies may be used to meet water demands in the future.
- **Message**: We think we can deliver all the water our customers want, but request their help to conserve water to be sure local and imported supplies are adequate to meet future years' water demands – please conserve.
- **Type**: Voluntary.
- **Expected Reduction**: Up to 20%

Stage 2- Moderate Reduction

- **Definition**: There are definable events that lead to a reasonable conclusion that in the current and/or upcoming water years, water supplies may not be adequate to meet all customer water demands.
- **Message**: We may not be able to deliver all the water our customers want and we need customers' help to conserve water.
- **Type**: Voluntary or Mandatory.
- **Expected Reduction**: up to 20%

Stage 3- Severe Reduction

- **Definition**: There are definable events that lead to a firm conclusion that in the current water year, water supplies will not be adequate to meet customers' water demands.
- **Message**: We can not deliver all the water our customers need and we are requiring our customers to use less water.
- **Type**: Mandatory.
- **Expected Reduction**: 20 to 35%

Stage 4- Critical Reduction

- **Definition**: A Stage 3 shortage has been in effect and the reduction goal is not being met or new definable events require increasing the reduction goal.
- **Message**: We can not deliver all the water our customers need and we have not been able to achieve targeted reductions so we are now have to enforce the use of less water.
- **Type**: Mandatory.
- **Expected Reduction**: 35 to 50%

Water Emergency

A water emergency is when a specific event causes a disruption in the water supply. The disruption may affect all or part of the local Livermore Municipal Water system or the wider Zone 7, or statewide distribution system. In the event of emergency conditions affecting the water supply, the Livermore City Manager may declare a Water Emergency.

- **Definition**: There is a major failure of a supply, storage or distribution facility.
- **Message**: A very serious problem has occurred and we are unable to deliver sufficient water for human consumption, sanitation and/or fire protection.
- **Type**: Mandatory.
- **Expected Reduction**: Varies by area in response to specific situation

Table 1 below summarizes the Stages of Action that Livermore Municipal Water will use to address water supply shortages.

Table 1 – Livermore Municipal Water Stages of Action

Stage	Shortage Condition	Required Reduction	Voluntary or Mandatory
1	Up to 20%	10% to 20%	Voluntary
2	Up to 20%	20%	Voluntary or Mandatory
3	20% - 35%	35%	Mandatory
4	35% - 50%	50%	Mandatory

Actions required by each Stage of the Water Shortage Contingency Plan are cumulative; therefore if Stage 2 of the Plan is implemented, all of the reduction measures in both Stage 1 and Stage 2 shall be implemented.

The priorities for use of available water during shortages, based on Chapter 3 of the California Water Code, are as follows:

1. Health & Safety – interior residential (drinking & sanitation) and fire fighting;
2. Commercial, Industrial & Governmental – maintain jobs and economic base;
3. Annual Crops – protect jobs;
4. Existing Landscaping – especially trees and shrubs;
5. New Demands – projects without permits when shortage is declared

Table 2 below shows the types of actions or prohibitions that will be implemented by Livermore Municipal Water staff in response to each shortage Stage.

Table 2 – Stages of Actions and Consumption Reduction Methods

Stage	Expected Reduction	Consumption Reduction Methods
1	0 to 20%	• Public Education / Outreach; • Minimize distribution system flushing; • Voluntary Conservation Practices; o Use shut-off nozzles, no runoff, over-spray, or saturation of landscaping; o Sprinkler irrigation only between 9 p.m. and 6 a.m.; o Pools, fountains/spas must be leak-proof; o Use broom/bucket to wash pavement; o Recommend recycled water for construction uses if available.
2	0 to 20%	• Expanded Outreach / Voluntary cutback request; • Implement Stage 2 Conservation Rates; • Eliminate distribution system flushing; • Expanded Conservation Practices; o Stage 1 practices may become mandatory; o Odd / Even irrigation only, twice per week; o Cover pools/spas when not in use; o Use bucket to wash vehicles/boats/buildings, no more than monthly, encourage commercial wash services that recycle; o Require low-flow rinse nozzles at restaurants.

Stage	Expected Reduction	Consumption Reduction Methods
3	20 to 30%	• Expanded Outreach / Mandatory cutback request; • Implement Stage 3 Conservation Rates; • Eliminate sewer main flushing except in the case of back-ups or overflows; • Expanded Conservation Practices o Hand watering on Saturday or Sunday only; o Prohibit the use of potable water for street washing or flushing; o Only wash vehicles at commercial establishments that recycle water; o Prohibit potable water for construction uses; o Require low flow nozzles at restaurants
4	35 to 50%	• Aggressive Public Outreach via Livermore “communicator” system – Mandatory cutback request • Implementation of Stage 4 Conservation Rates • Mandatory use prohibitions o No turf irrigation; hand water only on Saturday or Sunday o Prohibit potable water use for ornamental fountains and ponds; refill only for public health or structural needs o Prohibit draining and filling of private pools; prohibit draining of public pool except for public health or structural needs • Excessive Use Penalties as appropriate

Minimum 3 Year Water Supply

Livermore Municipal Water purchases all of its potable water supplies from the Zone 7 Water Agency and has no other source of supply. While Livermore Municipal Water relies on Zone 7 as its primary water source, the Zone 7 system consists of a variety of different sources. A summary of Zone 7 supplies includes:

- Imported Surface Water
  - State Water Project
  - Byron Bethany Irrigation District
- Local Surface Water Runoff
  - Arroyo Las Positas
  - Arroyo Mocho
- Local Storage
  - Lake Del Valle
  - Chain of Lakes
- Non-Local Storage
  - Semitropic Water Storage District
  - Cawelo Water District

Therefore, Zone 7 is able to balance its supply between a variety of different sources to adapt to shortages or limitations in any one source due to legal, environmental, regulatory, or climatic factors. Chapters 7 and 16 of the 2010 Zone 7 Water Agency Urban Water Management Plan discuss the reliability of each of the Zone's water supply sources and the overall system reliability through 2030. Excerpts from page 16-1 of the Zone 7 Urban Water Management Plan regarding system reliability during normal, singly dry years, and multiple dry years are included below:

- *Under normal water years, Zone 7 does not anticipate any difficulty in meeting projected water demands, with or without additional conservation measures, assuming Zone 7 can successfully implement planned programs and projects (Table 16-1);*
- *Under single dry years, Zone 7 does not expect shortages through 2030 with the implementation of planned programs and projects (Table 16-2). The maximum potential shortage—based on the High Water Demand scenario—could be as high as 8,700 AF between 2020 and 2030 if Zone 7cannot implement planned programs and projects.*
- *Under multiple dry years, planned programs and projects have similarly been designed to prevent any shortages. Zone 7's analysis indicates that, without such programs and projects, shortages of up to 36,000 AF can be expected under a multiple dry year scenario ending in 2030 based on the High Water Demand scenario.*

City staff will continue to work with Zone 7 staff directly and through the Tri Valley Water Retailers Group and the Committee of Valley Water Retailers to ensure that appropriate projects and programs are implemented to meet expected water demand at build-out of the adopted Livermore General Plan.

The 2010 Zone 7 Urban Water Management Plan includes projections for the minimum water supply available during the next three years based on the driest three-year historic sequence for Zone 7's water supplies. Table 13-1 from the 2010 Zone 7 UWMP is included below. The minimum supply years vary between imported surface water and local runoff sources due to hydrologic conditions, water supply infrastructure, and other conditions[1].

Table 13-1. Three-Year Estimated Minimum Water Supply[(a)] (Acre-Feet Annually)

Acre-Feet Annually		Year			
		2011	2012	2013	Normal
Imported Surface Water	SWP[(b)] – Table A	15,700	22,700	19,500	51,400
	SWP[(b)] – Yuba Accord	676	676	676	145
	BBID[(c)]	2,000	2,000	2,000	4,000
Local Runoff	Arroyo del Valle	350	520	150	3,440
Total Water Supply		18,726	25,896	22,326	58,985

[(a)] Based on the driest three-year historic sequence applicable for each water supply.
[(b)] State Water Project
[(c)] Byron-Bethany Irrigation District

Based on water demand projections submitted by Livermore Municipal Water to Zone 7 during preparation of the 2010 Urban Water Management Plan, Zone 7 confirmed that it would meet all of the projected demands over the 20 year planning horizon provided that water supply projects could be implemented as planned.

Catastrophic Supply Interruptions

This section describes actions taken by Livermore Municipal Water to prepare for and to be implemented during a catastrophic interruption of water supplies. Potential catastrophic supply interruptions include but are not limited to a regional power outage, earthquake, or other disaster causing a water supply outage such as a failure of the San Joaquin Delta levee system.

Livermore Municipal Water has developed a comprehensive Emergency Response Plan (ERP) that addresses a variety of potential emergency situations directly affecting the LMW system. The goals of the ERP are to:

- Rapidly restore water service after an emergency;
- Ensure adequate water supply for fire suppression;
- Minimize water system damage;
- Minimize impacts and loss to customers;
- Minimize negative impacts on public health and employee safety;
- Provide emergency public information concerning customer service.

[1] 2010 Zone 7 Urban Water Management Plan, p 13-3

The ERP establishes “Action Plans” for different emergency conditions which outline the steps LMW staff will take to respond to, evaluate, and mitigate the emergency. Action Plans were developed for a variety of water supply interruptions, including: power outages; earthquakes; flooding; and terrorist events.

In addition to Action Plans, the LMW Emergency Response Plan includes an inventory of emergency supplies, mutual aid contacts, and lists of potential vendors of emergency supplies.

The LMW Emergency Response plan was developed to comply with Section 1433(b) of the Safe Drinking Water Act (SDWA) as amended by the Public Health Security and Bioterrorism Preparedness and Response Act of 2002. Due to the sensitive nature of the information contained in the Emergency Response Plan, the plan includes an Access Control section that limits distribution of the plan to “individuals directly involved in Livermore Municipal Water’s emergency planning and response activities. Therefore, excerpts from the LMW ERP are not included with the Urban Water Management Plan or Water Shortage Contingency Plan.

Mandatory Prohibitions

The Water Shortage Contingency Plan includes a variety of voluntary and mandatory management practices to conserve water. The majority of the mandatory conservation practices are triggered at the Stage 3 level; corresponding to an expected reduction of 20-35% below normal use as shown above in Table 2. Some of the mandatory prohibitions are described below:

- The use of potable water for municipal activities such as street cleaning and sewer main flushing will be suspended at the Stage 3 level. Recycled water will be used for these needs in Stage 3 water shortage events, with the exception of water used for sewer line flushing during emergency sanitary sewer blockages or overflows.

- Implementation of odd/even irrigation, with no watering on the 31st of each month for residential and commercial uses is included in Stage 2 and may be implemented as a voluntary or mandatory prohibition.

- The use of sprinkler irrigation will be prohibited and the requirement to irrigate by hand-watering only on Saturday or Sunday will become mandatory at the Stage 3 level.

- The use of potable water for compaction or dust control during construction activities will be prohibited at the Stage 3 level since recycled

water is available for these uses.

- The use of potable water for filling swimming pools will become a mandatory prohibition at the Stage 4 level.

- The use of potable water for washing buildings, vehicles or boats except at facilities which capture and recycle the water will become a mandatory prohibition at the Stage 4 level.

Penalties for Excessive Use

Livermore Municipal Water utilizes several financial disincentives or penalties to discourage excessive use, both during normal water conditions and during shortage events.

The primary financial "penalty" for excessive use is the ascending tier water rates used by LMW, with increasing rates for higher levels of use. Ascending tier rates are in-place during normal and water shortage conditions. In addition, LMW also utilizes conservation rates that have an ascending rate structure to further discourage excessive use.

Livermore Municipal Water also has the authority to implement a penalty for excessive use by individual customers. Livermore Municipal Water staff will develop conservation usage targets based on average per-capita consumption or a percentage of historic consumption in response to specific shortage events. These usage targets will be used to evaluate customers for potential excessive use penalties. If customers uses more than the allotted usage targets for three consecutive billing periods, the City may increase the water rates to the highest conservation tier for a period of three months.

Customers will be provided with the ability to appeal excessive use penalties if they feel their use allocation was inappropriate due to factors such as:

- A higher than average number of people in residential units;
- Medical needs that demand water-consuming devices or uses;
- Water consumed in products or activities that cannot be reduced.

Customers will also have an opportunity to appeal excessive use penalties based on economic hardship or other factors. Excessive use penalties would be implemented at the Stage IV level.

In addition to additional charges for excessive use through ascending tier rates and penalties for excessive use, LMW may also issue penalties for violating mandatory prohibitions. Livermore Municipal Water staff will be able to issue administrative citations to customers violating mandatory prohibitions starting at the Stage IV conservation level. Administrative citations carry a fine of

approximately $100 each.

Analysis of Revenue Impacts

Prolonged water shortage events and conservation practices that reduce water consumption will have impacts to water system revenues. To offset the impacts of water shortages on water system revenue, Livermore Municipal Water has developed an operating reserve and conservation rates that can be enacted in response to water shortages.

Conservation rates are updated and adopted by the Livermore City Council each time LMW water rates and service charges are adjusted. By having conservation rates previously adopted, LMW can avoid the delays associated with Proposition 218 notification and ballot procedures prior to implementing conservation rates in response to emergency water supply shortages. Conservation rates can then be implemented by Council resolution during water shortage events.

The Livermore City Council will typically implement the conservation rate corresponding to each Shortage Level; however Council may adopt conservation rates of a higher or lower Shortage Level at their discretion, based on the current status of water system revenues, progress towards compliance with water reduction targets, or other factors. Council can also declare a water shortage and implement the corresponding voluntary or mandatory use restrictions/prohibitions without implementing conservation rates.

Livermore Municipal Water has conservation rates that correspond to each Stage identified in the Water Shortage Contingency Plan, and are calculated to recover the necessary revenue based on the expected percentage reduction at each Stage. Since Livermore Municipal Water rates are comprised of both a fixed meter service charge and a variable water rate component, only a portion of the monthly charges are affected by reductions in water consumption.

Table 3 below presents a general overview of 2010 Livermore Municipal Water system revenues and expenses showing how the expected use reductions at each Stage might impact net water system revenue.

Table 3 – Impacts of Water Use Reductions on Net Water System Revenue[2]

	Normal	Stage 1[3] 10%	Stage 2 20%	Stage 3 35%	Stage 4 50%
Operating Revenue					
Water Sales	$7,879,000	$7,091,100	$6,303,200	$5,121,350	$3,939,500
Meter Service Chg	$2,521,000	$2,521,000	$2,521,000	$2,521,000	$2,521,000
Total Revenue	$10,400,000	$9,612,100	$8,824,200	$7,642,350	$6,460,500
Gross Revenue Loss	0	$787,900	$1,575,800	$2,757,650	$3,939,500
Operating Expenses					
Administration	$1,289,150	$1,289,150	$1,289,150	$1,289,150	$1,289,150
Water Purchase	$5,850,900	$5,265,810	$4,680,720	$3,803,085	$2,925,450
Pumping Expense	$204,650	$202,600	$198,500	$184,200	$167,800
Transport/Distribution	$1,688,600	$1,688,600	$1,688,600	$1,688,600	$1,688,600
Accounting/Billing	$641,230	$641,230	$641,230	$641,230	$641,230
Conservation[4]	0	$20,000	$50,000	$150,000	$250,000
Total Expenses	$9,674,530	$9,107,390	$8,548,200	$7,756,265	$6,962,230
Expense Savings	0	$567,140	$1,126,330	$1,918,265	$2,712,300
Net Revenue Loss	0	$220,760	$449,470	$839,385	$1,227,200

Livermore Municipal Water's conservation rates are designed to recover the revenue necessary to fund water system operations as well as prudent operating and renewal/replacement reserves at each Stage of Action.

Based on the estimated 2010 revenue and expense information shown in Table 3, water conservation rates would need to recover between approximately $220,000 and $1.2 million in net revenue lost per year, depending on the Conservation Stage implemented. This estimate of lost revenue takes into account the reduced water purchase and pumping expenses as well as increased conservation program expenses. With an estimated 2010 water sales revenue of approximately $7.88 million from "normal" water rates, an additional $220,000 to $1.2 million represents an increase of between 2.8% and 15.6% in revenue, and therefore in conservation rates. However, the actual increase in conservation rates would be greater than these percentages, since the lost revenue would have to be recovered from a smaller *volume* of water sold. Also, the calculation of conservation rates is more complicated due to the ascending tier rate structure used by Livermore Municipal Water to encourage conservation during Normal supply conditions. The general water rate impacts discussed above are for example purposes only.

[2] Based on projected Fiscal Year 2010/2011 expenses and revenue.
[3] Stage 1 use reduction assumed at 10% (Stage 1 range is 0 to 20%).
[4] Estimated additional expenses to implement expanded public outreach, billing, monitoring and other procedures and activities to achieve use reductions associated with each Stage.

An evaluation of the potential loss in water system revenue is conducted each time normal water rates are adjusted to calculate and adopt updated conservation rates as noted above. Normal water rates and conservation rates were last adjusted in July 2009.

Mechanism for Determining Use Reductions

Livermore Municipal Water has developed monitoring procedures to determine if water use reductions are being met during Stage 1-4 water shortages, as well as during critical water emergency or disaster events.

Normal Monitoring Procedure:

In normal water supply conditions, purchase and sales data is checked monthly by water staff and compiled by the Water Supervisor. These totals are reported to the Water Resources Manager or the Public Works Director as requested. The totals are also logged into the annual report to the Department of Water Resources.

Stage 1 or Stage 2 Water Shortage*:*

During a Stage 1 or Stage 2 water shortage, weekly turnout readings are reported to the Water Supervisor. The Supervisor compares the weekly purchase records to the weekly target to verify that the reduction goal is being met. Weekly reports are forwarded to the Water Resources Manager and the Public Works Director. Monthly summary reports are also sent to the Public Works Director. If reduction goals are not met, the Water Supervisor will propose additional activities or conservation measures and advise the Water Resources Manager. The Manager will notify the Public Works Director that additional corrective actions or use-reduction measures will be implemented.

Stage 3 and 4 Water Shortages:

During a Stage 3 or 4 water shortage, the procedure listed above will be followed, with the addition of a daily water purchase report being submitted to the Water Resources Manager.

Emergency Shortage*:*

During an Emergency Shortage, a major focus will be on monitoring LMW storage tanks to ensure adequate fire protection and emergency storage. Water staff will review tank levels via the Supervisor Control and Data Acquisition (SCADA) system on an hourly or continuous basis to ensure tank levels are maintained at safe levels for as long as possible. Also, meter readings of the volume of water purchased by LMW can be reported to the Water Supervisor, Water Resources Manager or Public Works Director hourly, if needed.

Appendix C-3 Resolution 2011-097
Adopting Water Shortage Contingency Plan

IN THE CITY COUNCIL OF THE CITY OF LIVERMORE, CALIFORNIA

A RESOLUTION APPROVING A WATER SHORTAGE CONTINGENCY PLAN FOR THE LIVERMORE MUNICIPAL WATER SYSTEM

California Water Code section 10632 requires each urban water supplier to conduct a water shortage contingency analysis including: stages of action to be taken in response to water supply shortages; an estimate of the minimum water supply available in the next three years; actions to be taken to prepare for and implement during catastrophic water supply interruptions; additional, mandatory prohibitions against specific practices during shortages; consumption reduction methods capable of achieving a fifty percent reduction in water use; penalties and charges for excessive use; an analysis of the impacts to water system revenues and expenses of implementing the shortage plan; and mechanisms for determining reductions in water use.

The City of Livermore first developed a water shortage contingency plan in 1991 and updated the plan in 1996 and 2005. In 2009, the Committee of Valley Water Retailers, comprised of representatives from the Livermore City Council, the Pleasanton City Council, the Dublin San Ramon Services District Board of Directors, and the California Water Service Company adopted a model water shortage contingency plan to encourage regional consistency. The Water Shortage Contingency Plan for the Livermore Municipal Water System has been updated to incorporate provisions from the model water shortage plan adopted by the Committee of Valley Water Retailers.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Livermore that the Water Shortage Plan for the City of Livermore Municipal Water System is approved, a copy of which is on file in the Office of the City Clerk.

On the motion of Councilmember Williams, seconded by, Vice Mayor Marchand, the foregoing resolution was passed and adopted on the 13th day of June, 2011, by the following vote:

AYES: Councilmembers Horner, Leider, Williams, Vice Mayor Marchand, Mayor Kamena
NOES: None
ABSENT: None
ABSTAIN: None

ATTEST & DATE:

CITY CLERK
SUSAN NEER

APPROVED AS TO FORM:

SPECIAL COUNSEL
AMARA MORRISON

DATE: June 14, 2011

RESOLUTION NO. 2011-097

IN THE CITY COUNCIL OF THE CITY OF LIVERMORE, CALIFORNIA

AN ORDINANCE ADDING A NEW CHAPTER 13.26, WATER CONSERVATION, TO DIVISION 1 (WATER) OF TITLE 13 (PUBLIC WORKS) OF THE LIVERMORE MUNICIPAL CODE, TO PROVIDE FOR VOLUNTARY AND MANDATORY WATER CONSERVATION

In November 2009, the Governor of the State of California enacted the Water Conservation Bill of 2009, Senate Bill x7-7, which required urban water suppliers in California to reduce per-capita water demand by twenty (20) percent by the year 2020.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF LIVERMORE DOES ORDAIN AS FOLLOWS:

Section 1. *Amendment.* Chapter 13.26 of the Livermore Municipal Code is hereby amended, as set forth in Exhibit A, attached hereto.

Section 2. *Environmental.* The passage of this ordinance is not a project according to the definition in the California Environmental Quality Act and, therefore, is not subject to the provisions requiring environmental review.

Section 3. *Severability.* If any part of this ordinance is declared invalid by a court, such invalidity shall not affect any of the remaining parts.

Section 4. *Publication.* This ordinance shall be published once in a newspaper of general circulation of the City of Livermore within fifteen (15) days after its adoption.

Section 5. *Effective date.* This Ordinance shall take effect thirty (30) days after its adoption.

The foregoing ordinance was introduced at the meeting of the City Council of the City of Livermore held on September 12, 2011, by the following vote:

AYES: Councilmembers Horner, Williams, Vice Mayor Marchand, Mayor Kamena
NOES: None
ABSENT: Councilmember Leider
ABSTAIN: None

The ordinance was adopted at the regular meeting of the City Council held on September 26, 2011, by the following vote:

AYES: Councilmembers Horner, Leider, Williams, Vice Mayor Marchand, Mayor Kamena
NOES: None
ABSENT: None
ABSTAIN: None

Marshall Kamena
Mayor, City of Livermore

ATTEST & DATE:

Susan Neer
CITY CLERK
SUSAN NEER

DATE: September 27, 2011

APPROVED AS TO FORM:

Amara
SPECIAL COUNSEL
AMARA MORRISON

EXHIBIT A

Chapter 13.26

WATER CONSERVATION

Sections:

13.26.010 Authority
13.26.020 Findings-Purpose
13.26.030 Definitions
13.26.040 Application
13.26.050 Water Shortage Contingency Plan
13.26.060 Water Shortage Contingency Plan Activation
13.26.070 Voluntary Conservation Measures
13.26.080 Conservation Measures – Stage 1 Water Shortage
13.26.090 Conservation Measures – Stage 2 Water Shortage
13.26.100 Conservation Measures – Stage 3 Water Shortage
13.26.110 Conservation Measures – Stage 4 Water Shortage
13.26.120 Water Emergency
13.26.130 Use Allocations
13.26.140 Demand Management Measures
13.26.150 Conservation Rates
13.26.160 Exemptions
13.26.170 Enforcement and Penalties
13.26.180 Additional Penalties

13.26.010 Authority.

In January 2008, the Governor of the State of California declared a drought and requested a voluntary 20 percent reduction in water use by all consumers in the state. Also, the Water Conservation Bill of 2009 was enacted in November 2009, requiring urban water suppliers to reduce water demands a minimum of 20 percent by 2020. California Water Code Section 10608.20 requires urban water suppliers such as the City of Livermore to reduce per-capita water consumption by twenty percent by 2020, and to develop water use targets based on 80 percent of historic demands. One of the primary means of achieving the required reduction in water usage will be through the implementation of water conservation measures and demand management measures.

In addition to long-term use reduction goals, the provisions of this chapter will also be used to reduce water demands during water shortage events. California Water Code Section 10632(a) requires urban water suppliers to develop a Water Shortage Contingency Plan which indicates the actions the City will take in response to supply shortages in the Livermore Municipal Water system service area. California Water Code Section 10632(a)(5) allows water suppliers to use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water

use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

13.26.020 Findings-Purpose.

The City Council finds that it is in the public interest of the city's water customers and the state to enact water conservation measures to address the 20 percent reduction in per capita water use required by the Water Conservation Bill of 2009 and to establish voluntary and mandatory water conservation practices to address water supply shortages and required demand reductions.

The purpose of this chapter is to establish voluntary and mandatory water conservation measures, best management practices, and use penalties to encourage wise water use and to minimize the effect of shortages on the City's customers. This is accomplished through provisions that will significantly reduce the consumption of water over an extended period of time, thereby extending the availability of water for the City's customers while reducing the hardship to the greatest extent possible on or to the City and on or to the general public.

13.26.030 Definitions.

For the purposes of this Article, the following definitions shall apply:

"Advisory notice" shall mean a written notice informing a Livermore Municipal Water customer that they are in violation of one or more provisions of this ordinance and that additional violations may result in fines or termination of service.

"City" shall mean the City of Livermore, Alameda County, California.

"City Water Service Area" shall mean the City of Livermore Municipal Water service area, excluding the portions of the City of Livermore that are served by California Water Service Company.

"Conservation Measures" shall mean activities or procedures to be used by residential and commercial water customers to reduce their water consumption.

"Conservation Water Rates" shall mean a water rate adopted and enacted by the City Council to be used during water shortage events to both encourage conservation and to recover the appropriate amount of revenue to fund water system operations from a reduced volume of water sold. Conservation rates are therefore higher than normal water rates charged during periods of adequate water supply. Conservation rates are broken down in to several "tiers" or levels which correspond to different tiers, levels or stages of water supply reduction.

"Demand Management Measure" shall mean practices, procedures and methods to reduce water demands, including but not limited to behavior change, installing high-

efficiency water fixtures, and financial incentives or penalties to encourage wise water use and discourage water waste.

"Effective Date" shall mean the date the ordinance adopting this chapter becomes effective.

"Hand-watering" shall mean the irrigation of landscaping or vegetation using a hand-held hose equipped with a positive shut-off nozzle to supply water directly to the area to be irrigated.

"Hand-watering from container" shall mean the irrigation of landscaping or vegetation using a watering can, bucket or container to pour water directly on the area to be irrigated.

"Impervious surface" shall mean a constructed or modified surface that cannot effectively infiltrate rainfall. The term includes, but is not limited to, sidewalks, driveways, gutters and roadways.

"Non-essential water use" shall mean the application or usage of water for functions or additional activities which do not have any health or safety impacts, are not required by regulation, and are not part of the core function or business process at a site. This would include but not be limited to uses such as the watering of planters and landscape at a car wash, the washing of cars on display at a car dealer, and other activities that a reasonable person would conclude will reduce extra use of water, while not affecting a given enterprise in a fundamental way.

"Positive shut-off nozzle" shall mean a device attached to the end of a hose that must be manually squeezed, pressed or otherwise held in place to allow water to flow out of the hose and which automatically shuts off the flow of water when continuous manual pressure is released.

"Urban Water Management Plan" shall mean a plan required by California Water Code Section 10621(a) for urban water suppliers to review available water supplies and water demands over a 20 year planning horizon to confirm the adequacy of water supplies.

"Water Shortage Contingency Plan" shall mean a plan developed by the City pursuant to California Water Code Section 10632(a) which outlines the steps the City will take to reduce water demands in response to water supply shortages. The plan establishes different stages or levels of water supply shortage corresponding to the expected amount of water supply reduction.

"Water Waste" shall mean uses of water which are prohibited or limited, going beyond the purpose of necessary or intended use, including area runoff, and which could reasonably be prevented.

13.26.040 Application.

This chapter shall apply within the Livermore Municipal Water system service area and to all users connected to the Livermore Municipal Water distribution system. Compliance with the provisions of this chapter shall be a condition of continued water service. However, users connected to the Livermore Municipal Water distribution system that have already implemented equivalent conservation measures or have achieved extremely low levels of per capita water consumption through other means, as determined by the Public Works Director or his/her designee, will not be required to implement additional conservation measures or to further reduce consumption during normal water supply conditions.

13.26.050 Water Shortage Contingency Plan.

The Livermore City Council shall adopt a Water Shortage Contingency Plan for the operation of the Livermore Municipal Water utility as required under California Water Code Section 10632(a). The Water Shortage Contingency Plan shall be adopted by Council resolution and shall be reviewed and updated periodically as needed, however no less than every 5 years in years ending in five and zero as required by California Water Code Section 10621(a).

The Water Shortage Contingency Plan shall specify stages of action corresponding to different levels of water supply shortage and identify voluntary or mandatory water conservation measures to be used by Livermore Municipal Water customers and as articulated in Section 13.26.080 through 13.26.110. This ordinance provides the legal authority to implement the water conservation measures and best management practices included in the Water Shortage Contingency Plan.

13.26.060 Water Shortage Contingency Plan Activation.

The Water Shortage Contingency Plan will be activated by Livermore City Council resolution following the Plan guidelines. Council resolutions to activate the Water Shortage Contingency Plan shall establish the stage of action necessary to address the supply shortage as well estimate the expected duration of the water shortage. When activating the Water Shortage Contingency Plan, Council may also enact Conservation Rates as specified in 13.26.150.

13.26.070 Voluntary Conservation Measures.

Water customers are requested to voluntarily limit the amount of water used to the amount absolutely necessary for health, business, and irrigation, by undertaking the following water conservation measures:

A. Lawn watering and landscape irrigation, including construction meter irrigation, is

permitted only between the hours of 6 p.m. Pacific Daylight Savings Time (PDST), or 5 p.m. Pacific Standard Time (PST), and 9 a.m. the following day. Watering is permitted at any hour if a hand-held nozzle is used, a hand-held container is used, or a drip irrigation system is used.

C. Washing of autos, trucks, trailers, boats, airplanes, and other types of mobile equipment may be done at any hour with a bucket and a hose equipped with a positive shut-off nozzle for quick rinses. Washing is permitted at a commercial car wash, or by a mobile car wash or on-site car wash using high-pressure washing equipment. No wastewater from vehicle washing may enter the storm drain system.

D. The overfilling of swimming pools, spas, ponds, and artificial lakes is prohibited.

E. Irrigation of golf courses, parks, school grounds and recreation fields is permitted only between the hours of 6 p.m. PDST (5 p.m. PST) and 8 a.m. the following day. Tees and greens may be watered at any time.

F. The use of water from fire hydrants shall be limited to fighting and related activities, approved metered uses or other activities necessary to maintain the health, safety and welfare of the public.

G. Construction operations receiving water from a construction meter or water truck shall not use water unnecessarily for any purposes other than those required by regulatory agencies. The City has the right to inspect all construction sites using water from a City construction meter for the efficient use of water.

H. Restaurants shall not serve water to their customers except when specifically requested.

13.26.080 Conservation Measures - Stage 1 Water Shortage.

The following voluntary restrictions shall be applicable during a Stage 1 activation of the Water Shortage Contingency Plan:
A. All of the prohibitions and restrictions set forth in section 13.26.070 shall be in effect.

B. Swimming pools, spas and fountains must be leak-proof. Any leak shall be repaired in a timely manner after notification by the city, but in no case after notification in excess of seventy-two (72) hours for the first violation and then every seventy-two (72) hours thereafter for the second and third violations.

C. There shall be no hose washing of sidewalks, walkways, driveways, parking areas, patios, porches or verandas, except that flammable or similarly dangerous materials may be washed from such areas by direct hose flushing for the benefit of public health and safety. A bucket and broom may be used to wash paved surfaces if necessary.

D. No potable water may be used for compacting or dust control purposes in construction activities where there is a reasonably available source of recycled or other non-potable water approved by the California Department of Public Health and appropriate for such use. This condition must be identified and specified on construction drawings submitted to the City for review.

E. No person shall cause or allow water to run off or leak from landscaped areas to adjoining streets, sidewalks, or other paved areas due to incorrectly directed or maintained sprinklers or excessive watering.

13.26.090 Conservation Measure - Stage 2 Water Shortage.

The following mandatory restrictions shall be applicable during a Stage 2 activation of the Water Shortage Contingency Plan:

A. All of the prohibitions and restrictions set forth in section 13.26.070 and 13.26.080 shall be in effect and shall be mandatory prohibitions.

B. Lawn watering and landscape irrigation, including construction meter irrigation, shall be reduced to no more often than twice per week on an odd-even schedule; properties with odd street address numbers water on odd days of the month and properties with even street address numbers water on even days of the month, with no watering permitted on the 31st day of the month. Lawn watering and landscape irrigation is permitted only between the hours of 6 p.m. Pacific Daylight Savings Time (PDST), or 5 p.m. Pacific Standard Time (PST), and 9 a.m. the following day.

C. Swimming pools and spas shall be covered when not in use;

D. Washing of autos, trucks, trailers, boats, airplanes, and other types of mobile equipment may be done at any hour, but no more frequently than once per month with a bucket and a hose equipped with a positive shut-off nozzle for quick rinses. Washing is permitted at a commercial car wash, or by a mobile car wash or on-site car wash using high-pressure washing equipment. No wastewater from vehicle washing may enter the storm drain system;

E. Restaurant kitchens shall be equipped with low-flow rinse nozzles;

13.26.100 Conservation Measures - Stage 3 Water Shortage.

The following mandatory restrictions shall be applicable during a Stage 3 activation of the Water Shortage Contingency Plan:

A. All of the prohibitions and restrictions set forth in section 13.26.070, 13.26.080 and 13.26.090 shall be in effect and shall be mandatory prohibitions.

B. All water customers other than commercial nurseries, golf courses, and other water dependent industries shall be limited in the use of outdoor watering for any shrubbery, trees, lawns, grass, groundcovers, plants, vines, gardens, vegetables, flowers, or any other landscaped or vegetated areas to hand-watering using a hose with a positive shut off nozzle on Saturday and Sunday only.

C. No person shall empty and refill a swimming pool except to prevent or repair structural damage or to comply with public health regulations.

D. Potable water shall not be used for street washing or flushing, except to meet public health and safety requirements.

E. Washing of autos, trucks, trailers, boats, airplanes, and other types of mobile equipment is permitted only at commercial car wash facilities that recycle all or part of the water.

F. No potable water may be used for compaction or dust control purposes for construction activities.

13.26.110 Conservation Measures - Stage 4 Water Shortage.

The following mandatory restrictions shall be applicable during a Stage 4 activation of the Water Shortage Contingency Plan:

A. All of the prohibitions and restrictions set forth in section 13.26.070, 13.26.080, 13.26.090 and 13.26.100 shall be in effect and shall be mandatory prohibitions.

B. The irrigation of turf or lawn using potable water is prohibited. All water customers other than commercial nurseries, golf courses, and other water dependent industries shall be limited in the use of outdoor watering for any shrubbery, trees, plants, vines, gardens, vegetables, flowers, or any other non-turf landscaped or vegetated areas to hand-watering from a container of less than five (5) gallon capacity on Saturday and Sunday only.

C. Cleaning of Structures. No person shall use water through a hose, including pressure-washing, to clean the exterior of any building or structure.

D. Fountains, Decorative Basins, Ponds, Lakes, Waterways. No person shall use water to operate or maintain levels in decorative fountains, basins, ponds, lakes, and waterways.

E. Public Health and Safety. These regulations shall not be construed to limit water use which is immediately necessary to protect public health and/or safety.

13.26.120 Water Emergency.

In the event that a Water Emergency is declared pursuant to the City's Water Shortage Contingency Plan, the City Manager or his/her designee may implement additional, mandatory conservation measures, restrictions, or best management practices as may be necessary to reduce water demands to match the available supply or to extend the length of time that current supplies will last.

13.26.130 Use Allocations.

A. During water shortage events, the Public Works Director or his/her designee shall establish water use allocations for different customer classes. Water use allocations shall be based on a combination of average historical usage, per-capita water use targets, and/or other activity-specific water usage data. Water use allocations will be calculated to achieve a reduction in demand necessary to match the amount of supply available or to maximize the length of time that existing supplies will last. The Public Works Director or his/her designee shall, to the extent possible, establish Use Allocations at levels that achieve the required demand reduction while minimizing the impacts to users that have already implemented conservation measures or have by other means achieved extremely low per capita water consumption.

B. In the event that use allocations are established, all customers shall reduce their consumption to meet the allocation within 30 days.

13.26.140 Demand Management Measures

The Urban Water Planning Act includes fourteen (14) demand management measures for urban water conservation. These measures include:

A. Water Survey Programs for single-family residential and multi-family residential customers.
B. Residential Plumbing Retrofit Programs.
C. System Water Audits, Leak Detection, and Repair.
D. Metering with Commodity Rates.
E. Large Landscape Conservation Programs.
F. High Efficiency Washing Machine Rebate Programs.
G. Public Information Programs.
H. School Education Programs.
I. Conservation Programs for Commercial, Industrial and Institutional users.
J. Wholesale agency programs.
K. Conservation pricing.
L. Water Conservation Coordinator.
M. Water waste prohibition.
N. Residential Ultra-Low Flush Toilet Replacement

These Demand Management Measures correspond to the fourteen Best Management Practices (BMPs) listed in the California Urban Water Conservation Council (CUWCC) Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). In 1991, the CUWCC developed the MOU to aid urban water suppliers in implementing water conservation programs. Although the City of Livermore is not a signatory to the 1991 California Urban Water Conservation Council MOU, the City supports the use of the Demand Management Measures to minimize water use. The Urban Water Management Plan includes a description of how the Demand Management Measures will be implemented in the Livermore Municipal Water system service area and is available on the City's website at www.livermore.net and at the Water Resources Plant located at 101 W. Jack London Boulevard, Livermore CA 94551.

13.26.150 Conservation Rates.

A. The Livermore City Council shall establish water rates and charges pursuant to Section 13.20.030 to provide funding for the operation, maintenance and renewal and replacement needs of the City water system. In addition to normal water rates and charges, the Livermore City Council shall also adopt Water Conservation Rates to be used in the event of declared water shortages and implementation of the Water Shortage Contingency Plan described in 13.26.050. Conservation Water Rates shall be calculated to recover the necessary revenue to continue to fund budgeted water system expenditures based on an expected reduction in water use at each Stage of the Water Shortage Contingency Plan.

B. Conservation Water Rates will be implemented by Council resolution at the time of a declared water shortage event and will remain in effect until a subsequent Council resolution returning to normal water rates.

C. Conservation Water Rates may also be implemented by Council resolution to address shortfalls in water system revenues caused by reduced water sales, or as a method to encourage water conservation in the absence of a declared shortage event.

13.26.160 Exemptions.

A. Any customer who believes that the application of the provisions of this Ordinance results in unfair treatment or causes undue hardship may seek an adjustment in the customer's allocation.

B. Such customer shall request the adjustment in writing and shall state with specificity the reasons why the adjustment is warranted.

C. The Public Works Director and the Administrative Services Director shall consider all requests and make a recommendation on the request to the City Manager. In formulating a recommendation, the Public Works Director and Administrative Services

Director shall review particular consideration to the following:

1. The reduction would cause conditions threatening to health, sanitation, fire protection or safety of the customer, the customer's dependents or the general public.

2. The reduction would cause unfair economic hardship including, but not limited to loss of employment, loss of production, or loss of jobs or be unfair or result in the unnecessary loss of a business.

3. Medical requirements of the customer.

4. Household size of the customer.

5. Other reasons to be judged on individual merit.

13.26.170 Enforcement and Penalties.

A. Any violation of this chapter is a misdemeanor. Upon conviction thereof, such person shall be punished by imprisonment in the county jail for not more than thirty (30) days, or by fine not exceeding One Thousand Dollars ($1,000), or both. In addition to any other remedies which the city may have for the enforcement of this chapter, service of water shall be discontinued or appropriately limited to any customer who willfully uses water in violation of any provision of this chapter.

B. If a customer exceeds the allotted usage developed under 13.26.130 for three consecutive billing periods the City may increase the billing rate for all water used by that customer to the highest Tier Conservation Rate for a period of three (3) months. At the end of three (3) months, if the customer's use still exceeds the allotted amount, the City may continue to charge the customer at the highest conservation rate for an additional three (3) months or until the customer's usage drops to below the allocation.

13.26.180 Additional Penalties.

In addition to the penalties provided by section 13.26.170, violation of this Ordinance may result in the imposition of surcharges and/or termination of water service as set for below:

A. First Violation - Advisory notice accompanied by a copy of this Ordinance and a City conservation information packet delivered to customer by United States mail.

B. Second Violation (within one year) - $100.00 surcharge.

C. Third Violation (within one year of the first violation) - $300.00 surcharge.

D. Fourth Violation (within one year of the first violation)--$500.00 surcharge and termination of service for such period as the City Council determines to be appropriate under the circumstances, following a hearing regarding said issue. Written notice of the hearing shall be mailed to the customer at least ten (10) days before the hearing.

E. Any surcharge hereunder shall be in addition to the basic or conservation water rates and other charges of the City for the account. Receipt of payment must be made to the city's Finance Director within five (5) business days of the violation. If payment is not received within five (5) business days, the water meter will be locked off until payment is received. In addition to any surcharge, a customer violating this chapter shall be responsible for payment of the City's charges for disconnecting and/or reconnecting service per the City's rate resolution then in effect. Nonpayment shall be subject to the same remedies as nonpayment of basic water rates.

F. The Public Works Director shall designate specified employees to act as enforcement officers, who shall have the authority to enforce the provisions of this chapter and to issue administrative citations for violations of this chapter pursuant to Chapter 1.20 of the Livermore Municipal Code.

G. In addition to the above, the City Manager or his or her designee is empowered to enact other penalties and restrictive measures including but not limited to the placement of a flow restricting device upon the water service, locking off of a water meter, removal of a water meter, and/or shutting off of a mainline.

IN THE CITY COUNCIL OF THE CITY OF LIVERMORE, CALIFORNIA

AN ORDINANCE ADDING TITLE 13, *PUBLIC SERVICES*, CHAPTER 13.27, *MANDATORY DROUGHT CONSERVATION MEASURES,* TO THE LIVERMORE MUNICIPAL CODE TO PROHIBIT WASTEFUL WATER PRACTICES

THE CITY COUNCIL OF THE CITY OF LIVERMORE DOES ORDAIN AS FOLLOWS:

Section 1. *Findings*. In January 2008, California's Governor declared a drought and requested a voluntary 20% reduction in water use by all consumers in the state. In November 2009, the Water Conservation Bill of 2009 was enacted requiring urban water suppliers to reduce water demands by a minimum of 20% by 2020. Each water retailer in Livermore adopted regulations for their respective customers.

As a water retailer, Livermore responded by adopting and implementing water conservation measures and demand management measures. Livermore developed a water shortage contingency plan specifying the actions it will take in response to supply shortages in the Livermore municipal water system service area. Livermore also adopted Chapter 13.26 of the Livermore Municipal Code to establish water conservation measures for its customers to reduce water demands during water shortage events. The provisions were intended to significantly reduce the consumption of water over an extended period of time, thereby extending the availability of water for the city's water customers while reducing the hardship to the greatest extent possible on or to the city and on or to the general public. The city's voluntary and mandatory water conservation measures, best management practices, and use penalties are intended to encourage wise water use by the city's water customers and to minimize the effect of shortages. However, these measures only apply to the customers of the city's municipal water system.

On January 17, 2014, Governor Jerry Brown declared a state of emergency and called on all Californians to conserve water, with the goal of reducing consumption by 20%.

On April 18, 2014, the California Department of Water Resources established an annual allocation of 0% of contracted water supplies which will be increased to just 5% beginning on September 1, 2014. In response to Governor Brown's declaration, the Tri-Valley water wholesaler, Zone 7, and the four Tri-Valley water retailers enacted their own emergency declarations. Livermore adopted Resolution No. 2014-027 declaring a drought emergency on February 24, 2014. Subsequently, Zone 7 adopted a resolution directing the four retailers to reduce their annual water demand for 2014 by 25% from requested levels.

On April 15, 2014, Livermore adopted Stage 2 mandatory conservation regulations, and called for 5% conservation on indoor use combined with 50% conservation on outdoor use.

On April 28, 2014, Livermore adopted Stage 3 water conservation rates to encourage further water conservation in the Livermore Municipal Water service area.

Section 2. *Prior Urgency Ordinance.* Concurrent with the introduction of this ordinance, the City Council adopted an urgency ordinance (Ordinance No. 1995) adding Chapter 13.27 to the Livermore Municipal Code. The City Council also directed staff to prepare an identical ordinance to be adopted by way of the usual, non-urgency, procedures set forth in Government Code Sections 36934 and 36937(b).

Section 3. *Municipal Code Addition.* Chapter 13.27, *Mandatory Drought Conservation Measures,* is hereby added to the Livermore Municipal Code as set forth in Exhibit A, attached hereto.

Section 4. *Environmental.* The passage of this ordinance is not considered to be a project as defined by the California Environmental Quality Act and, therefore, is not subject to environmental review.

Section 5. *Severability.* If any part of this ordinance is declared invalid by a court, such invalidity shall not affect any of the remaining parts.

Section 6. *Publication.* This ordinance shall be published once in a newspaper of general circulation of the city of Livermore within fifteen days after its adoption.

Section 7. *Effective date.* This ordinance shall take effect 30 days after its adoption.

The foregoing ordinance was introduced at the meeting of the City Council of the City of Livermore held on May 12, 2014, by the following vote:

AYES: Councilmembers Gary, Horner, Turner, Vice Mayor Woerner, Mayor Marchand
NOES: None
ABSENT: None
ABSTAIN: None

The ordinance was adopted at the regular meeting of the City Council held on June 9, 2014, by the following vote:

AYES: Councilmembers Gary, Horner, Turner, Vice Mayor Woerner, Mayor Marchand
NOES: None
ABSENT: None
ABSTAIN: None

John Marchand
Mayor, City of Livermore

ATTEST:

Susan Neer
City Clerk

Dated: June 10, 2014

APPROVED AS TO FORM:

Jason R. Alcala
City Attorney

EXHIBIT A

Chapter 13.27

MANDATORY DROUGHT CONSERVATION MEASURES

Sections:

13.27.010 Purpose

13.27.020 Application

13.27.030 General Prohibition

13.27.040 Prohibited Wasteful Water Practices – Stage 2 Water Shortage

13.27.050 Prohibited Wasteful Water Practices – Stage 3 Water Shortage

13.27.060 Prohibited Wasteful Water Practices – Stage 4 Water Shortage

13.27.070 Hardship Waiver

13.27.080 Penalties

13.27.010 Purpose

The purpose of this chapter is to establish mandatory drought conservation measures to prohibit wasting potable water during periods of severe water shortage. This is accomplished through provisions intended to reduce the wasting of potable water over an extended period of time, thereby extending the availability of potable water supply for residents and businesses throughout Livermore.

13.27.020 Application

A. To the extent authorized by law, this chapter shall apply to all water users in the city. For the purposes of this chapter, a "water user" means any person drawing water delivered to a business or residence in the city via a water system operated by a water retailer, as well as the individual in whose name the account with the water retailer is held.

B. For water users that are also customers of the City of Livermore's municipal water system, the provisions in this chapter are in addition to the conservation measures set forth in chapter 13.26, and the provisions in this chapter shall control in the event there is a conflict between the regulations.

C. The provisions in this chapter do not apply to water uses necessary to protect public health, safety, and welfare, for essential health care, or for government services such as police, fire, and other similar emergency services.

EXHIBIT A

13.27.030 General Prohibition

No water user shall make, cause, use, or permit the use of potable water in the city in a manner contrary to any provision of this chapter. Each water user violating the provisions in this chapter shall be guilty of a separate offense for each day during which such violation occurred, continued, or was permitted.

13.27.040 Prohibited Wasteful Water Practices – Stage 2 Water Shortage

If the city adopts a resolution for a Stage 2 activation of its water shortage contingency plan for customers in the Livermore municipal water system area in accordance with Section 13.26.090 of the municipal code, the wasting of potable water throughout the city shall be prohibited for all water users, and the following restrictions shall apply to all water users:

A. Lawn watering and landscape irrigation, including construction meter irrigation, shall be reduced to no more often than twice per week on an odd-even schedule; properties with odd street address numbers are only allowed to water on Mondays, Wednesdays and Fridays and properties with even street address numbers are only allowed to water on Tuesdays, Thursdays, and Saturdays, with no watering is permitted on Sundays. Lawn watering and landscape irrigation is permitted only between the hours of 6:00 p.m. and 9:00 a.m. the following day.

B. Irrigation of golf courses, parks, school grounds, and recreation fields with potable water is permitted only between the hours of 6:00 p.m. and 8:00 a.m. the following day. Tees and greens may be watered at any time.

C. No person shall cause or allow water to run off or leak from landscaped areas to adjoining streets, sidewalks, or other paved areas due to incorrectly directed or maintained sprinklers or excessive watering.

D. Washing of autos, trucks, trailers, boats, airplanes, and other types of mobile equipment may be done at any hour, but no more frequently than once per month with a bucket and a hose equipped with a positive shut-off nozzle for quick rinses. Washing is permitted at a commercial car wash, or by a mobile car wash or on-site car wash using high-pressure washing equipment. No wastewater from vehicle washing may enter the storm drain system.

E. There shall be no hose washing of sidewalks, walkways, driveways, parking areas, patios, porches, or verandas, except that flammable or similarly dangerous materials may be washed from such areas by direct hose flushing for the benefit of public health and safety. A bucket and broom may be used to wash paved surfaces if necessary.

F. The overfilling of swimming pools, spas, ponds, and artificial lakes is prohibited.

G. Swimming pools and spas shall be covered when not in use.

H. Swimming pools, spas, and fountains must be leak-proof. Any leak shall be repaired in a timely manner after notification by the city, but in no case after notification in excess of 72 hours for the first violation and then every 72 hours thereafter for the second and third violations.

I. No potable water may be used for compacting or dust control purposes in construction activities where there is a reasonably available source of recycled or other nonpotable water approved by the California Department of Public Health and appropriate for such use. This condition must be identified and specified on construction drawings submitted to the city for review.

J. Restaurant kitchens shall be equipped with low-flow rinse nozzles.

K. Restaurants shall not serve water to their customers unless specifically requested.

13.27.050 Prohibited Wasteful Water Practices - Stage 3 Water Shortage

If the city adopts a resolution for a Stage 3 activation of its water shortage contingency plan for customers in the Livermore municipal water system area in accordance with Section 13.26.100 of the Municipal Code, the wasting of potable water throughout the city shall be prohibited for all water users, and all the restrictions for a Stage 2 activation included in Section 13.27.040 shall apply to all water users with the following modifications:

A. All residents and businesses other than commercial nurseries, golf courses, and other water dependent industries shall be limited in the use of outdoor watering using potable water for any shrubbery, trees, lawns, grass, groundcovers, plants, vines, gardens, vegetables, flowers, or any other landscaped or vegetated areas to hand-watering using a hose with a positive shut-off nozzle on Saturday and Sunday only.

B. No person shall empty and refill a swimming pool except to prevent or repair structural damage or to comply with public health regulations.

C. Potable water shall not be used for street washing or flushing, except to meet public health and safety requirements.

D. Washing of autos, trucks, trailers, boats, airplanes, and other types of mobile equipment is permitted only at commercial car wash facilities that recycle all or part of the water.

E. No potable water may be used for compaction or dust control purposes for construction activities.

EXHIBIT A

13.27.060 Prohibited Wasteful Water Practices - Stage 4 Water Shortage

If the city adopts a resolution for a Stage 4 activation of its water shortage contingency plan for customers in the Livermore municipal water system area in accordance with Section 13.26.110 of the municipal code, the wasting of potable water throughout the city shall be prohibited for all water users, all the restrictions for a Stage 2 activation included in Section 13.27.040, and a Stage 3 activation included in Section 13.27.050 shall apply to all water users with the following modifications:

A. The irrigation of turf or lawn using potable water is prohibited. All water customers other than commercial nurseries, golf courses, and other water dependent industries shall be limited in the use of outdoor watering for any shrubbery, trees, plants, vines, gardens, vegetables, flowers, or any other non-turf landscaped or vegetated areas to hand-watering from a container of less than five-gallon capacity on Saturday and Sunday only.

B. Cleaning of Structures. No person shall use water through a hose, including pressure-washing, to clean the exterior of any building or structure.

C. Fountains, Decorative Basins, Ponds, Lakes, Waterways. No person shall use water to operate or maintain levels in decorative fountains, basins, ponds, lakes, and waterways.

Section 13.27.070 Hardship Waiver

If, due to unique circumstances, the application of a specific provision in this chapter would result in undue hardship to a water user, or to property upon which water is used, that is disproportionate to the impacts to water users generally or to similar property or classes of water users, then the person may apply for a waiver to the requirements as provided in this section.

A. Written Finding: A hardship waiver may be granted or conditionally granted only upon a written finding of fact demonstrating an undue hardship to the water user or to property upon which water is used, that is disproportionate to the impacts to water users generally or to similar property or classes of water use due to specific and unique circumstances of the user or the user's property.

1. Application: Application for a waiver must be on a form prescribed by the city and accompanied by a non-refundable processing fee in an amount set by City Council resolution.

2. Supporting Documentation: The application should include photographs, maps, drawings, and other information, including a written statement of the applicant.

3. Required Findings for Waiver: An application for a waiver will be denied unless the city finds, based on the information provided in the application, supporting documents, or such additional information as may be requested, and on water use information for the property as shown by water use records, all of the following:

(i) That a waiver does not constitute a grant of special privilege inconsistent with the limitations upon other water users;

(ii) That because of special circumstances applicable to the property or its use, the strict application of this chapter would have a disproportionate impact on the property or use that exceeds the impacts to residents and businesses generally; and,

(iii) That the authorizing of such waiver will not be of substantial detriment to adjacent properties, and will not materially affect the ability of the city to effectuate the purpose of this chapter and will not be detrimental to the public interest.

4. Approval Authority: The Public Works Director must act upon any completed application no later than fourteen (14) days after submittal and may approve, conditionally approve, or deny the waiver. The applicant requesting the waiver must be promptly notified in writing of any action taken. Unless specified otherwise at the time a waiver is approved, the waiver will apply to the subject property during the period of the mandatory water supply shortage condition.

13.27.080 Penalties

Any person violating or causing the violation of any of the provisions of this chapter shall be guilty of an infraction, unless otherwise specifically stated. Penalties for infractions shall be as set forth in Government Code Section 36900.

Notwithstanding the above, any violation occurring after a third infraction citation has been issued during any 12 month period shall be considered a misdemeanor. Penalties for misdemeanors shall be as set forth in Penal Code Section 19.

Nothing in this chapter shall be deemed to prevent the city council from ordering the commencement of a civil proceeding to abate a public nuisance pursuant to the applicable law or from pursuing any other remedy available under applicable law.

IN THE CITY COUNCIL OF THE CITY OF LIVERMORE, CALIFORNIA

A RESOLUTION AMENDING WATER RATES AND CHARGES FOR FY 2012-13 AND 2013-14

The City of Livermore operates the municipal water system as an Enterprise fund, with customer rates and charges providing full funding for all water storage and distribution system costs, including capital improvement projects to renew and replace water system facilities and the cost of purchasing water from the Zone 7 Water Agency.

Water rates and charges must be adjusted to provide renewal/replacement funding and to reflect past increases in the cost of purchased water from Zone 7 as well as a provision to increase rates to pass through annually any future Zone 7 water cost increases beginning in January 2013 and for the next five (5) years upon notice to customers as required by law.

The Water Resources Division staff has completed a Water Rate Study in conjunction with utility management consultants NBS Government Finance Group which identifies the revenue necessary to fund expected expenses of the Livermore Municipal Water Enterprise.

Notices of a public hearing for increasing water rates for FY 2012-13 and 2013-14 were mailed out to all property owners within Livermore Municipal Water's service area on or before March 29, 2012 as required by the provisions of Proposition 218.

A public hearing on proposed increases and adjustments to water rates was held by the City Council on May 14, 2012.

The City Council determined that a majority protest to the increases to water rates does not exist at the conclusion of the public hearing.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Livermore as follows:

Section 1. Deposits, Meter Testing Fees, Service Reconnection Fees, Water Rates and Charges. Pursuant to Chapters 13.08, 13.16 and 13.20 of the Livermore Municipal Code, the City Council establishes the following deposits, meter testing fees, service reconnection fees, water rates and charges for meters and water furnished by the City of Livermore:

DEPOSITS

The amount of deposit required for water service for an applicant who is not the owner of the premises shall be as follows:

If the application is for residential service:

5/8" meter ..... $ 100.00

1" 100.00

If the application is for service other than residential:

5/8" or 3/4" meter	$ 100.00
1" or 1-1/2" meter	100.00
2" or 3" meter	200.00
4" or larger	400.00

The amount of deposit required for the meter provided by the City in furnishing water for construction work shall be as follows:

5/8", 3/4" and 1" meter	$ 250.00
3" and larger	1,000.00

METER TESTING FEES

The meter testing fee shall be $100.00 for meters up to 2 inches in size and $200.00 for meters larger than 2 inches.

RECONNECTION FEES

The service reconnection fee shall be $40.00 for first-time restoration and $60.00 for any subsequent restoration in a 12-month period. The reconnection fee will be $250.00 if the reconnection occurs between the hours of 5:00 pm and 8:00 am. The reconnection fee shall be $100.00 if the water meter is removed.

WATER RATES FOR SERVICE WITHIN THE CORPORATE LIMITS OF THE CITY OF LIVERMORE

Quantity Rate

For all water delivered per water meter per month:

Normal Supply - Voluntary Conservation

Residential – Single Family

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-5	2.170	0.227	2.397	2.322	0.237	2.559
Tier II	5-35	2.170	0.703	2.873	2.322	0.735	3.057
Tier III	Over 35	2.170	2.276	4.446	2.322	2.379	4.700

1. Wholesale Water Costs shown on July 1, 2013 are based on an estimated 7% increase in Zone 7 Water Agency Rates on January 1, 2013.

Residential – Multi Family

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-50	2.170	0.703	2.873	2.322	0.735	3.057
Tier II	Over 50	2.170	2.276	4.446	2.322	2.379	4.700

Commercial

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-50	2.170	0.703	2.873	2.322	0.735	3.057
Tier II	Over 50	2.170	2.276	4.446	2.322	2.379	4.700

Stage I - Voluntary 10% Water Conservation

Residential – Single Family

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-5	2.170	0.494	2.664	2.322	0.516	2.838
Tier II	5-35	2.170	1.023	3.193	2.322	1.069	3.391
Tier III	Over 35	2.170	2.770	4.940	2.322	2.894	5.216

Residential – Multi Family

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-50	2.170	1.023	3.193	2.322	1.069	3.391
Tier II	Over 50	2.170	2.770	4.940	2.322	2.894	5.216

Commercial

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-50	2.170	1.023	3.193	2.322	1.069	3.391
Tier II	Over 50	2.170	2.770	4.940	2.322	2.894	5.216

1. Wholesale Water Costs shown on July 1, 2013 are based on an estimated 7% increase in Zone 7 Water Agency Rates on January 1, 2013.

Stage II – Voluntary/Mandatory 20% Water Conservation

Residential – Single Family

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-5	2.170	0.860	3.030	2.322	0.899	3.221
Tier II	5-35	2.170	1.462	3.632	2.322	1.528	3.850
Tier III	Over 35	2.170	3.450	5.620	2.322	3.605	5.927

Residential – Multi Family

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-50	2.170	1.462	3.632	2.322	1.528	3.850
Tier II	Over 50	2.170	3.450	5.620	2.322	3.605	5.927

Commercial

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-50	2.170	1.462	3.632	2.322	1.528	3.850
Tier II	Over 50	2.170	3.450	5.620	2.322	3.605	5.927

Stage III - Mandatory 35% Water Conservation

Residential – Single Family

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-5	2.170	1.472	3.642	2.322	1.538	3.860
Tier II	5-35	2.170	2.196	4.366	2.322	2.295	4.617
Tier III	Over 35	2.170	4.586	6.756	2.322	4.792	7.114

1. Wholesale Water Costs shown on July 1, 2013 are based on an estimated 7% increase in Zone 7 Water Agency Rates on January 1, 2013.

Residential – Multi Family

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-50	2.170	2.196	4.366	2.322	2.295	4.617
Tier II	Over 50	2.170	4.586	6.756	2.322	4.792	7.114

Commercial

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-50	2.170	2.196	4.366	2.322	2.295	4.617
Tier II	Over 50	2.170	4.586	6.756	2.322	4.792	7.114

Stage IV - Mandatory 50% Water Conservation

Residential – Single Family

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-5	2.170	2.624	4.794	2.322	2.742	5.064
Tier II	5-35	2.170	3.576	5.746	2.322	3.737	6.059
Tier III	Over 35	2.170	6.722	8.892	2.322	7.025	9.347

Residential – Multi Family

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-50	2.170	3.576	5.746	2.322	3.737	6.059
Tier II	Over 50	2.170	6.722	8.892	2.322	7.025	9.347

Commercial

		Effective July 1, 2012			Effective July 1, 2013		
Rate Tier	Per 100 Cu ft	Wholesale Water Cost per 100 Cubic Feet	City Distribution Cost per 100 Cubic Feet	Total Cost per 100 Cubic Feet	Wholesale Water Cost[1] Per 100 Cubic Feet	City Distribution Cost Per 100 Cubic Feet	Total Cost Per 100 Cubic Feet
Tier I	0-50	2.170	3.576	5.746	2.322	3.737	6.059
Tier II	Over 50	2.170	6.722	8.892	2.322	7.025	9.347

1. Wholesale Water Costs shown on July 1, 2013 are based on an estimated 7% increase in Zone 7 Water Agency Rates on January 1, 2013.

Meter Service Charges: Per Meter, Per Month

Meter Size	Effective July 1, 2012	Effective July 1, 2013
Meter Service Charges:		
5/8 Inch	$14.85	$15.50
3/4 inch	$20.15	$21.05
1 inch w/ fire meter	$18.75	$19.60
1 inch	$30.50	$31.85
1 1/2 inch	$56.50	$59.05
2 inch	$88.00	$91.95
3 inch	$186.90	$195.30
4 inch	$526.35	$550.00
6 inch	$1,044.00	$1,091.00
8 inch	$1,812.00	$1,893.00
10 inch	$2,869.00	$2,998.00
Fire-Line Meter Service Charges:		
1 inch	$3.90	$4.10
1 1/2 inch	$6.25	$6.55
2 inch	$8.45	$8.85
3 inch	$12.60	$13.15
4 inch	$16.75	$17.50
6 inch	$25.50	$26.65
8 inch	$33.60	$35.10
10 inch	$42.30	$44.20

Private fire protection service charges are applicable to all water service furnished for privately-owned fire protection systems.

Public Agency Charges

The Public Agency Rate for all water delivered per water meter per month is equal to the current Residential Tier II water rate. The Public Agency meter service charges and private fire protection service charges are the same as those for residential or commercial listed above.

Recycled Water Rate - Non-demineralized

The recycled water rate as of July 1, 2012 is $2.299 per 100 cubic feet. Effective July 1, 2013, the recycled water rate will increase to $2.446 per 100 cubic feet based on the Zone 7 rate on Jan.1, 2013. The recycled water rate is based on a fixed percentage (80%) of the Residential Tier #2 (Stage I) water rates. Municipal divisions of the City who use recycled water will pay this rate, with the exception of the Las Positas Golf Course, which will gradually increase from the 20% to the 80% level over 10 years due to its large recycled water usage.

Section 2. Definitions. The following definitions and policies shall apply to the water rate increases:

a) Quantity Rate – Quantity rates are charged per unit volume of water delivered as determined by metering. The total quantity rate will be broken down into a Wholesale Water Cost, based on the rate charged by the Zone 7 Water Agency, and a City Distribution Cost based on the City's operations, maintenance and replacement costs.

b) Wholesale Water Cost – A quantity rate based on the City's water costs from the Zone 7 Water Agency. Annual rate increases by the Zone 7 Water Agency will be passed through to customers beginning in January 2013 and for the next five (5) years by adjusting the Wholesale Water Cost upon notice to customers required by law. Livermore City Council resolves to pass-through without further Council action, an increase of up to 7% in the Wholesale Water Cost if approved by the Zone 7 Water Agency and scheduled to take effect on January 1, 2013, and an increase of up to 7% in the Wholesale Water Cost if approved by the Zone 7 Water Agency and scheduled to take effect on January 1, 2014. If the Zone 7 Water Agency adopts rate increases of greater than 7% to be effective on January 1, 2013 or January 1, 2014, the Council may still choose pass-through the full increase, but an additional Council action will be required prior to increasing the Wholesale Water Cost.

c) City Distribution Cost – A quantity rate based on the City's operations, maintenance and replacement costs. The City Distribution Costs will be adjusted by Council Resolution and adjustments will take effect on July 1st of each year.

d) Service Charge – The service or demand charge is a base rate per month representing the fixed costs of providing water service and is charges in addition to the quantity rate.

e) Private Fire Protection Service – The private fire protection service rate is the amount charged per month for each fire protection service lateral connected to the water system. Water is only delivered through the fire protection system for routine maintenance or fire emergencies. A bypass meter is read at regular intervals to verify that water is not being used through unauthorized connections to the fire system.

Section 3. In accordance with the City's current Water Shortage Contingency Plan, the "Normal Supply" water rates are implemented during this period of voluntary conservation.

Section 4. This resolution is effective July 1, 2012.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Livermore that, commencing July 1, 2012 and July 1, 2013, the Water Rates and Meter Service Charges will be amended as described hereinabove.

On the motion of Councilmember Gary, seconded by Councilmember Turner, the foregoing resolution was passed and adopted on the 14th day of May, 2012, by the following vote:

AYES: Councilmembers Gary, Turner, Woerner, Vice Mayor Horner, Mayor Marchand
NOES: None
ABSENT: None
ABSTAIN: None

ATTEST:

CITY CLERK
SUSAN NEER

DATE: May 15, 2012

APPROVED AS TO FORM:

ASSISTANT CITY ATTORNEY
E. KEVIN YOUNG

**IN THE CITY COUNCIL OF THE CITY OF LIVERMORE
STATE OF CALIFORNIA**

AN ORDINANCE ADDING CHAPTER 15.80 (CIVIC BAY-FRIENDLY LANDSCAPING) TO TITLE 15 (BUILDINGS AND CONSTRUCTION) OF THE LIVERMORE MUNICIPAL CODE

The City Council of the City of Livermore does ordain as follows:

Section 1. Civic Bay-Friendly Landscaping Ordinance. Chapter 15.80 (Civic Bay-Friendly Landscaping) is added to Title 15 (Buildings and Construction), as set forth in Exhibit A, attached hereto.

Section 2. Exemptions. The designated bay-friendly landscaping compliance official(s) shall have the responsibility to grant waivers or exemptions from the requirements of this chapter.

Section 3. Severability. If any section, subsection, subdivision, paragraph, sentence, clause or phrase of this chapter, or any part thereof, is for any reason held to be unconstitutional, invalid, or ineffective by any court of competent jurisdiction, such decision shall not affect the validity or effectiveness of the remaining portions of this chapter or any part thereof. The City Council hereby declares that it would have passed each section, subsection, subdivision, paragraph, sentence, clause, and phrase of this Article irrespective of the fact that one or more sections, subsections, subdivisions, paragraphs, sentences, clauses, or phrases be declared unconstitutional, invalid, or effective. To this end, the provision of this chapter are declared to be severable.

Section 4. Exemption from CEQA. The adoption of this ordinance is exempt from the California Environmental Quality Act pursuant to California Code of Regulations, Title 14, Chapter 3, Section 15308 (Class 8-actions by regulatory agencies, as authorized by local ordinance, to assure the maintenance, restoration, enhancement or protection of the environment where the regulatory process involves procedures for protection of the environment).

Section 5. Publication. This ordinance or a comprehensive summary thereof shall be published once in a newspaper of general circulation of the City of Livermore within fifteen days after its adoption.

Section 6. Effective Date. This Ordinance shall take effect thirty (30) days after its passage.

The foregoing ordinance was introduced by the following vote at the meeting of the City Council of the City of Livermore held on the 11th day of May, 2009, by the following vote:

AYES: Councilmembers Horner, Leider, Vice Mayor Marchand, Mayor Kamena
NOES: None
ABSENT: Councilmember Williams
ABSTAIN: None

The ordinance was adopted at the meeting of the City Council of the City of Livermore held on the 8th day of June, 2009, by the following vote:

AYES: Councilmembers Horner, Leider, Williams, Vice Mayor Marchand, Mayor Kamena
NOES: None
ABSENT: None
ABSTAIN: None

Marshall Kamena
MAYOR, CITY OF LIVERMORE

ATTEST & DATE:

Susan Gibbs
CITY CLERK
SUSAN GIBBS

DATE: June 9, 2009

APPROVED AS TO FORM:

John J Pomidor
CITY ATTORNEY
JOHN J. POMIDOR

Chapter 15.80

CIVIC BAY-FRIENDLY LANDSCAPING

Sections:

15.80.010 Purpose
15.80.020 Findings
15.80.030 Definitions
15.80.040 Standards for Compliance
15.80.050 Implementation

15.80.010 Purpose.

To promote economic and environmental health in the City, it is essential that the City itself, through the design, construction, and maintenance of its own landscapes and the landscapes it funds, provide leadership to both the private and public sectors by incorporating bay-friendly landscaping practices. The most immediate and meaningful way to do this is to require the integration of bay-friendly landscaping strategies in City landscapes.

15.80.020 Findings.

The City Council of the City of Livermore finds that:

A. The design, construction, and maintenance of landscapes within the City can have a significant impact on the City's environmental sustainability, resource usage and efficiency, waste management, and the health of the watershed as well as the health of residents, workers, and visitors to the City.

B. Based on studies, plant debris from landscape construction, renovation and maintenance activities comprises 7% of the materials disposed in Alameda County landfills.

C. Bay-Friendly landscape design, construction, operation and maintenance can have a significant positive effect on energy, water and resource efficiency, waste and pollution generation, wildlife habitat, and the health of workers and users of the landscape and can contribute to a reduction in greenhouse gas emissions, improve air quality and enhance urban sustainability.

D. Bay-Friendly landscaping benefits are spread throughout the systems and features of the landscape, the larger San Francisco Bay area ecosystem and the Livermore community. Bay-friendly landscaping is a whole systems' approach to the design, construction and maintenance of the landscape in order to support the integrity of the San Francisco Bay watershed. Key components of bay-friendly landscaping

include reducing waste and using recycled content materials; nurturing healthy soils while reducing fertilizer use; conserving water, energy and topsoil; using Integrated Pest Management (IPM) to minimize chemical use; reducing stormwater runoff; and creating wildlife habitat.

E. Bay-friendly landscape design and construction decisions made by the City in the construction and maintenance of landscapes can result in significant cost savings to the City over the life of the projects.

F. It is critical to both the economic and environmental health of the City that the City provide leadership to both the private and public sectors in the area of bay-friendly landscaping.

G. The most immediate and meaningful way to do so is to include bay-friendly landscaping elements in City landscape projects and in landscape projects built as public-private partnerships, and to encourage private landscape projects to include green building and bay-friendly landscaping elements.

H. In Alameda County, StopWaste.Org has taken the lead in defining and promoting environmentally friendly landscaping for the commercial, institutional and residential sectors by developing the Bay-Friendly Landscape Guidelines for professional landscapers and the Bay-Friendly Gardening Guide for residents and the use of these guidelines are increasingly widespread in residential and commercial landscape construction.

I. Requiring City Projects to incorporate Bay-Friendly Landscape Guidelines is necessary and appropriate to achieving the benefits of Bay-Friendly landscaping in the City.

15.80.030 Definitions.

For the purposes of this Article, the following definitions shall apply:

A. "Bay-Friendly Landscape Guidelines" means the most recent version of guidelines developed by StopWaste.Org for use in the design, construction and maintenance of Landscapes.

B. "Bay-Friendly Landscaping Scorecard" means the most recent version of the Bay-Friendly Landscaping points system developed by StopWaste.Org.

C. "Covered Project" means all new Landscaping projects or Renovations of Landscapes that equal or exceed $100,000 in construction costs and are owned or maintained by the City or Redevelopment Agency.

D. "Bay-Friendly Landscaping Compliance Official" means the designated staff person(s) authorized and responsible for implementing this chapter.

E. "Initiated" means officially identified and substantially funded.

F. "Landscape" means the parcel area less the building pad and includes all planted areas and hardscapes (i.e. driveway, parking, paths and other paved areas adjacent to or integral to the Landscape).

G. "Renovation" means any change, addition, or modification to an existing Landscape.

H. "Public Project" means those projects identified as such by Public Contracts Code section 20161.

15.80.040 Standards for Compliance.

A. All Covered Projects with landscapes initiated on or after the effective date of this Ordinance shall meet the minimum requirements of the most recent version of the Bay Friendly Landscape Scorecard as recommended by StopWaste.Org or its designee.

B. For the purposes of reducing operating and maintenance costs in all City facilities, projects that do not meet the threshold triggering compliance with the requirements of this ordinance (non-covered projects) are encouraged to meet as many Bay-Friendly Landscaping Scorecard points as practicable, using the Bay-Friendly Landscaping Scorecard for documentation.

C. The community development department shall regularly review the project specifications used in bidding public projects to include applicable bay-friendly landscape practices.

15.80.050 Implementation.

A. The community development director or his designee shall, within six months of this ordinance's effective date, promulgate any rules and regulations necessary or appropriate to achieve compliance with the requirements of this chapter.

B. The rules and regulations promulgated by the community development director pursuant to this section shall provide for at least the following:

1. The incorporation of the bay-friendly landscaping requirements of this chapter into the appropriate design, construction, maintenance and development agreement documents prepared for the applicable covered projects.

2. The designation of an appropriate bay-friendly landscaping compliance official(s) who shall have the responsibility to administer and monitor compliance with the bay-friendly landscaping requirements set forth in this chapter and

with any rules or regulations promulgated thereunder, and to grant waivers or exemptions from the requirements of this chapter, and to report to the city council regarding bay-friendly landscaping compliance on all covered projects.

EXHIBIT A

Appendix C - 8
State Water Efficient Landscape Ordinance (WELO)

The following is Chapter 2.7 Model Water Efficient Landscape Ordinance currently in effect for the City of Livermore. The material has been retrieved from the California Department of Water Resources website (http://www.dwr.water.ca.gov/wateruseefficiency/landscapeordinance/).

entering into the loan contract. For investor–owned utilities, meetings or hearings held by the Public Utilities Commission may serve as Project Feasibility Meetings.

(b) Before a Project Feasibility Meeting, the supplier shall:

(1) Make available information describing the project in a form and location that will enable the water users to review it and to make appropriate comments. The information must be made available for a period of at least fifteen days before the Project Feasibility Meeting.

(2) Establish a date for the meeting agreeable to the Department and Department of Health Services.

(3) Notify the Department, the Department of Health Services and appropriate county health agencies in writing at least twenty calendar days before the meeting, and notify all water users and the local news media in writing at least fifteen calendar days before the meeting. The notice shall state: the date, time, location, and purpose of the meeting and the location of information describing the project for review by the water users. Sample notice forms will be provided by the Department.

(4) Obtain a meeting place of sufficient size and at a convenient location to accommodate the anticipated attendance.

(c) The agenda of the meeting shall include the following matters: (1) A discussion of applicable public health and water works standards, existing and potential health hazards associated with the water system, how the proposed project will bring the system to minimum health standards, and alternative solutions to the problem. (2) The supplier shall describe the proposed project in detail, using maps, charts, and other illustrative devices, if appropriate. The discussion shall include the costs, sources of funds, the amount of the loan–grant commitment, and changes in water costs resulting from the project.

(3) A representative of the State may describe the Act, the State's role in its administration and the Department's recommendation regarding the supplier's loan application. Persons present at the meeting shall be permitted to ask questions regarding all subjects discussed at the meeting.

(d) If no representative of the Department is present at the meeting, the supplier shall submit an official written report to the Department describing the meeting and its outcome including the results of any vote taken.

NOTE: Authority cited: Section 13834, Water Code. Reference: Section 13834, Water Code.

§ 489.1. Plans and Specifications.

Before commencing construction, each Supplier shall provide detailed plans and specifications to the Department of Health Services for review and approval by a registered Civil Engineer employed by the Department of Health Services. Unless otherwise authorized in writing by the Department of Health Services, the supplier shall not commence construction without written notification from the Department of Health Services that the plans and specifications have been approved.

NOTE: Authority cited: Section 13834, Water Code. Reference: Section 13837, Water Code.

§ 489.2. Certification of Completion.

Department of Health Services shall inspect the completed project and if satisfied that the project has been completed in accordance with approved plans and specifications, shall provide the supplier and the Department with written certification to that effect.

NOTE: Authority cited: Section 13834, Water Code. Reference: Section 13834, Water Code.

Chapter 2.6. Weather Resources Management [Repealed]

NOTE: Authority cited: Sections 161, 401, 403 and 6078, Water Code. Reference: Sections 401, 402 and 403, Water Code and Sections 21000 et seq., Public Resources Code.

HISTORY

1. New Subchapter 2.6 (Articles 1–5, Sections 490–495.03, not consecutive) filed 9–28–79; effective thirtieth day thereafter (Register 79, No. 39).
2. Repealer of Subchapter 2.6 (Articles 1–5, Sections 490–495.03, not consecutive, not previously repealed by OAL Order of Repeal) filed 6–5–86; effective thirtieth day thereafter (Register 86, No. 23). For prior history, see Register 85, No. 26; 81, Nos. 40 and 38; and 80, No. 7.

Chapter 2.7. Model Water Efficient Landscape Ordinance

§ 490. Purpose.

(a) The State Legislature has found:

(1) that the waters of the state are of limited supply and are subject to ever increasing demands;

(2) that the continuation of California's economic prosperity is dependent on the availability of adequate supplies of water for future uses;

(3) that it is the policy of the State to promote the conservation and efficient use of water and to prevent the waste of this valuable resource;

(4) that landscapes are essential to the quality of life in California by providing areas for active and passive recreation and as an enhancement to the environment by cleaning air and water, preventing erosion, offering fire protection, and replacing ecosystems lost to development;

(5) that landscape design, installation, maintenance and management can and should be water efficient;

(6) that Section 2 of Article X of the California Constitution specifies that the right to use water is limited to the amount reasonably required for the beneficial use to be served and the right does not and shall not extend to waste or unreasonable method of use.

(b) Consistent with the legislative findings, the purpose of this model ordinance is to:

(1) promote the values and benefits of landscaping practices that integrate and go beyond the conservation and efficient use of water;

(2) establish a structure for planning, designing, installing, maintaining and managing water efficient landscapes in new construction and rehabilitated projects by encouraging the use of a watershed approach that requires cross–sector collaboration of industry, government and property owners to achieve the many benefits possible;

(3) establish provisions for water management practices and water waste prevention for existing landscapes;

(4) use water efficiently without waste by setting a Maximum Applied Water Allowance as an upper limit for water use and reduce water use to the lowest practical amount;

(5) promote the benefits of consistent landscape ordinances with neighboring local and regional agencies;

(6) encourage local agencies and water purveyors to use economic incentives that promote the efficient use of water, such as implementing a tiered–rate structure; and

(7) encourage local agencies to designate the necessary authority that implements and enforces the provisions of the Model Water Efficient Landscape Ordinance or its local landscape ordinance.

(c) Landscapes that are planned, designed, installed, managed and maintained with the watershed based approach can improve California's environmental conditions and provide benefits and realize sustainability goals. Such landscapes will make the urban environment resilient in the face of climatic extremes. Consistent with the legislative findings and purpose of the Ordinance, conditions in the urban setting will be improved by:

(1) Creating the conditions to support life in the soil by reducing compaction, incorporating organic matter that increases water retention, and promoting productive plant growth that leads to more carbon storage, oxygen production, shade, habitat and esthetic benefits.

(2) Minimizing energy use by reducing irrigation water requirements, reducing reliance on petroleum based fertilizers and pesticides, and planting climate appropriate shade trees in urban areas.

(3) Conserving water by capturing and reusing rainwater and graywater wherever possible and selecting climate appropriate plants that need minimal supplemental water after establishment.

(4) Protecting air and water quality by reducing power equipment use and landfill disposal trips, selecting recycled and locally sourced materi-

als, and using compost, mulch and efficient irrigation equipment to prevent erosion.

(5) Protecting existing habitat and creating new habitat by choosing local native plants, climate adapted non–natives and avoiding invasive plants. Utilizing integrated pest management with least toxic methods as the first course of action.

NOTE: Authority cited: Section 65593, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Sections 65591, 65593 and 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New chapter 2.7 (sections 490–495) filed 7–31–92; operative 7–31–92 (Register 92, No. 32).
2. Amendment of section and NOTE filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
3. Amendment of subsections (a)(4) and (b)(1)–(2), new subsections (c)–(c)(5) and amendment of NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 490.1. Applicability.

(a) After December 1, 2015, and consistent with Executive Order No. B–29–15, this ordinance shall apply to all of the following landscape projects:

(1) new construction projects with an aggregate landscape area equal to or greater than 500 square feet requiring a building or landscape permit, plan check or design review;

(2) rehabilitated landscape projects with an aggregate landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check, or design review;

(3) existing landscapes limited to Sections 493, 493.1 and 493.2; and

(4) cemeteries. Recognizing the special landscape management needs of cemeteries, new and rehabilitated cemeteries are limited to Sections 492.4, 492.11, and 492. 12; and existing cemeteries are limited to Sections 493, 493.1, and 493.2.

(b) For local land use agencies working together to develop a regional water efficient landscape ordinance, the reporting requirements of this ordinance shall become effective December 1, 2015 and the remainder of this ordinance shall be effective no later than February 1, 2016.

(c) Any project with an aggregate landscape area of 2,500 square feet or less may comply with the performance requirements of this ordinance or conform to the prescriptive measures contained in Appendix D.

(d) For projects using treated or untreated graywater or rainwater captured on site, any lot or parcel within the project that has less than 2500 sq. ft. of landscape and meets the lot or parcel's landscape water requirement (Estimated Total Water Use) entirely with treated or untreated graywater or through stored rainwater captured on site is subject only to Appendix D section (5).

(e) This ordinance does not apply to:

(1) registered local, state or federal historical sites;

(2) ecological restoration projects that do not require a permanent irrigation system;

(3) mined–land reclamation projects that do not require a permanent irrigation system; or

(4) existing plant collections, as part of botanical gardens and arboretums open to the public.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 491. Definitions.

The terms used in this ordinance have the meaning set forth below:

(a) "applied water" means the portion of water supplied by the irrigation system to the landscape.

(b) "automatic irrigation controller" means a timing device used to remotely control valves that operate an irrigation system. Automatic irrigation controllers are able to self–adjust and schedule irrigation events using either evapotranspiration (weather–based) or soil moisture data.

(c) "backflow prevention device" means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

(d) "Certificate of Completion" means the document required under Section 492.9.

(e) "certified irrigation designer" means a person certified to design irrigation systems by an accredited academic institution, a professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation designer certification program and Irrigation Association's Certified Irrigation Designer program.

(f) "certified landscape irrigation auditor" means a person certified to perform landscape irrigation audits by an accredited academic institution, a professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation auditor certification program and Irrigation Association's Certified Landscape Irrigation Auditor program.

(g) "check valve" or "anti–drain valve" means a valve located under a sprinkler head, or other location in the irrigation system, to hold water in the system to prevent drainage from sprinkler heads when the sprinkler is off.

(h) "common interest developments" means community apartment projects, condominium projects, planned developments, and stock cooperatives per Civil Code Section 1351.

(i) "compost" means the safe and stable product of controlled biologic decomposition of organic materials that is beneficial to plant growth.

(j) "conversion factor (0.62)" means the number that converts acre–inches per acre per year to gallons per square foot per year.

(k) "distribution uniformity" means the measure of the uniformity of irrigation water over a defined area.

(*l*) "drip irrigation" means any non–spray low volume irrigation system utilizing emission devices with a flow rate measured in gallons per hour. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

(m) "ecological restoration project" means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

(n) "effective precipitation" or "usable rainfall" (Eppt) means the portion of total precipitation which becomes available for plant growth.

(o) "emitter" means a drip irrigation emission device that delivers water slowly from the system to the soil.

(p) "established landscape" means the point at which plants in the landscape have developed significant root growth into the soil. Typically, most plants are established after one or two years of growth.

(q) "establishment period of the plants" means the first year after installing the plant in the landscape or the first two years if irrigation will be terminated after establishment. Typically, most plants are established after one or two years of growth. Native habitat mitigation areas and trees may need three to five years for establishment.

(r) "Estimated Total Water Use" (ETWU) means the total water used for the landscape as described in Section 492.4.

(s) "ET adjustment factor" (ETAF) means a factor of 0.55 for residential areas and 0.45 for non–residential areas, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape. The ETAF for new and existing (non–rehabilitated) Special Landscape Areas shall not exceed 1.0. The ETAF for existing non–rehabilitated landscapes is 0.8.

(t) "evapotranspiration rate" means the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specified time.

(u) "flow rate" means the rate at which water flows through pipes, valves and emission devices, measured in gallons per minute, gallons per hour, or cubic feet per second.

(v) "flow sensor" means an inline device installed at the supply point of the irrigation system that produces a repeatable signal proportional to flow rate. Flow sensors must be connected to an automatic irrigation controller, or flow monitor capable of receiving flow signals and operating master valves. This combination flow sensor/controller may also function as a landscape water meter or submeter.

(w) "friable" means a soil condition that is easily crumbled or loosely compacted down to a minimum depth per planting material requirements, whereby the root structure of newly planted material will be allowed to spread unimpeded.

(x) "Fuel Modification Plan Guideline" means guidelines from a local fire authority to assist residents and businesses that are developing land or building structures in a fire hazard severity zone.

(y) "graywater" means untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. "Graywater" includes, but is not limited to, wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs, but does not include wastewater from kitchen sinks or dishwashers. Health and Safety Code Section 17922.12.

(z) "hardscapes" means any durable material (pervious and non–pervious).

(aa) "hydrozone" means a portion of the landscaped area having plants with similar water needs and rooting depth. A hydrozone may be irrigated or non–irrigated.

(bb) "infiltration rate" means the rate of water entry into the soil expressed as a depth of water per unit of time (e.g., inches per hour).

(cc) "invasive plant species" means species of plants not historically found in California that spread outside cultivated areas and can damage environmental or economic resources. Invasive species may be regulated by county agricultural agencies as noxious species. Lists of invasive plants are maintained at the California Invasive Plant Inventory and USDA invasive and noxious weeds database.

(dd) "irrigation audit" means an in–depth evaluation of the performance of an irrigation system conducted by a Certified Landscape Irrigation Auditor. An irrigation audit includes, but is not limited to: inspection, system tune–up, system test with distribution uniformity or emission uniformity, reporting overspray or runoff that causes overland flow, and preparation of an irrigation schedule. The audit must be conducted in a manner consistent with the Irrigation Association's Landscape Irrigation Auditor Certification program or other U.S. Environmental Protection Agency "Watersense" labeled auditing program.

(ee) "irrigation efficiency" (IE) means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The irrigation efficiency for purposes of this ordinance are 0.75 for overhead spray devices and 0.81 for drip systems.

(ff) "irrigation survey" means an evaluation of an irrigation system that is less detailed than an irrigation audit. An irrigation survey includes, but is not limited to: inspection, system test, and written recommendations to improve performance of the irrigation system.

(gg) "irrigation water use analysis" means an analysis of water use data based on meter readings and billing data.

(hh) "landscape architect" means a person who holds a license to practice landscape architecture in the state of California Business and Professions Code, Section 5615.

(ii) "landscape area" means all the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Water Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non–pervious hardscapes, and other non–irrigated areas designated for non–development (e.g., open spaces and existing native vegetation).

(jj) "landscape contractor" means a person licensed by the state of California to construct, maintain, repair, install, or subcontract the development of landscape systems.

(kk) "Landscape Documentation Package" means the documents required under Section 492.3.

(*ll*) "landscape project" means total area of landscape in a project as defined in "landscape area" for the purposes of this ordinance, meeting requirements under Section 490.1.

(mm) "landscape water meter" means an inline device installed at the irrigation supply point that measures the flow of water into the irrigation system and is connected to a totalizer to record water use.

(nn) "lateral line" means the water delivery pipeline that supplies water to the emitters or sprinklers from the valve.

(oo) "local agency" means a city or county, including a charter city or charter county, that is responsible for adopting and implementing the ordinance. The local agency is also responsible for the enforcement of this ordinance, including but not limited to, approval of a permit and plan check or design review of a project.

(pp) "local water purveyor" means any entity, including a public agency, city, county, or private water company that provides retail water service.

(qq) "low volume irrigation" means the application of irrigation water at low pressure through a system of tubing or lateral lines and low–volume emitters such as drip, drip lines, and bubblers. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

(rr) "main line" means the pressurized pipeline that delivers water from the water source to the valve or outlet.

(ss) "master shut–off valve" is an automatic valve installed at the irrigation supply point which controls water flow into the irrigation system. When this valve is closed water will not be supplied to the irrigation system. A master valve will greatly reduce any water loss due to a leaky station valve.

(tt) "Maximum Applied Water Allowance" (MAWA) means the upper limit of annual applied water for the established landscaped area as specified in Section 492.4. It is based upon the area's reference evapotranspiration, the ET Adjustment Factor, and the size of the landscape area. The Estimated Total Water Use shall not exceed the Maximum Applied Water Allowance. Special Landscape Areas, including recreation areas, areas permanently and solely dedicated to edible plants such as orchards and vegetable gardens, and areas irrigated with recycled water are subject to the MAWA with an ETAF not to exceed 1.0. MAWA = (ETo) (0.62) [(ETAF x LA) + ((1–ETAF) x SLA)]

(uu) "median" is an area between opposing lanes of traffic that may be unplanted or planted with trees, shrubs, perennials, and ornamental grasses.

(vv) "microclimate" means the climate of a small, specific area that may contrast with the climate of the overall landscape area due to factors such as wind, sun exposure, plant density, or proximity to reflective surfaces.

(ww) "mined–land reclamation projects" means any surface mining operation with a reclamation plan approved in accordance with the Surface Mining and Reclamation Act of 1975.

(xx) "mulch" means any organic material such as leaves, bark, straw, compost, or inorganic mineral materials such as rocks, gravel, or decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.

(yy) "new construction" means, for the purposes of this ordinance, a new building with a landscape or other new landscape, such as a park, playground, or greenbelt without an associated building.

(zz) "non–residential landscape" means landscapes in commercial, institutional, industrial and public settings that may have areas designated for recreation or public assembly. It also includes portions of common areas of common interest developments with designated recreational areas.

(aaa) "operating pressure" means the pressure at which the parts of an irrigation system are designed by the manufacturer to operate.

(bbb) "overhead sprinkler irrigation systems" or "overhead spray irrigation systems" means systems that deliver water through the air (e.g., spray heads and rotors).

(ccc) "overspray" means the irrigation water which is delivered beyond the target area.

(ddd) "parkway" means the area between a sidewalk and the curb or traffic lane. It may be planted or unplanted, and with or without pedestrian egress.

(eee) "permit" means an authorizing document issued by local agencies for new construction or rehabilitated landscapes.

(fff) "pervious" means any surface or material that allows the passage of water through the material and into the underlying soil.

(ggg) "plant factor" or "plant water use factor" is a factor, when multiplied by ETo, estimates the amount of water needed by plants. For purposes of this ordinance, the plant factor range for very low water use plants is 0 to 0.1, the plant factor range for low water use plants is 0.1 to 0.3, the plant factor range for moderate water use plants is 0.4 to 0.6, and the plant factor range for high water use plants is 0.7 to 1.0. Plant factors cited in this ordinance are derived from the publication "Water Use Classification of Landscape Species". Plant factors may also be obtained from horticultural researchers from academic institutions or professional associations as approved by the California Department of Water Resources (DWR).

(hhh) "project applicant" means the individual or entity submitting a Landscape Documentation Package required under Section 492.3, to request a permit, plan check, or design review from the local agency. A project applicant may be the property owner or his or her designee.

(iii) "rain sensor" or "rain sensing shutoff device" means a component which automatically suspends an irrigation event when it rains.

(jjj) "record drawing" or "as–builts" means a set of reproducible drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor.

(kkk) "recreational area" means areas, excluding private single family residential areas, designated for active play, recreation or public assembly in parks, sports fields, picnic grounds, amphitheaters or golf course tees, fairways, roughs, surrounds and greens.

(*lll*) "recycled water," "reclaimed water," or "treated sewage effluent water" means treated or recycled waste water of a quality suitable for nonpotable uses such as landscape irrigation and water features. This water is not intended for human consumption.

(mmm) "reference evapotranspiration" or "ETo" means a standard measurement of environmental parameters which affect the water use of plants. ETo is expressed in inches per day, month, or year as represented in Appendix A, and is an estimate of the evapotranspiration of a large field of four– to seven–inch tall, cool–season grass that is well watered. Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowances so that regional differences in climate can be accommodated.

(nnn) "Regional Water Efficient Landscape Ordinance" means a local Ordinance adopted by two or more local agencies, water suppliers and other stakeholders for implementing a consistent set of landscape provisions throughout a geographical region. Regional ordinances are strongly encouraged to provide a consistent framework for the landscape industry and applicants to adhere to.

(ooo) "rehabilitated landscape" means any relandscaping project that requires a permit, plan check, or design review, meets the requirements of Section 490.1, and the modified landscape area is equal to or greater than 2,500 square feet.

(ppp) "residential landscape" means landscapes surrounding single or multifamily homes.

(qqq) "run off" means water which is not absorbed by the soil or landscape to which it is applied and flows from the landscape area. For example, run off may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or when there is a slope.

(rrr) "soil moisture sensing device" or "soil moisture sensor" means a device that measures the amount of water in the soil. The device may also suspend or initiate an irrigation event.

(sss) "soil texture" means the classification of soil based on its percentage of sand, silt, and clay.

(ttt) "Special Landscape Area" (SLA) means an area of the landscape dedicated solely to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water.

(uuu) "sprinkler head" or "spray head" means a device which delivers water through a nozzle.

(vvv) "static water pressure" means the pipeline or municipal water supply pressure when water is not flowing.

(www) "station" means an area served by one valve or by a set of valves that operate simultaneously.

(xxx) "swing joint" means an irrigation component that provides a flexible, leak–free connection between the emission device and lateral pipeline to allow movement in any direction and to prevent equipment damage.

(yyy) "submeter" means a metering device to measure water applied to the landscape that is installed after the primary utility water meter.

(zzz) "turf" means a ground cover surface of mowed grass. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are cool–season grasses. Bermudagrass, Kikuyugrass, Seashore Paspalum, St. Augustinegrass, Zoysiagrass, and Buffalo grass are warm–season grasses.

(aaaa) "valve" means a device used to control the flow of water in the irrigation system.

(bbbb) "water conserving plant species" means a plant species identified as having a very low or low plant factor.

(cccc) "water feature" means a design element where open water performs an aesthetic or recreational function. Water features include ponds, lakes, waterfalls, fountains, artificial streams, spas, and swimming pools (where water is artificially supplied). The surface area of water features is included in the high water use hydrozone of the landscape area. Constructed wetlands used for on–site wastewater treatment or stormwater best management practices that are not irrigated and used solely for water treatment or stormwater retention are not water features and, therefore, are not subject to the water budget calculation.

(dddd) "watering window" means the time of day irrigation is allowed.

(eeee) "WUCOLS" means the Water Use Classification of Landscape Species published by the University of California Cooperative Extension and the Department of Water Resources 2014.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Sections 65592 and 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 7–31–92; operative 7–31–92 (Register 92, No. 32).
2. Amendment of section and NOTE filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
3. Amendment of section and NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 492. Provisions for New Construction or Rehabilitated Landscapes.

(a) A local agency may designate by mutual agreement, another agency, such as a water purveyor, to implement some or all of the requirements contained in this ordinance. Local agencies may collaborate with water purveyors to define each entity's specific responsibilities relating to this ordinance.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596,

Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 7–31–92; operative 7–31–92 (Register 92, No. 32).
2. Amendment of section heading, repealer and new section and amendment of NOTE filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
3. Amendment of section and NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 492.1. Compliance with Landscape Documentation Package.

(a) Prior to construction, the local agency shall:

(1) provide the project applicant with the ordinance and procedures for permits, plan checks or design reviews;

(2) review the Landscape Documentation Package submitted by the project applicant;

(3) approve or deny the Landscape Documentation Package;

(4) issue a permit or approve the plan check or design review for the project applicant; and

(5) upon approval of the Landscape Documentation Package, submit a copy of the Water Efficient Landscape Worksheet to the local water purveyor.

(b) Prior to construction, the project applicant shall:

(1) submit a Landscape Documentation Package to the local agency.

(c) Upon approval of the Landscape Documentation Package by the local agency, the project applicant shall:

(1) receive a permit or approval of the plan check or design review and record the date of the permit in the Certificate of Completion;

(2) submit a copy of the approved Landscape Documentation Package along with the record drawings, and any other information to the property owner or his/her designee; and

(3) submit a copy of the Water Efficient Landscape Worksheet to the local water purveyor.

NOTE: Authority cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

§ 492.2. Penalties.

(a) A local agency may establish and administer penalties to the project applicant for non–compliance with the ordinance to the extent permitted by law.

NOTE: Authority cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

§ 492.3. Elements of the Landscape Documentation Package.

(a) The Landscape Documentation Package shall include the following six (6) elements:

(1) project information;

(A) date

(B) project applicant

(C) project address (if available, parcel and/or lot number(s))

(D) total landscape area (square feet)

(E) project type (e.g., new, rehabilitated, public, private, cemetery, homeowner–installed)

(F) water supply type (e.g., potable, recycled, well) and identify the local retail water purveyor if the applicant is not served by a private well

(G) checklist of all documents in Landscape Documentation Package

(H) project contacts to include contact information for the project applicant and property owner

(I) applicant signature and date with statement, "I agree to comply with the requirements of the water efficient landscape ordinance and submit a complete Landscape Documentation Package".

(2) Water Efficient Landscape Worksheet;

(A) hydrozone information table

(B) water budget calculations

1. Maximum Applied Water Allowance (MAWA)
2. Estimated Total Water Use (ETWU)

(3) soil management report;

(4) landscape design plan;

(5) irrigation design plan; and

(6) grading design plan.

NOTE: Authority cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

§ 492.4. Water Efficient Landscape Worksheet.

(a) A project applicant shall complete the Water Efficient Landscape Worksheet in Appendix B which contains information on the plant factor, irrigation method, irrigation efficiency, and area associated with each hydrozone. Calculations are then made to show that the evapotranspiration adjustment factor (ETAF) for the landscape project does not exceed a factor of 0.55 for residential areas and 0.45 for non–residential areas, exclusive of Special Landscape Areas. The ETAF for a landscape project is based on the plant factors and irrigation methods selected. The Maximum Applied Water Allowance is calculated based on the maximum ETAF allowed (0.55 for residential areas and 0.45 for non–residential areas) and expressed as annual gallons required. The Estimated Total Water Use (ETWU) is calculated based on the plants used and irrigation method selected for the landscape design. ETWU must be below the MAWA.

(1) In calculating the Maximum Applied Water Allowance and Estimated Total Water Use, a project applicant shall use the ETo values from the Reference Evapotranspiration Table in Appendix A. For geographic areas not covered in Appendix A, use data from other cities located nearby in the same reference evapotranspiration zone, as found in the CIMIS Reference Evapotranspiration Zones Map, Department of Water Resources, 1999.

(b) Water budget calculations shall adhere to the following requirements:

(1) The plant factor used shall be from WUCOLS or from horticultural researchers with academic institutions or professional associations as approved by the California Department of Water Resources (DWR). The plant factor ranges from 0 to 0.1 for very low water using plants, 0.1 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants.

(2) All water features shall be included in the high water use hydrozone and temporarily irrigated areas shall be included in the low water use hydrozone.

(3) All Special Landscape Areas shall be identified and their water use calculated as shown in Appendix B.

(4) ETAF for new and existing (non–rehabilitated) Special Landscape Areas shall not exceed 1.0.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 492.5. Soil Management Report.

(a) In order to reduce runoff and encourage healthy plant growth, a soil management report shall be completed by the project applicant, or his/her designee, as follows:

(1) Submit soil samples to a laboratory for analysis and recommendations.

(A) Soil sampling shall be conducted in accordance with laboratory protocol, including protocols regarding adequate sampling depth for the intended plants.

(B) The soil analysis shall include:

1. soil texture;

2. infiltration rate determined by laboratory test or soil texture infiltration rate table;

3. pH;

4. total soluble salts;

5. sodium;

6. percent organic matter; and

7. recommendations.

(C) In projects with multiple landscape installations (i.e. production home developments) a soil sampling rate of 1 in 7 lots or approximately 15% will satisfy this requirement. Large landscape projects shall sample at a rate equivalent to 1 in 7 lots.

(2) The project applicant, or his/her designee, shall comply with one of the following:

(A) If significant mass grading is not planned, the soil analysis report shall be submitted to the local agency as part of the Landscape Documentation Package; or

(B) If significant mass grading is planned, the soil analysis report shall be submitted to the local agency as part of the Certificate of Completion.

(3) The soil analysis report shall be made available, in a timely manner, to the professionals preparing the landscape design plans and irrigation design plans to make any necessary adjustments to the design plans.

(4) The project applicant, or his/her designee, shall submit documentation verifying implementation of soil analysis report recommendations to the local agency with Certificate of Completion.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of subsection (a)(1)(B), new subsection (a)(1)(C) and amendment of NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 492.6. Landscape Design Plan.

(a) For the efficient use of water, a landscape shall be carefully designed and planned for the intended function of the project. A landscape design plan meeting the following design criteria shall be submitted as part of the Landscape Documentation Package.

(1) Plant Material

(A) Any plant may be selected for the landscape, providing the Estimated Total Water Use in the landscape area does not exceed the Maximum Applied Water Allowance. Methods to achieve water efficiency shall include one or more of the following:

1. protection and preservation of native species and natural vegetation;

2. selection of water–conserving plant, tree and turf species, especially local native plants;

3. selection of plants based on local climate suitability, disease and pest resistance;

4. selection of trees based on applicable local tree ordinances or tree shading guidelines, and size at maturity as appropriate for the planting area; and

5. selection of plants from local and regional landscape program plant lists.

6. selection of plants from local Fuel Modification Plan Guidelines.

(B) Each hydrozone shall have plant materials with similar water use, with the exception of hydrozones with plants of mixed water use, as specified in Section 492.7(a)(2)(D).

(C) Plants shall be selected and planted appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the project site. Methods to achieve water efficiency shall include one or more of the following:

1. use the Sunset Western Climate Zone System which takes into account temperature, humidity, elevation, terrain, latitude, and varying degrees of continental and marine influence on local climate;

2. recognize the horticultural attributes of plants (i.e., mature plant size, invasive surface roots) to minimize damage to property or infrastructure [e.g., buildings, sidewalks, power lines]; allow for adequate soil volume for healthy root growth; and

3. consider the solar orientation for plant placement to maximize summer shade and winter solar gain.

(D) Turf is not allowed on slopes greater than 25% where the toe of the slope is adjacent to an impermeable hardscape and where 25% means 1 foot of vertical elevation change for every 4 feet of horizontal length (rise divided by run x 100 = slope percent).

(E) High water use plants, characterized by a plant factor of 0.7 to 1.0, are prohibited in street medians.

(F) A landscape design plan for projects in fire–prone areas shall address fire safety and prevention. A defensible space or zone around a building or structure is required per Public Resources Code Section 4291(a) and (b). Avoid fire–prone plant materials and highly flammable mulches. Refer to the local Fuel Modification Plan guidelines.

(G) The use of invasive plant species, such as those listed by the California Invasive Plant Council, is strongly discouraged.

(H) The architectural guidelines of a common interest development, which include community apartment projects, condominiums, planned developments, and stock cooperatives, shall not prohibit or include conditions that have the effect of prohibiting the use of low–water use plants as a group.

(2) Water Features

(A) Recirculating water systems shall be used for water features.

(B) Where available, recycled water shall be used as a source for decorative water features.

(C) Surface area of a water feature shall be included in the high water use hydrozone area of the water budget calculation.

(D) Pool and spa covers are highly recommended.

(3) Soil Preparation, Mulch and Amendments

(A) Prior to the planting of any materials, compacted soils shall be transformed to a friable condition. On engineered slopes, only amended planting holes need meet this requirement.

(B) Soil amendments shall be incorporated according to recommendations of the soil report and what is appropriate for the plants selected (see Section 492.5).

(C) For landscape installations, compost at a rate of a minimum of four cubic yards per 1,000 square feet of permeable area shall be incorporated to a depth of six inches into the soil. Soils with greater than 6% organic matter in the top 6 inches of soil are exempt from adding compost and tilling.

(D) A minimum three inch (3″) layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers, or direct seeding applications where mulch is contraindicated. To provide habitat for beneficial insects and other wildlife, up to 5 % of the landscape area may be left without mulch. Designated insect habitat must be included in the landscape design plan as such.

(E) Stabilizing mulching products shall be used on slopes that meet current engineering standards.

(F) The mulching portion of the seed/mulch slurry in hydro–seeded applications shall meet the mulching requirement.

(G) Organic mulch materials made from recycled or post–consumer shall take precedence over inorganic materials or virgin forest products unless the recycled post–consumer organic products are not locally available. Organic mulches are not required where prohibited by local Fuel Modification Plan Guidelines or other applicable local ordinances.

(b) The landscape design plan, at a minimum, shall:

(1) delineate and label each hydrozone by number, letter, or other method;

(2) identify each hydrozone as low, moderate, high water, or mixed water use. Temporarily irrigated areas of the landscape shall be included in the low water use hydrozone for the water budget calculation;

(3) identify recreational areas;

(4) identify areas permanently and solely dedicated to edible plants;

(5) identify areas irrigated with recycled water;

(6) identify type of mulch and application depth;

(7) identify soil amendments, type, and quantity;

(8) identify type and surface area of water features;

(9) identify hardscapes (pervious and non–pervious);

(10) identify location, installation details, and 24–hour retention or infiltration capacity of any applicable stormwater best management practices that encourage on–site retention and infiltration of stormwater. Project applicants shall refer to the local agency or regional Water Quality Control Board for information on any applicable stormwater technical requirements. Stormwater best management practices are encouraged in the landscape design plan and examples are provided in Section 492.16.

(11) identify any applicable rain harvesting or catchment technologies as discussed in Section 492.16 and their 24–hour retention or infiltration capacity;

(12) identify any applicable graywater discharge piping, system components and area(s) of distribution;

(13) contain the following statement: "I have complied with the criteria of the ordinance and applied them for the efficient use of water in the landscape design plan"; and

(14) bear the signature of a licensed landscape architect, licensed landscape contractor, or any other person authorized to design a landscape. (See Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the Business and Professions Code, Section 832.27 of Title16 of the California Code of Regulations, and Section 6721 of the Food and Agriculture Code.).

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; Section 1351, Civil Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 492.7. Irrigation Design Plan.

(a) This section applies to landscaped areas requiring permanent irrigation, not areas that require temporary irrigation solely for the plant establishment period. For the efficient use of water, an irrigation system shall meet all the requirements listed in this section and the manufacturers' recommendations. The irrigation system and its related components shall be planned and designed to allow for proper installation, management, and maintenance. An irrigation design plan meeting the following design criteria shall be submitted as part of the Landscape Documentation Package.

(1) System

(A) Landscape water meters, defined as either a dedicated water service meter or private submeter, shall be installed for all non–residential irrigated landscapes of 1,000 sq. ft. but not more than 5,000 sq.ft. (the level at which Water Code 535 applies) and residential irrigated landscapes of 5,000 sq. ft. or greater. A landscape water meter may be either:

1. a customer service meter dedicated to landscape use provided by the local water purveyor; or

2. a privately owned meter or submeter.

(B) Automatic irrigation controllers utilizing either evapotranspiration or soil moisture sensor data utilizing non–volatile memory shall be required for irrigation scheduling in all irrigation systems.

(C) If the water pressure is below or exceeds the recommended pressure of the specified irrigation devices, the installation of a pressure regulating device is required to ensure that the dynamic pressure at each emission device is within the manufacturer's recommended pressure range for optimal performance.

1. If the static pressure is above or below the required dynamic pressure of the irrigation system, pressure–regulating devices such as inline pressure regulators, booster pumps, or other devices shall be installed to meet the required dynamic pressure of the irrigation system.

2. Static water pressure, dynamic or operating pressure, and flow reading of the water supply shall be measured at the point of connection. These pressure and flow measurements shall be conducted at the design stage. If the measurements are not available at the design stage, the measurements shall be conducted at installation.

(D) Sensors (rain, freeze, wind, etc.), either integral or auxiliary, that suspend or alter irrigation operation during unfavorable weather conditions shall be required on all irrigation systems, as appropriate for local climatic conditions. Irrigation should be avoided during windy or freezing weather or during rain.

(E) Manual shut–off valves (such as a gate valve, ball valve, or butterfly valve) shall be required, as close as possible to the point of connection of the water supply, to minimize water loss in case of an emergency (such as a main line break) or routine repair.

(F) Backflow prevention devices shall be required to protect the water supply from contamination by the irrigation system. A project applicant shall refer to the applicable local agency code (i.e., public health) for additional backflow prevention requirements.

(G) Flow sensors that detect high flow conditions created by system damage or malfunction are required for all on non–residential landscapes and residential landscapes of 5000 sq. ft. or larger.

(H) Master shut–off valves are required on all projects except landscapes that make use of technologies that allow for the individual control of sprinklers that are individually pressurized in a system equipped with low pressure shut down features.

(I) The irrigation system shall be designed to prevent runoff, low head drainage, overspray, or other similar conditions where irrigation water flows onto non–targeted areas, such as adjacent property, non–irrigated areas, hardscapes, roadways, or structures.

(J) Relevant information from the soil management plan, such as soil type and infiltration rate, shall be utilized when designing irrigation systems.

(K) The design of the irrigation system shall conform to the hydrozones of the landscape design plan.

(L) The irrigation system must be designed and installed to meet, at a minimum, the irrigation efficiency criteria as described in Section 492.4 regarding the Maximum Applied Water Allowance.

(M) All irrigation emission devices must meet the requirements set in the American National Standards Institute (ANSI) standard, American Society of Agricultural and Biological Engineers'/International Code Council's (ASABE/ICC) 802–2014 "Landscape Irrigation Sprinkler and Emitter Standard, All sprinkler heads installed in the landscape must document a distribution uniformity low quarter of 0.65 or higher using the protocol defined in ASABE/ICC 802–2014.

(N) It is highly recommended that the project applicant or local agency inquire with the local water purveyor about peak water operating demands (on the water supply system) or water restrictions that may impact the effectiveness of the irrigation system.

(O) In mulched planting areas, the use of low volume irrigation is required to maximize water infiltration into the root zone.

(P) Sprinkler heads and other emission devices shall have matched precipitation rates, unless otherwise directed by the manufacturer's recommendations.

(Q) Head to head coverage is recommended. However, sprinkler spacing shall be designed to achieve the highest possible distribution uniformity using the manufacturer's recommendations.

(R) Swing joints or other riser–protection components are required on all risers subject to damage that are adjacent to hardscapes or in high traffic areas of turfgrass.

(S) Check valves or anti–drain valves are required on all sprinkler heads where low point drainage could occur.

(T) Areas less than ten (10) feet in width in any direction shall be irrigated with subsurface irrigation or other means that produces no runoff or overspray.

(U) Overhead irrigation shall not be permitted within 24 inches of any non–permeable surface. Allowable irrigation within the setback from non–permeable surfaces may include drip, drip line, or other low flow non–spray technology. The setback area may be planted or unplanted. The surfacing of the setback may be mulch, gravel, or other porous material. These restrictions may be modified if:

1. the landscape area is adjacent to permeable surfacing and no runoff occurs; or

2. the adjacent non–permeable surfaces are designed and constructed to drain entirely to landscaping; or

3. the irrigation designer specifies an alternative design or technology, as part of the Landscape Documentation Package and clearly demonstrates strict adherence to irrigation system design criteria in Section 492.7 (a)(1)(I). Prevention of overspray and runoff must be confirmed during the irrigation audit.

(V) Slopes greater than 25% shall not be irrigated with an irrigation system with a application rate exceeding 0.75 inches per hour. This restriction may be modified if the landscape designer specifies an alternative design or technology, as part of the Landscape Documentation Package, and clearly demonstrates no runoff or erosion will occur. Prevention of runoff and erosion must be confirmed during the irrigation audit.

(2) Hydrozone

(A) Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use.

(B) Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone.

(C) Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and turf to facilitate the appropriate irrigation of trees. The mature size and extent of the root zone shall be considered when designing irrigation for the tree.

(D) Individual hydrozones that mix plants of moderate and low water use, or moderate and high water use, may be allowed if:

1. plant factor calculation is based on the proportions of the respective plant water uses and their plant factor; or

2. the plant factor of the higher water using plant is used for calculations.

(E) Individual hydrozones that mix high and low water use plants shall not be permitted.

(F) On the landscape design plan and irrigation design plan, hydrozone areas shall be designated by number, letter, or other designation. On the irrigation design plan, designate the areas irrigated by each valve, and assign a number to each valve. Use this valve number in the Hydrozone Information Table (see Appendix B Section A). This table can also assist with the irrigation audit and programming the controller.

(b) The irrigation design plan, at a minimum, shall contain:

(1) location and size of separate water meters for landscape;

(2) location, type and size of all components of the irrigation system, including controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, pressure regulators, and backflow prevention devices;

(3) static water pressure at the point of connection to the public water supply;

(4) flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (pressure per square inch) for each station;

(5) recycled water irrigation systems as specified in Section 492.14;

(6) the following statement: "I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the irrigation design plan"; and

(7) the signature of a licensed landscape architect, certified irrigation designer, licensed landscape contractor, or any other person authorized to design an irrigation system. (See Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the Business and Professions Code, Section 832.27 of Title16 of the California Code of Regulations, and Section 6721 of the Food and Agricultural Code.)

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 492.8. Grading Design Plan.

(a) For the efficient use of water, grading of a project site shall be designed to minimize soil erosion, runoff, and water waste. A grading plan shall be submitted as part of the Landscape Documentation Package. A comprehensive grading plan prepared by a civil engineer for other local agency permits satisfies this requirement.

(1) The project applicant shall submit a landscape grading plan that indicates finished configurations and elevations of the landscape area including:

(A) height of graded slopes;

(B) drainage patterns;

(C) pad elevations;

(D) finish grade; and

(E) stormwater retention improvements, if applicable.

(2) To prevent excessive erosion and runoff, it is highly recommended that project applicants:

(A) grade so that all irrigation and normal rainfall remains within property lines and does not drain on to non–permeable hardscapes;

(B) avoid disruption of natural drainage patterns and undisturbed soil; and

(C) avoid soil compaction in landscape areas.

(3) The grading design plan shall contain the following statement: "I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the grading design plan" and shall bear the signature of a licensed professional as authorized by law.

NOTE: Authority cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

§ 492.9. Certificate of Completion.

(a) The Certificate of Completion (see Appendix C for a sample certificate) shall include the following six (6) elements:

(1) project information sheet that contains:

(A) date;

(B) project name;

(C) project applicant name, telephone, and mailing address;

(D) project address and location; and

(E) property owner name, telephone, and mailing address;

(2) certification by either the signer of the landscape design plan, the signer of the irrigation design plan, or the licensed landscape contractor that the landscape project has been installed per the approved Landscape Documentation Package;

(A) where there have been significant changes made in the field during construction, these "as–built" or record drawings shall be included with the certification;

(B) A diagram of the irrigation plan showing hydrozones shall be kept with the irrigation controller for subsequent management purposes.

(3) irrigation scheduling parameters used to set the controller (see Section 492.10);

(4) landscape and irrigation maintenance schedule (see Section 492.11);

(5) irrigation audit report (see Section 492.12); and

(6) soil analysis report, if not submitted with Landscape Documentation Package, and documentation verifying implementation of soil report recommendations (see Section 492.5).

(b) The project applicant shall:

(1) submit the signed Certificate of Completion to the local agency for review;

(2) ensure that copies of the approved Certificate of Completion are submitted to the local water purveyor and property owner or his or her designee.

(c) The local agency shall:

(1) receive the signed Certificate of Completion from the project applicant;

(2) approve or deny the Certificate of Completion. If the Certificate of Completion is denied, the local agency shall provide information to the project applicant regarding reapplication, appeal, or other assistance.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. New subsection (a)(2)(B) and amendment of NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 492.10. Irrigation Scheduling.

(a) For the efficient use of water, all irrigation schedules shall be developed, managed, and evaluated to utilize the minimum amount of water required to maintain plant health. Irrigation schedules shall meet the following criteria:

(1) Irrigation scheduling shall be regulated by automatic irrigation controllers.

(2) Overhead irrigation shall be scheduled between 8:00 p.m. and 10:00 a.m. unless weather conditions prevent it. If allowable hours of irrigation differ from the local water purveyor, the stricter of the two shall apply. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.

(3) For implementation of the irrigation schedule, particular attention must be paid to irrigation run times, emission device, flow rate, and current reference evapotranspiration, so that applied water meets the Estimated Total Water Use. Total annual applied water shall be less than or equal to Maximum Applied Water Allowance (MAWA). Actual irrigation schedules shall be regulated by automatic irrigation controllers using current reference evapotranspiration data (e.g., CIMIS) or soil moisture sensor data.

(4) Parameters used to set the automatic controller shall be developed and submitted for each of the following:

(A) the plant establishment period;

(B) the established landscape; and

(C) temporarily irrigated areas.

(5) Each irrigation schedule shall consider for each station all of the following that apply:

(A) irrigation interval (days between irrigation);

(B) irrigation run times (hours or minutes per irrigation event to avoid runoff);

(C) number of cycle starts required for each irrigation event to avoid runoff;

(D) amount of applied water scheduled to be applied on a monthly basis;

(E) application rate setting;

(F) root depth setting;

(G) plant type setting;

(H) soil type;

(I) slope factor setting;

(J) shade factor setting; and

(K) irrigation uniformity or efficiency setting.

NOTE: Authority cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

§ 492.11. Landscape and Irrigation Maintenance Schedule.

(a) Landscapes shall be maintained to ensure water use efficiency. A regular maintenance schedule shall be submitted with the Certificate of Completion.

(b) A regular maintenance schedule shall include, but not be limited to, routine inspection; auditing, adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; topdressing with compost, replenishing mulch; fertilizing; pruning; weeding in all landscape areas, and removing obstructions to emission devices. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.

(c) Repair of all irrigation equipment shall be done with the originally installed components or their equivalents or with components with greater efficiency.

(d) A project applicant is encouraged to implement established landscape industry sustainable Best Practices for all landscape maintenance activities.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 492.12. Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis.

(a) All landscape irrigation audits shall be conducted by a local agency landscape irrigation auditor or a third party certified landscape irrigation auditor. Landscape audits shall not be conducted by the person who designed the landscape or installed the landscape.

(b) In large projects or projects with multiple landscape installations (i.e. production home developments) an auditing rate of 1 in 7 lots or approximately 15% will satisfy this requirement.

(c) For new construction and rehabilitated landscape projects installed after December 1, 2015, as described in Section 490.1:

(1) the project applicant shall submit an irrigation audit report with the Certificate of Completion to the local agency that may include, but is not limited to: inspection, system tune–up, system test with distribution uniformity, reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule, including configuring irrigation controllers with application rate, soil types, plant factors, slope, exposure and any other factors necessary for accurate programming;

(2) the local agency shall administer programs that may include, but not be limited to, irrigation water use analysis, irrigation audits, and irrigation surveys for compliance with the Maximum Applied Water Allowance.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 492.13. Irrigation Efficiency.

(a) For the purpose of determining Estimated Total Water Use, average irrigation efficiency is assumed to be 0.75 for overhead spray devices and 0.81 for drip system devices.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596,

Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 492.14. Recycled Water.

(a) The installation of recycled water irrigation systems shall allow for the current and future use of recycled water.

(b) All recycled water irrigation systems shall be designed and operated in accordance with all applicable local and State laws.

(c) Landscapes using recycled water are considered Special Landscape Areas. The ET Adjustment Factor for new and existing (non–rehabilitated) Special Landscape Areas shall not exceed 1.0.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 492.15. Graywater Systems.

(a) Graywater systems promote the efficient use of water and are encouraged to assist in on–site landscape irrigation. All graywater systems shall conform to the California Plumbing Code (Title 24, Part 5, Chapter 16) and any applicable local ordinance standards. Refer to § 490.1 (d) for the applicability of this ordinance to landscape areas less than 2,500 square feet with the Estimated Total Water Use met entirely by graywater.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Renumbering of former section 492.15 to 492.16, new section 492.15 and amendment of NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 492.16. Stormwater Management and Rainwater Retention.

(a) Stormwater management practices minimize runoff and increase infiltration which recharges groundwater and improves water quality. Implementing stormwater best management practices into the landscape and grading design plans to minimize runoff and to increase on–site rainwater retention and infiltration are encouraged.

(b) Project applicants shall refer to the local agency or Regional Water Quality Control Board for information on any applicable stormwater technical requirements.

(c) All planted landscape areas are required to have friable soil to maximize water retention and infiltration. Refer to § 492.6(a)(3).

(d) It is strongly recommended that landscape areas be designed for capture and infiltration capacity that is sufficient to prevent runoff from impervious surfaces (i.e. roof and paved areas) from either: the one inch, 24–hour rain event or (2) the 85th percentile, 24–hour rain event, and/or additional capacity as required by any applicable local, regional, state or federal regulation.

(e) It is recommended that storm water projects incorporate any of the following elements to improve on–site storm water and dry weather runoff capture and use:

- Grade impervious surfaces, such as driveways, during construction to drain to vegetated areas.
- Minimize the area of impervious surfaces such as paved areas, roof and concrete driveways.
- Incorporate pervious or porous surfaces (e.g., gravel, permeable pavers or blocks, pervious or porous concrete) that minimize runoff.
- Direct runoff from paved surfaces and roof areas into planting beds or landscaped areas to maximize site water capture and reuse.
- Incorporate rain gardens, cisterns, and other rain harvesting or catchment systems.
- Incorporate infiltration beds, swales, basins and drywells to capture storm water and dry weather runoff and increase percolation into the soil.
- Consider constructed wetlands and ponds that retain water, equalize excess flow, and filter pollutants.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Renumbering of former section 492.16 to section 492.17 and renumbering of former section 492.15 to new section 492.16, including amendment of section heading, section and NOTE, filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 492.17. Public Education.

(a) Publications. Education is a critical component to promote the efficient use of water in landscapes. The use of appropriate principles of design, installation, management and maintenance that save water is encouraged in the community.

(1) A local agency or water supplier/purveyor shall provide information to owners of permitted renovations and new, single–family residential homes regarding the design, installation, management, and maintenance of water efficient landscapes based on a water budget.

(b) Model Homes. All model homes that are landscaped shall use signs and written information to demonstrate the principles of water efficient landscapes described in this ordinance.

(1) Signs shall be used to identify the model as an example of a water efficient landscape featuring elements such as hydrozones, irrigation equipment, and others that contribute to the overall water efficient theme. Signage shall include information about the site water use as designed per the local ordinance; specify who designed and installed the water efficient landscape; and demonstrate low water use approaches to landscaping such as using native plants, graywater systems, and rainwater catchment systems.

(2) Information shall be provided about designing, installing, managing, and maintaining water efficient landscapes.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Renumbering of former section 492.17 to new section 492.18 and renumbering of former section 492.16 to new section 492.17, including amendment of section and NOTE, filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 492.18. Environmental Review.

(a) The local agency must comply with the California Environmental Quality Act (CEQA), as appropriate.

NOTE: Authority cited: Section 21082, Public Resources Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Sections 21080 and 21082, Public Resources Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. Renumbering of former section 492.17 to new section 492.18, including amendment of NOTE, filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 493. Provisions for Existing Landscapes.

(a) A local agency may by mutual agreement, designate another agency, such as a water purveyor, to implement some or all of the requirements contained in this ordinance. Local agencies may collaborate with water purveyors to define each entity's specific responsibilities relating to this ordinance.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 7–31–92; operative 7–31–92 (Register 92, No. 32).
2. Repealer and new section and amendment of NOTE filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
3. Amendment of section and NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 493.1. Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis.

(a) This section, 493.1, shall apply to all existing landscapes that were installed before December 1, 2015 and are over one acre in size.

(1) For all landscapes in 493.1 (a) that have a water meter, the local agency shall administer programs that may include, but not be limited to, irrigation water use analyses, irrigation surveys, and irrigation audits to evaluate water use and provide recommendations as necessary to reduce landscape water use to a level that does not exceed the Maximum Applied Water Allowance for existing landscapes. The Maximum Applied Water Allowance for existing landscapes shall be calculated as: MAWA = (0.8) (ETo) (LA) (0.62).

(2) For all landscapes in 493.1(a), that do not have a meter, the local agency shall administer programs that may include, but not be limited to, irrigation surveys and irrigation audits to evaluate water use and provide recommendations as necessary in order to prevent water waste.

(b) All landscape irrigation audits shall be conducted by a certified landscape irrigation auditor.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of subsection (a) and NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 493.2. Water Waste Prevention.

(a) Local agencies shall prevent water waste resulting from inefficient landscape irrigation by prohibiting runoff from leaving the target landscape due to low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non–irrigated areas, walks, roadways, parking lots, or structures. Penalties for violation of these prohibitions shall be established locally.

(b) Restrictions regarding overspray and runoff may be modified if:

(1) the landscape area is adjacent to permeable surfacing and no runoff occurs; or

(2) the adjacent non–permeable surfaces are designed and constructed to drain entirely to landscaping.

NOTE: Authority cited: Section 65594, Government Code. Reference: Section 65596, Government Code.

HISTORY

1. New section filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).

§ 494. Effective Precipitation.

(a) A local agency may consider Effective Precipitation (25% of annual precipitation) in tracking water use and may use the following equation to calculate Maximum Applied Water Allowance:

MAWA= (ETo – Eppt) (0.62) [(0.55 x LA) + (0.45 x SLA)] for residential areas.

MAWA= (ETo–EPPT) (0.62) [(0.45 x LA) + (0.55 x SLA)] for non–residential areas.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. Repealer and new section; new NOTE and new Appendices A–C filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Amendment of section and NOTE filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

§ 495. Reporting.

(a) Local agencies shall report on implementation and enforcement by December 31, 2015. Local agencies responsible for administering individual ordinances shall report on their updated ordinance, while those agencies developing a regional ordinance shall report on their existing ordinance. Those agencies crafting a regional ordinances shall also report on their new ordinance by March 1, 2016. Subsequently, reporting for all agencies will be due by January 31st of each year. Reports shall be submitted to the Department of Water Resources.

(b) Local agencies are to address the following:

(1) State whether you are adopting a single agency ordinance or a regional agency alliance ordinance, and the date of adoption or anticipated date of adoption.

(2) Define the reporting period. The reporting period shall commence on December 1, 2015 and the end on December 28, 2015. For local agencies crafting regional ordinances with other agencies, there shall be an additional reporting period commencing on February 1, 2016 and ending on February 28, 2016. In subsequent years, all local agency reporting will be for the calendar year.

(3) State if using a locally modified Water Efficient Landscape Ordinance (WELO) or the MWELO. If using a locally modified WELO, how is it different than MWELO, is it at least as efficient as MWELO, and are there any exemptions specified?

(4) State the entity responsible for implementing the ordinance.

(5) State number and types of projects subject to the ordinance during the specified reporting period.

(6) State the total area (in square feet or acres) subject to the ordinance over the reporting period, if available.

(7) Provide the number of new housing starts, new commercial projects, and landscape retrofits during the reporting period.

(8) Describe the procedure for review of projects subject to the ordinance.

(9) Describe actions taken to verify compliance. Is a plan check performed; if so, by what entity? Is a site inspection performed; if so, by what entity? Is a post–installation audit required; if so, by whom?

(10) Describe enforcement measures.

(11) Explain challenges to implementing and enforcing the ordinance.

(12) Describe educational and other needs to properly apply the ordinance.

NOTE: Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B–29–15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B–29–15 (April 1, 2015).

HISTORY

1. New section filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38). For prior history, see Register 2009, No. 37.

Appendix A. Reference Evapotranspiration (ETo) Table

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
ALAMEDA													
Fremont	1.5	1.9	3.4	4.7	5.4	6.3	6.7	6.0	4.5	3.4	1.8	1.5	47.0
Livermore	1.2	1.5	2.9	4.4	5.9	6.6	7.4	6.4	5.3	3.2	1.5	0.9	47.2
Oakland	1.5	1.5	2.8	3.9	5.1	5.3	6.0	5.5	4.8	3.1	1.4	0.9	41.8
Oakland Foothills	1.1	1.4	2.7	3.7	5.1	6.4	5.8	4.9	3.6	2.6	1.4	1.0	39.6
Pleasanton	0.8	1.5	2.9	4.4	5.6	6.7	7.4	6.4	4.7	3.3	1.5	1.0	46.2
Union City	1.4	1.8	3.1	4.2	5.4	5.9	6.4	5.7	4.4	3.1	1.5	1.2	44.2
ALPINE													
Markleeville	0.7	0.9	2.0	3.5	5.0	6.1	7.3	6.4	4.4	2.6	1.2	0.5	40.6
AMADOR													
Jackson	1.2	1.5	2.8	4.4	6.0	7.2	7.9	7.2	5.3	3.2	1.4	0.9	48.9
Shanandoah Valley	1.0	1.7	2.9	4.4	5.6	6.8	7.9	7.1	5.2	3.6	1.7	1.0	48.8
BUTTE													
Chico	1.2	1.8	2.9	4.7	6.1	7.4	8.5	7.3	5.4	3.7	1.7	1.0	51.7
Durham	1.1	1.8	3.2	5.0	6.5	7.4	7.8	6.9	5.3	3.6	1.7	1.0	51.1
Gridley	1.2	1.8	3.0	4.7	6.1	7.7	8.5	7.1	5.4	3.7	1.7	1.0	51.9
Oroville	1.2	1.7	2.8	4.7	6.1	7.6	8.5	7.3	5.3	3.7	1.7	1.0	51.5
CALAVERAS													
San Andreas	1.2	1.5	2.8	4.4	6.0	7.3	7.9	7.0	5.3	3.2	1.4	0.7	48.8
COLUSA													
Colusa	1.0	1.7	3.4	5.0	6.4	7.6	8.3	7.2	5.4	3.8	1.8	1.1	52.8
Williams	1.2	1.7	2.9	4.5	6.1	7.2	8.5	7.3	5.3	3.4	1.6	1.0	50.8
CONTRA COSTA													
Brentwood	1.0	1.5	2.9	4.5	6.1	7.1	7.9	6.7	5.2	3.2	1.4	0.7	48.3
Concord	1.1	1.4	2.4	4.0	5.5	5.9	7.0	6.0	4.8	3.2	1.3	0.7	43.4
Courtland	0.9	1.5	2.9	4.4	6.1	6.9	7.9	6.7	5.3	3.2	1.4	0.7	48.0
Martinez	1.2	1.4	2.4	3.9	5.3	5.6	6.7	5.6	4.7	3.1	1.2	0.7	41.8
Moraga	1.2	1.5	3.4	4.2	5.5	6.1	6.7	5.9	4.6	3.2	1.6	1.0	44.9
Pittsburg	1.0	1.5	2.8	4.1	5.6	6.4	7.4	6.4	5.0	3.2	1.3	0.7	45.4
Walnut Creek	0.8	1.5	2.9	4.4	5.6	6.7	7.4	6.4	4.7	3.3	1.5	1.0	46.2
DEL NORTE													
Crescent City	0.5	0.9	2.0	3.0	3.7	3.5	4.3	3.7	3.0	2.0	0.9	0.5	27.7
EL DORADO													
Camino	0.9	1.7	2.5	3.9	5.9	7.2	7.8	6.8	5.1	3.1	1.5	0.9	47.3
FRESNO													
Clovis	1.0	1.5	3.2	4.8	6.4	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.4
Coalinga	1.2	1.7	3.1	4.6	6.2	7.2	8.5	7.3	5.3	3.4	1.6	0.7	50.9
Firebaugh	1.0	1.8	3.7	5.7	7.3	8.1	8.2	7.2	5.5	3.9	2.0	1.1	55.4
FivePoints	1.3	2.0	4.0	6.1	7.7	8.5	8.7	8.0	6.2	4.5	2.4	1.2	60.4
Fresno	0.9	1.7	3.3	4.8	6.7	7.8	8.4	7.1	5.2	3.2	1.4	0.6	51.1
Fresno State	0.9	1.6	3.2	5.2	7.0	8.0	8.7	7.6	5.4	3.6	1.7	0.9	53.7
Friant	1.2	1.5	3.1	4.7	6.4	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.3
Kerman	0.9	1.5	3.2	4.8	6.6	7.7	8.4	7.2	5.3	3.4	1.4	0.7	51.2
Kingsburg	1.0	1.5	3.4	4.8	6.6	7.7	8.4	7.2	5.3	3.4	1.4	0.7	51.6
Mendota	1.5	2.5	4.6	6.2	7.9	8.6	8.8	7.5	5.9	4.5	2.4	1.5	61.7
Orange Cove	1.2	1.9	3.5	4.7	7.4	8.5	8.9	7.9	5.9	3.7	1.8	1.2	56.7
Panoche	1.1	2.0	4.0	5.6	7.8	8.5	8.3	7.3	5.6	3.9	1.8	1.2	57.2
Parlier	1.0	1.9	3.6	5.2	6.8	7.6	8.1	7.0	5.1	3.4	1.7	0.9	52.0

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
FRESNO													
Reedley	1.1	1.5	3.2	4.7	6.4	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.3
Westlands	0.9	1.7	3.8	6.3	8.0	8.6	8.6	7.8	5.9	4.3	2.1	1.1	58.8
GLENN													
Orland	1.1	1.8	3.4	5.0	6.4	7.5	7.9	6.7	5.3	3.9	1.8	1.4	52.1
Willows	1.2	1.7	2.9	4.7	6.1	7.2	8.5	7.3	5.3	3.6	1.7	1.0	51.3
HUMBOLDT													
Eureka	0.5	1.1	2.0	3.0	3.7	3.7	3.7	3.7	3.0	2.0	0.9	0.5	27.5
Ferndale	0.5	1.1	2.0	3.0	3.7	3.7	3.7	3.7	3.0	2.0	0.9	0.5	27.5
Garberville	0.6	1.2	2.2	3.1	4.5	5.0	5.5	4.9	3.8	2.4	1.0	0.7	34.9
Hoopa	0.5	1.1	2.1	3.0	4.4	5.4	6.1	5.1	3.8	2.4	0.9	0.7	35.6
IMPERIAL													
Brawley	2.8	3.8	5.9	8.0	10.4	11.5	11.7	10.0	8.4	6.2	3.5	2.1	84.2
Calipatria/Mulberry	2.4	3.2	5.1	6.8	8.6	9.2	9.2	8.6	7.0	5.2	3.1	2.3	70.7
El Centro	2.7	3.5	5.6	7.9	10.1	11.1	11.6	9.5	8.3	6.1	3.3	2.0	81.7
Holtville	2.8	3.8	5.9	7.9	10.4	11.6	12.0	10.0	8.6	6.2	3.5	2.1	84.7
Meloland	2.5	3.2	5.5	7.5	8.9	9.2	9.0	8.5	6.8	5.3	3.1	2.2	71.6
Palo Verde II	2.5	3.3	5.7	6.9	8.5	8.9	8.6	7.9	6.2	4.5	2.9	2.3	68.2
Seeley	2.7	3.5	5.9	7.7	9.7	10.1	9.3	8.3	6.9	5.5	3.4	2.2	75.4
Westmoreland	2.4	3.3	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.4
Yuma	2.5	3.4	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.6
INYO													
Bishop	1.7	2.7	4.8	6.7	8.2	10.9	7.4	9.6	7.4	4.8	2.5	1.6	68.3
Death Valley Jct	2.2	3.3	5.4	7.7	9.8	11.1	11.4	10.1	8.3	5.4	2.9	1.7	79.1
Independence	1.7	2.7	3.4	6.6	8.5	9.5	9.8	8.5	7.1	3.9	2.0	1.5	65.2
Lower Haiwee Res.	1.8	2.7	4.4	7.1	8.5	9.5	9.8	8.5	7.1	4.2	2.6	1.5	67.6
Oasis	2.7	2.8	5.9	8.0	10.4	11.7	11.6	10.0	8.4	6.2	3.4	2.1	83.1
KERN													
Arvin	1.2	1.8	3.5	4.7	6.6	7.4	8.1	7.3	5.3	3.4	1.7	1.0	51.9
Bakersfield	1.0	1.8	3.5	4.7	6.6	7.7	8.5	7.3	5.3	3.5	1.6	0.9	52.4
Bakersfield/Bonanza	1.2	2.2	3.7	5.7	7.4	8.2	8.7	7.8	5.7	4.0	2.1	1.2	57.9
Bakersfield/Greenlee	1.2	2.2	3.7	5.7	7.4	8.2	8.7	7.8	5.7	4.0	2.1	1.2	57.9
Belridge	1.4	2.2	4.1	5.5	7.7	8.5	8.6	7.8	6.0	3.8	2.0	1.5	59.2
Blackwells Corner	1.4	2.1	3.8	5.4	7.0	7.8	8.5	7.7	5.8	3.9	1.9	1.2	56.6
Buttonwillow	1.0	1.8	3.2	4.7	6.6	7.7	8.5	7.3	5.4	3.4	1.5	0.9	52.0
China Lake	2.1	3.2	5.3	7.7	9.2	10.0	11.0	9.8	7.3	4.9	2.7	1.7	74.8
Delano	0.9	1.8	3.4	4.7	6.6	7.7	8.5	7.3	5.4	3.4	1.4	0.7	52.0
Famoso	1.3	1.9	3.5	4.8	6.7	7.6	8.0	7.3	5.5	3.5	1.7	1.3	53.1
Grapevine	1.3	1.8	3.1	4.4	5.6	6.8	7.6	6.8	5.9	3.4	1.9	1.0	49.5
Inyokern	2.0	3.1	4.9	7.3	8.5	9.7	11.0	9.4	7.1	5.1	2.6	1.7	72.4
Isabella Dam	1.2	1.4	2.8	4.4	5.8	7.3	7.9	7.0	5.0	3.2	1.7	0.9	48.4
Lamont	1.3	2.4	4.4	4.6	6.5	7.0	8.8	7.6	5.7	3.7	1.6	0.8	54.4
Lost Hills	1.6	2.2	3.7	5.1	6.8	7.8	8.7	7.8	5.7	4.0	2.1	1.6	57.1
McFarland/Kern	1.2	2.1	3.7	5.6	7.3	8.0	8.3	7.4	5.6	4.1	2.0	1.2	56.5
Shafter	1.0	1.7	3.4	5.0	6.6	7.7	8.3	7.3	5.4	3.4	1.5	0.9	52.1
Taft	1.3	1.8	3.1	4.3	6.2	7.3	8.5	7.3	5.4	3.4	1.7	1.0	51.2
Tehachapi	1.4	1.8	3.2	5.0	6.1	7.7	7.9	7.3	5.9	3.4	2.1	1.2	52.9
KINGS													
Caruthers	1.6	2.5	4.0	5.7	7.8	8.7	9.3	8.4	6.3	4.4	2.4	1.6	62.7

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
KINGS													
Corcoran	1.6	2.2	3.7	5.1	6.8	7.8	8.7	7.8	5.7	4.0	2.1	1.6	57.1
Hanford	0.9	1.5	3.4	5.0	6.6	7.7	8.3	7.2	5.4	3.4	1.4	0.7	51.5
Kettleman	1.1	2.0	4.0	6.0	7.5	8.5	9.1	8.2	6.1	4.5	2.2	1.1	60.2
Lemoore	0.9	1.5	3.4	5.0	6.6	7.7	8.3	7.3	5.4	3.4	1.4	0.7	51.7
Stratford	0.9	1.9	3.9	6.1	7.8	8.6	8.8	7.7	5.9	4.1	2.1	1.0	58.7
LAKE													
Lakeport	1.1	1.3	2.6	3.5	5.1	6.0	7.3	6.1	4.7	2.9	1.2	0.9	42.8
Lower Lake	1.2	1.4	2.7	4.5	5.3	6.3	7.4	6.4	5.0	3.1	1.3	0.9	45.4
LASSEN													
Buntingville	1.0	1.7	3.5	4.9	6.2	7.3	8.4	7.5	5.4	3.4	1.5	0.9	51.8
Ravendale	0.6	1.1	2.3	4.1	5.6	6.7	7.9	7.3	4.7	2.8	1.2	0.5	44.9
Susanville	0.7	1.0	2.2	4.1	5.6	6.5	7.8	7.0	4.6	2.8	1.2	0.5	44.0
LOS ANGELES													
Burbank	2.1	2.8	3.7	4.7	5.1	6.0	6.6	6.7	5.4	4.0	2.6	2.0	51.7
Claremont	2.0	2.3	3.4	4.6	5.0	6.0	7.0	7.0	5.3	4.0	2.7	2.1	51.3
El Dorado	1.7	2.2	3.6	4.8	5.1	5.7	5.9	5.9	4.4	3.2	2.2	1.7	46.3
Glendale	2.0	2.2	3.3	3.8	4.7	4.8	5.7	5.6	4.3	3.3	2.2	1.8	43.7
Glendora	2.0	2.5	3.6	4.9	5.4	6.1	7.3	6.8	5.7	4.2	2.6	2.0	53.1
Gorman	1.6	2.2	3.4	4.6	5.5	7.4	7.7	7.1	5.9	3.6	2.4	1.1	52.4
Hollywood Hills	2.1	2.2	3.8	5.4	6.0	6.5	6.7	6.4	5.2	3.7	2.8	2.1	52.8
Lancaster	2.1	3.0	4.6	5.9	8.5	9.7	11.0	9.8	7.3	4.6	2.8	1.7	71.1
Long Beach	1.8	2.1	3.3	3.9	4.5	4.3	5.3	4.7	3.7	2.8	1.8	1.5	39.7
Los Angeles	2.2	2.7	3.7	4.7	5.5	5.8	6.2	5.9	5.0	3.9	2.6	1.9	50.1
Monrovia	2.2	2.3	3.8	4.3	5.5	5.9	6.9	6.4	5.1	3.2	2.5	2.0	50.2
Palmdale	2.0	2.6	4.6	6.2	7.3	8.9	9.8	9.0	6.5	4.7	2.7	2.1	66.2
Pasadena	2.1	2.7	3.7	4.7	5.1	6.0	7.1	6.7	5.6	4.2	2.6	2.0	52.3
Pearblossom	1.7	2.4	3.7	4.7	7.3	7.7	9.9	7.9	6.4	4.0	2.6	1.6	59.9
Pomona	1.7	2.0	3.4	4.5	5.0	5.8	6.5	6.4	4.7	3.5	2.3	1.7	47.5
Redondo Beach	2.2	2.4	3.3	3.8	4.5	4.7	5.4	4.8	4.4	2.8	2.4	2.0	42.6
San Fernando	2.0	2.7	3.5	4.6	5.5	5.9	7.3	6.7	5.3	3.9	2.6	2.0	52.0
Santa Clarita	2.8	2.8	4.1	5.6	6.0	6.8	7.6	7.8	5.8	5.2	3.7	3.2	61.5
Santa Monica	1.8	2.1	3.3	4.5	4.7	5.0	5.4	5.4	3.9	3.4	2.4	2.2	44.2
MADERA													
Chowchilla	1.0	1.4	3.2	4.7	6.6	7.8	8.5	7.3	5.3	3.4	1.4	0.7	51.4
Madera	0.9	1.4	3.2	4.8	6.6	7.8	8.5	7.3	5.3	3.4	1.4	0.7	51.5
Raymond	1.2	1.5	3.0	4.6	6.1	7.6	8.4	7.3	5.2	3.4	1.4	0.7	50.5
MARIN													
Black Point	1.1	1.7	3.0	4.2	5.2	6.2	6.6	5.8	4.3	2.8	1.3	0.9	43.0
Novato	1.3	1.5	2.4	3.5	4.4	6.0	5.9	5.4	4.4	2.8	1.4	0.7	39.8
Point San Pedro	1.1	1.7	3.0	4.2	5.2	6.2	6.6	5.8	4.3	2.8	1.3	0.9	43.0
San Rafael	1.2	1.3	2.4	3.3	4.0	4.8	4.8	4.9	4.3	2.7	1.3	0.7	35.8
MARIPOSA													
Coulterville	1.1	1.5	2.8	4.4	5.9	7.3	8.1	7.0	5.3	3.4	1.4	0.7	48.8
Mariposa	1.1	1.5	2.8	4.4	5.9	7.4	8.2	7.1	5.0	3.4	1.4	0.7	49.0
Yosemite Village	0.7	1.0	2.3	3.7	5.1	6.5	7.1	6.1	4.4	2.9	1.1	0.6	41.4
MENDOCINO													
Fort Bragg	0.9	1.3	2.2	3.0	3.7	3.5	3.7	3.7	3.0	2.3	1.2	0.7	29.0
Hopland	1.1	1.3	2.6	3.4	5.0	5.9	6.5	5.7	4.5	2.8	1.3	0.7	40.9

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
MENDOCINO													
Point Arena	1.0	1.3	2.3	3.0	3.7	3.9	3.7	3.7	3.0	2.3	1.2	0.7	29.6
Sanel Valley	1.0	1.6	3.0	4.6	6.0	7.0	8.0	7.0	5.2	3.4	1.4	0.9	49.1
Ukiah	1.0	1.3	2.6	3.3	5.0	5.8	6.7	5.9	4.5	2.8	1.3	0.7	40.9
MERCED													
Kesterson	0.9	1.7	3.4	5.5	7.3	8.2	8.6	7.4	5.5	3.8	1.8	0.9	55.1
Los Banos	1.0	1.5	3.2	4.7	6.1	7.4	8.2	7.0	5.3	3.4	1.4	0.7	50.0
Merced	1.0	1.5	3.2	4.7	6.6	7.9	8.5	7.2	5.3	3.4	1.4	0.7	51.5
MODOC													
Modoc/Alturas	0.9	1.4	2.8	3.7	5.1	6.2	7.5	6.6	4.6	2.8	1.2	0.7	43.2
MONO													
Bridgeport	0.7	0.9	2.2	3.8	5.5	6.6	7.4	6.7	4.7	2.7	1.2	0.5	43.0
MONTEREY													
Arroyo Seco	1.5	2.0	3.7	5.4	6.3	7.3	7.2	6.7	5.0	3.9	2.0	1.6	52.6
Castroville	1.4	1.7	3.0	4.2	4.6	4.8	4.0	3.8	3.0	2.6	1.6	1.4	36.2
Gonzales	1.3	1.7	3.4	4.7	5.4	6.3	6.3	5.9	4.4	3.4	1.9	1.3	45.7
Greenfield	1.8	2.2	3.4	4.8	5.6	6.3	6.5	6.2	4.8	3.7	2.4	1.8	49.5
King City	1.7	2.0	3.4	4.4	4.4	5.6	6.1	6.7	6.5	5.2	2.2	1.3	49.6
King City-Oasis Rd.	1.4	1.9	3.6	5.3	6.5	7.3	7.4	6.8	5.1	4.0	2.0	1.5	52.7
Long Valley	1.5	1.9	3.2	4.1	5.8	6.5	7.3	6.7	5.3	3.6	2.0	1.2	49.1
Monterey	1.7	1.8	2.7	3.5	4.0	4.1	4.3	4.2	3.5	2.8	1.9	1.5	36.0
Pajaro	1.8	2.2	3.7	4.8	5.3	5.7	5.6	5.3	4.3	3.4	2.4	1.8	46.1
Salinas	1.6	1.9	2.7	3.8	4.8	4.7	5.0	4.5	4.0	2.9	1.9	1.3	39.1
Salinas North	1.2	1.5	2.9	4.1	4.6	5.2	4.5	4.3	3.2	2.8	1.5	1.2	36.9
San Ardo	1.0	1.7	3.1	4.5	5.9	7.2	8.1	7.1	5.1	3.1	1.5	1.0	49.0
San Juan	1.8	2.1	3.4	4.6	5.3	5.7	5.5	4.9	3.8	3.2	2.2	1.9	44.2
Soledad	1.7	2.0	3.4	4.4	5.5	5.4	6.5	6.2	5.2	3.7	2.2	1.5	47.7
NAPA													
Angwin	1.8	1.9	3.2	4.7	5.8	7.3	8.1	7.1	5.5	4.5	2.9	2.1	54.9
Carneros	0.8	1.5	3.1	4.6	5.5	6.6	6.9	6.2	4.7	3.5	1.4	1.0	45.8
Oakville	1.0	1.5	2.9	4.7	5.8	6.9	7.2	6.4	4.9	3.5	1.6	1.2	47.7
St Helena	1.2	1.5	2.8	3.9	5.1	6.1	7.0	6.2	4.8	3.1	1.4	0.9	44.1
Yountville	1.3	1.7	2.8	3.9	5.1	6.0	7.1	6.1	4.8	3.1	1.5	0.9	44.3
NEVADA													
Grass Valley	1.1	1.5	2.6	4.0	5.7	7.1	7.9	7.1	5.3	3.2	1.5	0.9	48.0
Nevada City	1.1	1.5	2.6	3.9	5.8	6.9	7.9	7.0	5.3	3.2	1.4	0.9	47.4
ORANGE													
Irvine	2.2	2.5	3.7	4.7	5.2	5.9	6.3	6.2	4.6	3.7	2.6	2.3	49.6
Laguna Beach	2.2	2.7	3.4	3.8	4.6	4.6	4.9	4.9	4.4	3.4	2.4	2.0	43.2
Santa Ana	2.2	2.7	3.7	4.5	4.6	5.4	6.2	6.1	4.7	3.7	2.5	2.0	48.2
PLACER													
Auburn	1.2	1.7	2.8	4.4	6.1	7.4	8.3	7.3	5.4	3.4	1.6	1.0	50.6
Blue Canyon	0.7	1.1	2.1	3.4	4.8	6.0	7.2	6.1	4.6	2.9	0.9	0.6	40.5
Colfax	1.1	1.5	2.6	4.0	5.8	7.1	7.9	7.0	5.3	3.2	1.4	0.9	47.9
Roseville	1.1	1.7	3.1	4.7	6.2	7.7	8.5	7.3	5.6	3.7	1.7	1.0	52.2
Soda Springs	0.7	0.7	1.8	3.0	4.3	5.3	6.2	5.5	4.1	2.5	0.7	0.7	35.4
Tahoe City	0.7	0.7	1.7	3.0	4.3	5.4	6.1	5.6	4.1	2.4	0.8	0.6	35.5
Truckee	0.7	0.7	1.7	3.2	4.4	5.4	6.4	5.7	4.1	2.4	0.8	0.6	36.2

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
PLUMAS													
Portola	0.7	0.9	1.9	3.5	4.9	5.9	7.3	5.9	4.3	2.7	0.9	0.5	39.4
Quincy	0.7	0.9	2.2	3.5	4.9	5.9	7.3	5.9	4.4	2.8	1.2	0.5	40.2
RIVERSIDE													
Beaumont	2.0	2.3	3.4	4.4	6.1	7.1	7.6	7.9	6.0	3.9	2.6	1.7	55.0
Blythe	2.4	3.3	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.4
Cathedral City	1.6	2.2	3.7	5.1	6.8	7.8	8.7	7.8	5.7	4.0	2.1	1.6	57.1
Coachella	2.9	4.4	6.2	8.4	10.5	11.9	12.3	10.1	8.9	6.2	3.8	2.4	88.1
Desert Center	2.9	4.1	6.4	8.5	11.0	12.1	12.2	11.1	9.0	6.4	3.9	2.6	90.0
Elsinore	2.1	2.8	3.9	4.4	5.9	7.1	7.6	7.0	5.8	3.9	2.6	1.9	55.0
Indio	3.1	3.6	6.5	8.3	10.5	11.0	10.8	9.7	8.3	5.9	3.7	2.7	83.9
La Quinta	2.4	2.8	5.2	6.5	8.3	8.7	8.5	7.9	6.5	4.5	2.7	2.2	66.2
Mecca	2.6	3.3	5.7	7.2	8.6	9.0	8.8	8.2	6.8	5.0	3.2	2.4	70.8
Oasis	2.9	3.3	5.3	6.1	8.5	8.9	8.7	7.9	6.9	4.8	2.9	2.3	68.4
Palm Desert	2.5	3.4	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.6
Palm Springs	2.0	2.9	4.9	7.2	8.3	8.5	11.6	8.3	7.2	5.9	2.7	1.7	71.1
Rancho California	1.8	2.2	3.4	4.8	5.6	6.3	6.5	6.2	4.8	3.7	2.4	1.8	49.5
Rancho Mirage	2.4	3.3	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.4
Ripley	2.7	3.3	5.6	7.2	8.7	8.7	8.4	7.6	6.2	4.6	2.8	2.2	67.8
Salton Sea North	2.5	3.3	5.5	7.2	8.8	9.3	9.2	8.5	6.8	5.2	3.1	2.3	71.7
Temecula East II	2.3	2.4	4.1	4.9	6.4	7.0	7.8	7.4	5.7	4.1	2.6	2.2	56.7
Thermal	2.4	3.3	5.5	7.6	9.1	9.6	9.3	8.6	7.1	5.2	3.1	2.1	72.8
Riverside UC	2.5	2.9	4.2	5.3	5.9	6.6	7.2	6.9	5.4	4.1	2.9	2.6	56.4
Winchester	2.3	2.4	4.1	4.9	6.4	6.9	7.7	7.5	6.0	3.9	2.6	2.1	56.8
SACRAMENTO													
Fair Oaks	1.0	1.6	3.4	4.1	6.5	7.5	8.1	7.1	5.2	3.4	1.5	1.0	50.5
Sacramento	1.0	1.8	3.2	4.7	6.4	7.7	8.4	7.2	5.4	3.7	1.7	0.9	51.9
Twitchell Island	1.2	1.8	3.9	5.3	7.4	8.8	9.1	7.8	5.9	3.8	1.7	1.2	57.9
SAN BENITO													
Hollister	1.5	1.8	3.1	4.3	5.5	5.7	6.4	5.9	5.0	3.5	1.7	1.1	45.1
San Benito	1.2	1.6	3.1	4.6	5.6	6.4	6.9	6.5	4.8	3.7	1.7	1.2	47.2
San Juan Valley	1.4	1.8	3.4	4.5	6.0	6.7	7.1	6.4	5.0	3.5	1.8	1.4	49.1
SAN BERNARDINO													
Baker	2.7	3.9	6.1	8.3	10.4	11.8	12.2	11.0	8.9	6.1	3.3	2.1	86.6
Barstow NE	2.2	2.9	5.3	6.9	9.0	10.1	9.9	8.9	6.8	4.8	2.7	2.1	71.7
Big Bear Lake	1.8	2.6	4.6	6.0	7.0	7.6	8.1	7.4	5.4	4.1	2.4	1.8	58.6
Chino	2.1	2.9	3.9	4.5	5.7	6.5	7.3	7.1	5.9	4.2	2.6	2.0	54.6
Crestline	1.5	1.9	3.3	4.4	5.5	6.6	7.8	7.1	5.4	3.5	2.2	1.6	50.8
Lake Arrowhead	1.8	2.6	4.6	6.0	7.0	7.6	8.1	7.4	5.4	4.1	2.4	1.8	58.6
Lucerne Valley	2.2	2.9	5.1	6.5	9.1	11.0	11.4	9.9	7.4	5.0	3.0	1.8	75.3
Needles	3.2	4.2	6.6	8.9	11.0	12.4	12.8	11.0	8.9	6.6	4.0	2.7	92.1
Newberry Springs	2.1	2.9	5.3	8.4	9.8	10.9	11.1	9.9	7.6	5.2	3.1	2.0	78.2
San Bernardino	2.0	2.7	3.8	4.6	5.7	6.9	7.9	7.4	5.9	4.2	2.6	2.0	55.6
Twentynine Palms	2.6	3.6	5.9	7.9	10.1	11.2	11.2	10.3	8.6	5.9	3.4	2.2	82.9
Victorville	2.0	2.6	4.6	6.2	7.3	8.9	9.8	9.0	6.5	4.7	2.7	2.1	66.2
SAN DIEGO													
Chula Vista	2.2	2.7	3.4	3.8	4.9	4.7	5.5	4.9	4.5	3.4	2.4	2.0	44.2
Escondido SPV	2.4	2.6	3.9	4.7	5.9	6.5	7.1	6.7	5.3	3.9	2.8	2.3	54.2
Miramar	2.3	2.5	3.7	4.1	5.1	5.4	6.1	5.8	4.5	3.3	2.4	2.1	47.1

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
SAN DIEGO													
Oceanside	2.2	2.7	3.4	3.7	4.9	4.6	4.6	5.1	4.1	3.3	2.4	2.0	42.9
Otay Lake	2.3	2.7	3.9	4.6	5.6	5.9	6.2	6.1	4.8	3.7	2.6	2.2	50.4
Pine Valley	1.5	2.4	3.8	5.1	6.0	7.0	7.8	7.3	6.0	4.0	2.2	1.7	54.8
Ramona	2.1	2.1	3.4	4.6	5.2	6.3	6.7	6.8	5.3	4.1	2.8	2.1	51.6
San Diego	2.1	2.4	3.4	4.6	5.1	5.3	5.7	5.6	4.3	3.6	2.4	2.0	46.5
Santee	2.1	2.7	3.7	4.5	5.5	6.1	6.6	6.2	5.4	3.8	2.6	2.0	51.1
Torrey Pines	2.2	2.3	3.4	3.9	4.0	4.1	4.6	4.7	3.8	2.8	2.0	2.0	39.8
Warner Springs	1.6	2.7	3.7	4.7	5.7	7.6	8.3	7.7	6.3	4.0	2.5	1.3	56.0
SAN FRANCISCO													
San Francisco	1.5	1.3	2.4	3.0	3.7	4.6	4.9	4.8	4.1	2.8	1.3	0.7	35.1
SAN JOAQUIN													
Farmington	1.5	1.5	2.9	4.7	6.2	7.6	8.1	6.8	5.3	3.3	1.4	0.7	50.0
Lodi West	1.0	1.6	3.3	4.3	6.3	6.9	7.3	6.4	4.5	3.0	1.4	0.8	46.7
Manteca	0.9	1.7	3.4	5.0	6.5	7.5	8.0	7.1	5.2	3.3	1.6	0.9	51.2
Stockton	0.8	1.5	2.9	4.7	6.2	7.4	8.1	6.8	5.3	3.2	1.4	0.6	49.1
Tracy	1.0	1.5	2.9	4.5	6.1	7.3	7.9	6.7	5.3	3.2	1.3	0.7	48.5
SAN LUIS OBISPO													
Arroyo Grande	2.0	2.2	3.2	3.8	4.3	4.7	4.3	4.6	3.8	3.2	2.4	1.7	40.0
Atascadero	1.2	1.5	2.8	3.9	4.5	6.0	6.7	6.2	5.0	3.2	1.7	1.0	43.7
Morro Bay	2.0	2.2	3.1	3.5	4.3	4.5	4.6	4.6	3.8	3.5	2.1	1.7	39.9
Nipomo	2.2	2.5	3.8	5.1	5.7	6.2	6.4	6.1	4.9	4.1	2.9	2.3	52.1
Paso Robles	1.6	2.0	3.2	4.3	5.5	6.3	7.3	6.7	5.1	3.7	2.1	1.4	49.0
San Luis Obispo	2.0	2.2	3.2	4.1	4.9	5.3	4.6	5.5	4.4	3.5	2.4	1.7	43.8
San Miguel	1.6	2.0	3.2	4.3	5.0	6.4	7.4	6.8	5.1	3.7	2.1	1.4	49.0
San Simeon	2.0	2.0	2.9	3.5	4.2	4.4	4.6	4.3	3.5	3.1	2.0	1.7	38.1
SAN MATEO													
Hal Moon Bay	1.5	1.7	2.4	3.0	3.9	4.3	4.3	4.2	3.5	2.8	1.3	1.0	33.7
Redwood City	1.5	1.8	2.9	3.8	5.2	5.3	6.2	5.6	4.8	3.1	1.7	1.0	42.8
Woodside	1.8	2.2	3.4	4.8	5.6	6.3	6.5	6.2	4.8	3.7	2.4	1.8	49.5
SANTA BARBARA													
Betteravia	2.1	2.6	4.0	5.2	6.0	5.9	5.8	5.4	4.1	3.3	2.7	2.1	49.1
Carpenteria	2.0	2.4	3.2	3.9	4.8	5.2	5.5	5.7	4.5	3.4	2.4	2.0	44.9
Cuyama	2.1	2.4	3.8	5.4	6.9	7.9	8.5	7.7	5.9	4.5	2.6	2.0	59.7
Goleta	2.1	2.5	3.9	5.1	5.7	5.7	5.4	5.4	4.2	3.2	2.8	2.2	48.1
Goleta Foothills	2.3	2.6	3.7	5.4	5.3	5.6	5.5	5.7	4.5	3.9	2.8	2.3	49.6
Guadalupe	2.0	2.2	3.2	3.7	4.9	4.6	4.5	4.6	4.1	3.3	2.4	1.7	41.1
Lompoc	2.0	2.2	3.2	3.7	4.8	4.6	4.9	4.8	3.9	3.2	2.4	1.7	41.1
Los Alamos	1.8	2.0	3.2	4.1	4.9	5.3	5.7	5.5	4.4	3.7	2.4	1.6	44.6
Santa Barbara	2.0	2.5	3.2	3.8	4.6	5.1	5.5	4.5	3.4	2.4	1.8	1.8	40.6
Santa Maria	1.8	2.3	3.7	5.1	5.7	5.8	5.6	5.3	4.2	3.5	2.4	1.9	47.4
Santa Ynez	1.7	2.2	3.5	5.0	5.8	6.2	6.4	6.0	4.5	3.6	2.2	1.7	48.7
Sisquoc	2.1	2.5	3.8	4.1	6.1	6.3	6.4	5.8	4.7	3.4	2.3	1.8	49.2
Solvang	2.0	2.0	3.3	4.3	5.0	5.6	6.1	5.6	4.4	3.7	2.2	1.6	45.6
SANTA CLARA													
Gilroy	1.3	1.8	3.1	4.1	5.3	5.6	6.1	5.5	4.7	3.4	1.7	1.1	43.6
Los Gatos	1.5	1.8	2.8	3.9	5.0	5.6	6.2	5.5	4.7	3.2	1.7	1.1	42.9
Morgan Hill	1.5	1.8	3.4	4.2	6.3	7.0	7.1	6.0	5.1	3.7	1.9	1.4	49.5
Palo Alto	1.5	1.8	2.8	3.8	5.2	5.3	6.2	5.6	5.0	3.2	1.7	1.0	43.0

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Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
SANTA CLARA													
San Jose	1.5	1.8	3.1	4.1	5.5	5.8	6.5	5.9	5.2	3.3	1.8	1.0	45.3
SANTA CRUZ													
De Laveaga	1.4	1.9	3.3	4.7	4.9	5.3	5.0	4.8	3.6	3.0	1.6	1.3	40.8
Green Valley Rd	1.2	1.8	3.2	4.5	4.6	5.4	5.2	5.0	3.7	3.1	1.6	1.3	40.6
Santa Cruz	1.5	1.8	2.6	3.5	4.3	4.4	4.8	4.4	3.8	2.8	1.7	1.2	36.6
Watsonville	1.5	1.8	2.7	3.7	4.6	4.5	4.9	4.2	4.0	2.9	1.8	1.2	37.7
Webb	1.8	2.2	3.7	4.8	5.3	5.7	5.6	5.3	4.3	3.4	2.4	1.8	46.2
SHASTA													
Burney	0.7	1.0	2.1	3.5	4.9	5.9	7.4	6.4	4.4	2.9	0.9	0.6	40.9
Fall River Mills	0.6	1.0	2.1	3.7	5.0	6.1	7.8	6.7	4.6	2.8	0.9	0.5	41.8
Glenburn	0.6	1.0	2.1	3.7	5.0	6.3	7.8	6.7	4.7	2.8	0.9	0.6	42.1
McArthur	0.7	1.4	2.9	4.2	5.6	6.9	8.2	7.2	5.0	3.0	1.1	0.6	46.8
Redding	1.2	1.4	2.6	4.1	5.6	7.1	8.5	7.3	5.3	3.2	1.4	0.9	48.8
SIERRA													
Downieville	0.7	1.0	2.3	3.5	5.0	6.0	7.4	6.2	4.7	2.8	0.9	0.6	41.3
Sierraville	0.7	1.1	2.2	3.2	4.5	5.9	7.3	6.4	4.3	2.6	0.9	0.5	39.6
SISKIYOU													
Happy Camp	0.5	0.9	2.0	3.0	4.3	5.2	6.1	5.3	4.1	2.4	0.9	0.5	35.1
MacDoel	1.0	1.7	3.1	4.5	5.9	7.2	8.1	7.1	5.1	3.1	1.5	1.0	49.0
Mt Shasta	0.5	0.9	2.0	3.0	4.5	5.3	6.7	5.7	4.0	2.2	0.7	0.5	36.0
Tule lake FS	0.7	1.3	2.7	4.0	5.4	6.3	7.1	6.4	4.7	2.8	1.0	0.6	42.9
Weed	0.5	0.9	2.0	2.5	4.5	5.3	6.7	5.5	3.7	2.0	0.9	0.5	34.9
Yreka	0.6	0.9	2.1	3.0	4.9	5.8	7.3	6.5	4.3	2.5	0.9	0.5	39.2
SOLANO													
Benicia	1.3	1.4	2.7	3.8	4.9	5.0	6.4	5.5	4.4	2.9	1.2	0.7	40.3
Dixon	0.7	1.4	3.2	5.2	6.3	7.6	8.2	7.2	5.5	4.3	1.6	1.1	52.1
Fairfield	1.1	1.7	2.8	4.0	5.5	6.1	7.8	6.0	4.8	3.1	1.4	0.9	45.2
Hastings Tract	1.6	2.2	3.7	5.1	6.8	7.8	8.7	7.8	5.7	4.0	2.1	1.6	57.1
Putah Creek	1.0	1.6	3.2	4.9	6.1	7.3	7.9	7.0	5.3	3.8	1.8	1.2	51.0
Rio Vista	0.9	1.7	2.8	4.4	5.9	6.7	7.9	6.5	5.1	3.2	1.3	0.7	47.0
Suisun Valley	0.6	1.3	3.0	4.7	5.8	7.0	7.7	6.8	5.3	3.8	1.4	0.9	48.3
Winters	0.9	1.7	3.3	5.0	6.4	7.5	7.9	7.0	5.2	3.5	1.6	1.0	51.0
SONOMA													
Bennett Valley	1.1	1.7	3.2	4.1	5.5	6.5	6.6	5.7	4.5	3.1	1.5	0.9	44.4
Cloverdale	1.1	1.4	2.6	3.4	5.0	5.9	6.2	5.6	4.5	2.8	1.4	0.7	40.7
Fort Ross	1.2	1.4	2.2	3.0	3.7	4.5	4.2	4.3	3.4	2.4	1.2	0.5	31.9
Healdsburg	1.2	1.5	2.4	3.5	5.0	5.9	6.1	5.6	4.5	2.8	1.4	0.7	40.8
Lincoln	1.2	1.7	2.8	4.7	6.1	7.4	8.4	7.3	5.4	3.7	1.9	1.2	51.9
Petaluma	1.2	1.5	2.8	3.7	4.6	5.6	4.6	5.7	4.5	2.9	1.4	0.9	39.6
Santa Rosa	1.2	1.7	2.8	3.7	5.0	6.0	6.1	5.9	4.5	2.9	1.5	0.7	42.0
Valley of the Moon	1.0	1.6	3.0	4.5	5.6	6.6	7.1	6.3	4.7	3.3	1.5	1.0	46.1
Windsor	0.9	1.6	3.0	4.5	5.5	6.5	6.5	5.9	4.4	3.2	1.4	1.0	44.2
STANISLAUS													
Denair	1.0	1.9	3.6	4.7	7.0	7.9	8.0	6.1	5.3	3.4	1.5	1.0	51.4
La Grange	1.2	1.5	3.1	4.7	6.2	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.2
Modesto	0.9	1.4	3.2	4.7	6.4	7.7	8.1	6.8	5.0	3.4	1.4	0.7	49.7
Newman	1.0	1.5	3.2	4.6	6.2	7.4	8.1	6.7	5.0	3.4	1.4	0.7	49.3
Oakdale	1.2	1.5	3.2	4.7	6.2	7.7	8.1	7.1	5.1	3.4	1.4	0.7	50.3

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Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
STANISLAUS													
Patterson	1.3	2.1	4.2	5.4	7.9	8.6	8.2	6.6	5.8	4.0	1.9	1.3	57.3
Turlock	0.9	1.5	3.2	4.7	6.5	7.7	8.2	7.0	5.1	3.4	1.4	0.7	50.2
SUTTER													
Nicolaus	0.9	1.6	3.2	4.9	6.3	7.5	8.0	6.9	5.2	3.4	1.5	0.9	50.2
Yuba City	1.3	2.1	2.8	4.4	5.7	7.2	7.1	6.1	4.7	3.2	1.2	0.9	46.7
TEHAMA													
Corning	1.2	1.8	2.9	4.5	6.1	7.3	8.1	7.2	5.3	3.7	1.7	1.1	50.7
Gerber	1.0	1.8	3.5	5.0	6.6	7.9	8.7	7.4	5.8	4.1	1.8	1.1	54.7
Gerber Dryland	0.9	1.6	3.2	4.7	6.7	8.4	9.0	7.9	6.0	4.2	2.0	1.0	55.5
Red Bluff	1.2	1.8	2.9	4.4	5.9	7.4	8.5	7.3	5.4	3.5	1.7	1.0	51.1
TRINITY													
Hay Fork	0.5	1.1	2.3	3.5	4.9	5.9	7.0	6.0	4.5	2.8	0.9	0.7	40.1
Weaverville	0.6	1.1	2.2	3.3	4.9	5.9	7.3	6.0	4.4	2.7	0.9	0.7	40.0
TULARE													
Alpaugh	0.9	1.7	3.4	4.8	6.6	7.7	8.2	7.3	5.4	3.4	1.4	0.7	51.6
Badger	1.0	1.3	2.7	4.1	6.0	7.3	7.7	7.0	4.8	3.3	1.4	0.7	47.3
Delano	1.1	1.9	4.0	4.9	7.2	7.9	8.1	7.3	5.4	3.2	1.5	1.2	53.6
Dinuba	1.1	1.5	3.2	4.7	6.2	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.2
Lindcove	0.9	1.6	3.0	4.8	6.5	7.6	8.1	7.2	5.2	3.4	1.6	0.9	50.6
Porterville	1.2	1.8	3.4	4.7	6.6	7.7	8.5	7.3	5.3	3.4	1.4	0.7	52.1
Visalia	0.9	1.7	3.3	5.1	6.8	7.7	7.9	6.9	4.9	3.2	1.5	0.8	50.7
TUOLUMNE													
Groveland	1.1	1.5	2.8	4.1	5.7	7.2	7.9	6.6	5.1	3.3	1.4	0.7	47.5
Sonora	1.1	1.5	2.8	4.1	5.8	7.2	7.9	6.7	5.1	3.2	1.4	0.7	47.6
VENTURA													
Camarillo	2.2	2.5	3.7	4.3	5.0	5.2	5.9	5.4	4.2	3.0	2.5	2.1	46.1
Oxnard	2.2	2.5	3.2	3.7	4.4	4.6	5.4	4.8	4.0	3.3	2.4	2.0	42.3
Piru	2.8	2.8	4.1	5.6	6.0	6.8	7.6	7.8	5.8	5.2	3.7	3.2	61.5
Port Hueneme	2.0	2.3	3.3	4.6	4.9	4.9	4.9	5.0	3.7	3.2	2.5	2.2	43.5
Thousand Oaks	2.2	2.6	3.4	4.5	5.4	5.9	6.7	6.4	5.4	3.9	2.6	2.0	51.0
Ventura	2.2	2.6	3.2	3.8	4.6	4.7	5.5	4.9	4.1	3.4	2.5	2.0	43.5
YOLO													
Bryte	0.9	1.7	3.3	5.0	6.4	7.5	7.9	7.0	5.2	3.5	1.6	1.0	51.0
Davis	1.0	1.9	3.3	5.0	6.4	7.6	8.2	7.1	5.4	4.0	1.8	1.0	52.5
Esparto	1.0	1.7	3.4	5.5	6.9	8.1	8.5	7.5	5.8	4.2	2.0	1.2	55.8
Winters	1.7	1.7	2.9	4.4	5.8	7.1	7.9	6.7	5.3	3.3	1.6	1.0	49.4
Woodland	1.0	1.8	3.2	4.7	6.1	7.7	8.2	7.2	5.4	3.7	1.7	1.0	51.6
Zamora	1.1	1.9	3.5	5.2	6.4	7.4	7.8	7.0	5.5	4.0	1.9	1.2	52.8
YUBA													
Browns Valley	1.0	1.7	3.1	4.7	6.1	7.5	8.5	7.6	5.7	4.1	2.0	1.1	52.9
Brownsville	1.1	1.4	2.6	4.0	5.7	6.8	7.9	6.8	5.3	3.4	1.5	0.9	47.4

* The values in this table were derived from:

1) California Irrigation Management Information System (CIMIS);
2) Reference EvapoTranspiration Zones Map, UC Dept. of Land, Air & Water Resources and California Dept of Water Resources 1999; and
3) Reference Evapotranspiration for California, University of California, Department of Agriculture and Natural Resources (1987) Bulletin 1922;
4) Determining Daily Reference Evapotranspiration, Cooperative Extension UC Division of Agriculture and Natural Resources (1987), Publication Leaflet 21426

HISTORY

1. New Appendix A filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Repealer and new Appendix A filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

Appendix B — Sample Water Efficient Landscape Worksheet.

WATER EFFICIENT LANDSCAPE WORKSHEET

This worksheet is filled out by the project applicant and it is a required element of the Landscape Documentation Package.

Reference Evapotranspiration (ETo) _____

Hydrozone # /Planting Description[a]	Plant Factor (PF)	Irrigation Method[b]	Irrigation Efficiency (IE)[c]	ETAF (PF/IE)	Landscape Area (sq, ft,)	ETAF x Area	Estimated Total Water Use (ETWU)[e]
Regular Landscape Areas							
				Totals	(A)	(B)	
Special Landscape Areas							
				1			
				1			
				1			
				Totals	(C)	(D)	
						ETWU Total	
						Maximum Allowed Water Allowance (MAWA)[e]	

[a] *Hydrozone #/Planting Description*
E.g
1.) front lawn
2.) low water use plantings
3.) medium water use planting

[b] *Irrigation Method*
overhead spray
or drip

[c] *Irrigation Efficiency*
0.75 for spray head
0.81 for drip

[d] *ETWU* (Annual Gallons Required) =
Eto x 0.62 x ETAF x Area
where 0.62 is a conversion factor that converts acre-inches per acre per year to gallons per square foot per year.

[e] *MAWA (Annual Gallons Allowed) = (Eto) (0.62) [(ETAF x LA) + ((1-ETAF) x SLA)]*
where 0.62 is a conversion factor that converts acre-inches per acre per year to gallons per square foot per year, LA is the total landscape area in square feet, SLA is the total special landscape area in square feet, and ETAF is .55 for residential areas and 0.45 for non-residential areas.

ETAF Calculations

Regular Landscape Areas

Total ETAF x Area	(B)
Total Area	(A)
Average ETAF	**B ÷ A**

Average ETAF for Regular Landscape Areas must be 0.55 or below for residential areas, and 0.45 or below for non-residential areas.

All Landscape Areas

Total ETAF x Area	(B+D)
Total Area	(A+C)
Sitewide ETAF	**(B+D) ÷ (A+C)**

HISTORY

1. New Appendix B filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Repealer and new Appendix B filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

Appendix C — Sample Certificate of Completion.

CERTIFICATE OF COMPLETION

This certificate is filled out by the project applicant upon completion of the landscape project.

PART 1. PROJECT INFORMATION SHEET

Date		
Project Name		
Name of Project Applicant	Telephone No.	
	Fax No.	
Title	Email Address	
Company	Street Address	
City	State	Zip Code

Project Address and Location:

Street Address		Parcel, tract or lot number, if available.
City		Latitude/Longitude (optional)
State	Zip Code	

Property Owner or his/her designee:

Name	Telephone No.	
	Fax No.	
Title	Email Address	
Company	Street Address	
City	State	Zip Code

Property Owner

"I/we certify that I/we have received copies of all the documents within the Landscape Documentation Package and the Certificate of Completion and that it is our responsibility to see that the project is maintained in accordance with the Landscape and Irrigation Maintenance Schedule."

_____

Property Owner Signature Date

Please answer the questions below:

1. Date the Landscape Documentation Package was submitted to the local agency_____
2. Date the Landscape Documentation Package was approved by the local agency_____
3. Date that a copy of the Water Efficient Landscape Worksheet (including the Water Budget Calculation) was submitted to the local water purveyor_____

PART 2. CERTIFICATION OF INSTALLATION ACCORDING TO THE LANDSCAPE DOCUMENTATION PACKAGE

"I/we certify that based upon periodic site observations, the work has been completed in accordance with the ordinance and that the landscape planting and irrigation installation conform with the criteria and specifications of the approved Landscape Documentation Package."

Signature*	Date	
Name (print)	Telephone No.	
	Fax No.	
Title	Email Address	
License No. or Certification No.		
Company	Street Address	
City	State	Zip Code

*Signer of the landscape design plan, signer of the irrigation plan, or a licensed landscape contractor.

PART 3. IRRIGATION SCHEDULING

Attach parameters for setting the irrigation schedule on controller per ordinance Section 492.10.

PART 4. SCHEDULE OF LANDSCAPE AND IRRIGATION MAINTENANCE

Attach schedule of Landscape and Irrigation Maintenance per ordinance Section 492.11.

PART 5. LANDSCAPE IRRIGATION AUDIT REPORT

Attach Landscape Irrigation Audit Report per ordinance Section 492.12.

PART 6. SOIL MANAGEMENT REPORT

Attach soil analysis report, if not previously submitted with the Landscape Documentation Package per ordinance Section 492.6.

Attach documentation verifying implementation of recommendations from soil analysis report per ordinance Section 492.6.

HISTORY

1. New Appendix C filed 9–10–2009; operative 9–10–2009 pursuant to Government Code section 11343.4 (Register 2009, No. 37).
2. Repealer and new Appendix C filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

Appendix D — Prescriptive Compliance Option.

(a) This appendix contains prescriptive requirements which may be used as a compliance option to the Model Water Efficient Landscape Ordinance.

(b) Compliance with the following items is mandatory and must be documented on a landscape plan in order to use the prescriptive compliance option:

(1) Submit a Landscape Documentation Package which includes the following elements:

(A) date

(B) project applicant

(C) project address (if available, parcel and/or lot number(s))

(D) total landscape area (square feet), including a breakdown of turf and plant material

(E) project type (e.g., new, rehabilitated, public, private, cemetery, homeowner–installed)

(F) water supply type (e.g., potable, recycled, well) and identify the local retail water purveyor if the applicant is not served by a private well

(G) contact information for the project applicant and property owner

(H) applicant signature and date with statement, "I agree to comply with the requirements of the prescriptive compliance option to the MWELO".

(2) Incorporate compost at a rate of at least four cubic yards per 1,000 square feet to a depth of six inches into landscape area (unless contra–indicated by a soil test);

(3) Plant material shall comply with all of the following;

(A) For residential areas, install climate adapted plants that require occasional, little or no summer water (average WUCOLS plant factor 0.3) for 75% of the plant area excluding edibles and areas using recycled water; For non–residential areas, install climate adapted plants that require occasional, little or no summer water (average WUCOLS plant factor 0.3) for 100% of the plant area excluding edibles and areas using recycled water;

(B) A minimum three inch (3″) layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers, or direct seeding applications where mulch is contraindicated.

(4) Turf shall comply with all of the following:

(A) Turf shall not exceed 25% of the landscape area in residential areas, and there shall be no turf in non–residential areas;

(B) Turf shall not be planted on sloped areas which exceed a slope of 1 foot vertical elevation change for every 4 feet of horizontal length;

(C) Turf is prohibited in parkways less than 10 feet wide, unless the parkway is adjacent to a parking strip and used to enter and exit vehicles. Any turf in parkways must be irrigated by sub–surface irrigation or by other technology that creates no overspray or runoff.

(5) Irrigation systems shall comply with the following:

(A) Automatic irrigation controllers are required and must use evapotranspiration or soil moisture sensor data and utilize a rain sensor.

(B) Irrigation controllers shall be of a type which does not lose programming data in the event the primary power source is interrupted.

(C) Pressure regulators shall be installed on the irrigation system to ensure the dynamic pressure of the system is within the manufacturers recommended pressure range.

(D) Manual shut–off valves (such as a gate valve, ball valve, or butterfly valve) shall be installed as close as possible to the point of connection of the water supply.

(E) All irrigation emission devices must meet the requirements set in the ANSI standard, ASABE/ICC 802–2014. "Landscape Irrigation Sprinkler and Emitter Standard," All sprinkler heads installed in the landscape must document a distribution uniformity low quarter of 0.65 or higher using the protocol defined in ASABE/ICC 802–2014.

(F) Areas less than ten (10) feet in width in any direction shall be irrigated with subsurface irrigation or other means that produces no runoff or overspray.

(6) For non–residential projects with landscape areas of 1,000 sq. ft. or more, a private submeter(s) to measure landscape water use shall be installed.

(c) At the time of final inspection, the permit applicant must provide the owner of the property with a certificate of completion, certificate of installation, irrigation schedule and a schedule of landscape and irrigation maintenance.

History

1. New Appendix D filed 9–15–2015; operative 9–15–2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B–29–15 (4–1–2015) (Register 2015, No. 38).

Chapter 2.7.1. Flood Protection Corridor Program of the Costa–Machado Water Act of 2000

§ 497.1. Scope.

(a) These regulations implement Sections 79035 through 79044, and 79044.9 in Article 2.5 of Chapter 5 of Division 26 of the Water Code, which Division is the Costa–Machado Water Act of 2000. They establish a process for funding acquisition of property rights and related activities for flood protection corridor projects undertaken by the Department of Water Resources directly or through grants to local public agencies or nonprofit organizations.

(b) The Flood Protection Corridor Program is statewide in scope. Within the geographic scope of the CALFED Bay–Delta Program, funds in the subaccount for this program shall be used for projects that, to the greatest extent possible, are consistent with the CALFED long–term plan identified in the Programmatic Record of Decision of August 28, 2000.

NOTE: Authority cited: Sections 8300, 12580 and 79044.9, Water Code; 2000 Cal. Stat. Ch. 52, Item No. 3860–101–6005; 2001 Cal. Stat. Ch. 106, Item No. 3860–001–0001, Provision 3; and 2002 Cal. Stat. Ch. 379, Item No. 3860–101–6005. Reference: Sections 79037, 79043, 79044 and 79044.9, Water Code

History

1. New chapter 2.7.1 (sections 497.1–497.12) and section filed 8–19–2003; operative 8–19–2003 pursuant to Government Code section 11343.4 (Register 2003, No. 34).

§ 497.2. Definitions.

The words used in this chapter have meanings set forth as follows:

(a) "A List" means the preferred priority list of projects described in Section 497.6.

(b) "Applicant" means an entity that is acting as the principal party making an application for funding under the provisions of the Costa–Machado Water Act of 2000.

(c) "B List" means the reserve priority list of projects described in Section 497.6.

(d) "CEQA" means the California Environmental Quality Act, Public Resources Code Sections 21000 *et seq.*

(e) "Department" means the California Department of Water Resources.

(f) "Director" means the Director of the Department of Water Resources.

(g) "FEMA" means the Federal Emergency Management Agency.

(h) "Fully funded" with respect to a grant project means funded to the full amount of the requested funds or to the funding limit, whichever is less.

(i) "Grant application form" means the Department's form entitled "Flood Protection Corridor Program Project Evaluation Criteria and Competitive Grant Application Form" dated April 9, 2003 and incorporated herein by this reference.

(j) "Local public agency" means any political subdivision of the State of California, including but not limited to any county, city, city and county, district, joint powers agency, or council of governments.

(k) "Milestone" means a time when a significant portion of a project is completed, as defined in the contract as a time for disbursement of grant funds.

(*l*) "Nonprofit organization" means an organization that does not operate for profit and has no official governmental status, including but not limited to clubs, societies, neighborhood organizations, advisory councils, conservation organizations and privately run local community conservation corps.

(m) "Program" means the Flood Protection Corridor Program established by Water Code Division 26, Chapter 5, Article 2.5.

(n) "Property interest" means any right in real property, including easement, fee title, and any other kind of right acquired by legally binding means.

(o) "Project" means all planning, engineering, acquisition of real property interests, construction and related activities undertaken to implement a discrete action undertaken under the program pursuant to Water Code Section 79037.

(p) "Sponsor" means an applicant who has received grant funding through the application process described in these regulations.

(q) "Subaccount" means the Flood Protection Corridor Subaccount created by Water Code Section 79035(a).

NOTE: Authority cited: Sections 8300, 12580 and 79044.9, Water Code. Reference: Sections 79035, 70937, 79038(a) and 79043, Water Code; and Sections 21000 *et seq.,* Public Resources Code.

HISTORY

1. New section filed 8–19–2003; operative 8–19–2003 pursuant to Government Code section 11343.4 (Register 2003, No. 34).

§ 497.3. Program Management Process.

The Department selects, approves, funds, and monitors projects funded by grants under the program. The process of managing the program includes these steps:

(a) The Department shall appoint and maintain a Project Evaluation Team composed of Department staff and other consulting governmental agencies. The Department may request consultation with any appropriate government agency, including but not limited to the Department of Conservation, the Department of Fish and Game, the Department of Food and Agriculture, the Office of Emergency Services, and the CALFED Bay–Delta Program.

(b) Local public agencies or nonprofit organizations qualified under Section 497.4 may apply for program grants for projects at such times as the Department may designate. Applications for proposed projects shall be submitted in response to a solicitation issued by the Department. As long as uncommitted funds remain available to fund new projects, the Department shall solicit proposals at least once per calendar year. The time period for submitting applications shall be 90 days from the date notice is given by the Department that project proposals are being solicited. Notices shall be provided to cities, counties, flood control districts, reclamation districts, and other local government entities that manage flood plains and flood control projects. The Department will also provide notice to nonprofit organizations with interest in flood management issues, and shall send notice to all individuals and organizations that have requested notice of the opportunity to submit applications. Notices may be given by mail, electronic mail, website posting, or any other method that provides easy access and prompt availability. Projects shall meet the requirements of Section 497.5. Applications shall meet the requirements of Section 497.7.

(c) The Project Evaluation Team shall review each application and evaluate the subject project within 60 days of the close of the specified submittal period, or within 60 days of receipt of requested additional information, whichever is later.

(d) The Project Evaluation Team shall notify the Department to request the applicant to provide additional information within 30 days of the Department's request if:

(1) The project appears potentially eligible but is missing information needed to evaluate the merits of the project, or

(2) Additional information is needed to evaluate the merits of the project in comparison to others received.

(e) If the requested additional information cannot be provided in 30 days, the applicant may refile its application with the additional information at the Department's next solicitation of proposals.

(f) When a proposal that meets minimum qualifications is complete and all requested additional information has been supplied, the Project Evaluation Team shall complete the evaluation of the project including recommending its place on a priority list as described in Section 497.6.

(g) After each solicitation of proposals, Department staff, using the evaluations and recommended priorities of the Project Evaluation Team, shall recommend projects, priority, and amounts per project to be funded and submit the recommendations to the Director for approval of the priority lists. Department staff may recommend:

[The next page is 38.15.]

Appendix D: Supporting Documents

1. Recycled Water Master Plan Report Executive Summary
2. AWWA Audit Water Loss 2011 - 2015
3. School education program brochure
4. Zone 7 Ground Water Management Plan

2011 EXECUTIVE SUMMARY

RECYCLED WATER MASTER PLAN

Founded in 1869, the City of Livermore (City) is framed by award-winning wineries, farm lands and ranches that reflect the Livermore valley's western heritage. As an area with rich cultural and agricultural history, the City is committed to protecting the environment, improving the quality of life for residents and visitors, and promoting sustainability. In order to fulfill this commitment, the City has developed policy objectives and initiatives ranging from Green Building ordinances for commercial and residential development to programs to reduce water and energy use within the City.

The City commitment to promoting sustainability is evident in the City's recycled water program. The City has practiced water reuse for over 25 years and last identified recycled water expansion opportunities in 2004. Many of the opportunities identified in the 2004 study have been realized and further expansion requires identification of a long term plan to maximize current and future recycled water supply.

Further expansion of the recycled water system would enable the City to offset current and future potable water use and continue to support the City's green initiatives and strategic objectives. This Recycled Water Master Plan (RWMP) presents a plan that the City can implement in a phased manner as technical, funding, partnering, and other factors align to make recycled water expansion feasible.

The objective of this RWMP is to identify an implementable action plan for achieving the following goals:

- Offsetting potable water use by supplying recycled water when and where appropriate.
- Expanding and fully subscribing the existing recycled water system.
- Optimizing the existing and future system configuration.

A two-phased process is being used to develop the RWMP. Phase I consisted of identifying numerous conceptual alternatives along with developing associated quantitative and qualitative data to evaluate the alternatives. The conceptual alternatives were then ranked to develop the top three preferred projects. Phase II of the RWMP will consist of further development of the top three preferred projects. Phase II of the RWMP is currently underway and is planned to be completed by June 2011. This report summarizes the findings of Phase I.

INTRODUCTION

The RWMP study area is the City of Livermore boundary and includes City Zones 1 through 3 and the California Water Service Company (Cal Water) service area. Some areas immediately adjacent to the City such as the eastern part of Pleasanton, north Livermore,

the area surrounding the Ruby Hill Golf Club, and the vineyards to the south east of the City limits along Tesla Road were also considered.

The water purveyors in the City boundary include the Livermore Municipal Water Utility and California Water Service Company (Cal Water). Recycled water presents a sustainable resource available to offset potable water use in the region and expansion of the existing system will help diversify and strengthen the regional water supply. Irrigation of agricultural lands, including vineyards, occurs through the use of raw water purveyed by Zone 7 and limited use of private groundwater. Zone 7 is currently updating their water supply master plan to replace imported surface water supplies threatened by regulatory decisions in the delta and recycled water is currently projected to replace 2,000 acre feet per year (AFY) of these lost supplies.

RECYCLED WATER SUPPLY

The source of recycled water considered in the study was the advanced tertiary treated wastewater from the Livermore Water Reclamation Plant (LWRP). The LWRP was originally built in 1958 with a design capacity of 2.5 million gallons per day (mgd). Tertiary treatment facilities were constructed in 1974. The tertiary facilities have been upgraded several times since its initial construction and currently consist of media filters and ultraviolet (UV) disinfection.

The LWRP effluent meets Title 22 disinfected tertiary recycled water standards and is suitable for irrigation of food crops, landscape irrigation, and non-restricted recreational impoundments. As part of the RWMP, effluent parameters from 2006 through 2008 were reviewed for key irrigation water quality constituents and also compared to the groundwater quality in the region. The results revealed that the LWRP effluent is suitable for irrigation use.

Currently the LWRP has a build out flow capacity of 9.5 mgd and processes on average over 7.0 mgd of wastewater. The City's recycled water distribution system consists of approximately 14 miles of pipeline and 3.8 million gallons (MG) of storage. In concert with the City's green initiatives, it was the objective of this RWMP to evaluate methods to efficiently utilize 100 percent of the available recycled water supply.

RECYCLED WATER DEMAND

Over 150 potential recycled water customers were identified within the study area. These include customers in both the Livermore Municipal Water and Cal Water service areas, as well as customers near the city boundaries in the City of Pleasanton and the unincorporated county such as agricultural users in North Livermore. The customers were identified using multiple sources including previous reports, water usage data, discussions with Water Resources Division (WRD) staff and City engineering and planning staff, GIS mapping, and

meetings with various potential customer groups including the City of Pleasanton, Zone 7 Water Agency, and Cal Water.

The types of acceptable uses identified include urban irrigation (i.e. school yards, parks, cemeteries, golf courses, Home Owners Associations (HOAs)), agricultural irrigation (i.e. vineyards, miscellaneous row crops and orchards), toilet flushing, and process/commercial uses. The potential recycled water customer sites identified are shown on Figure ES.1. The recycled water use sites were then quantified to determine potential recycled water demand.

Expected landscape irrigation requirements for the Livermore area were calculated based on evapotranspiration and rainfall data. Calculated irrigation requirements were used to estimate irrigation use at the sites. The net annual average landscape irrigation requirement in the study area was found to be approximately 2.4 feet per year.

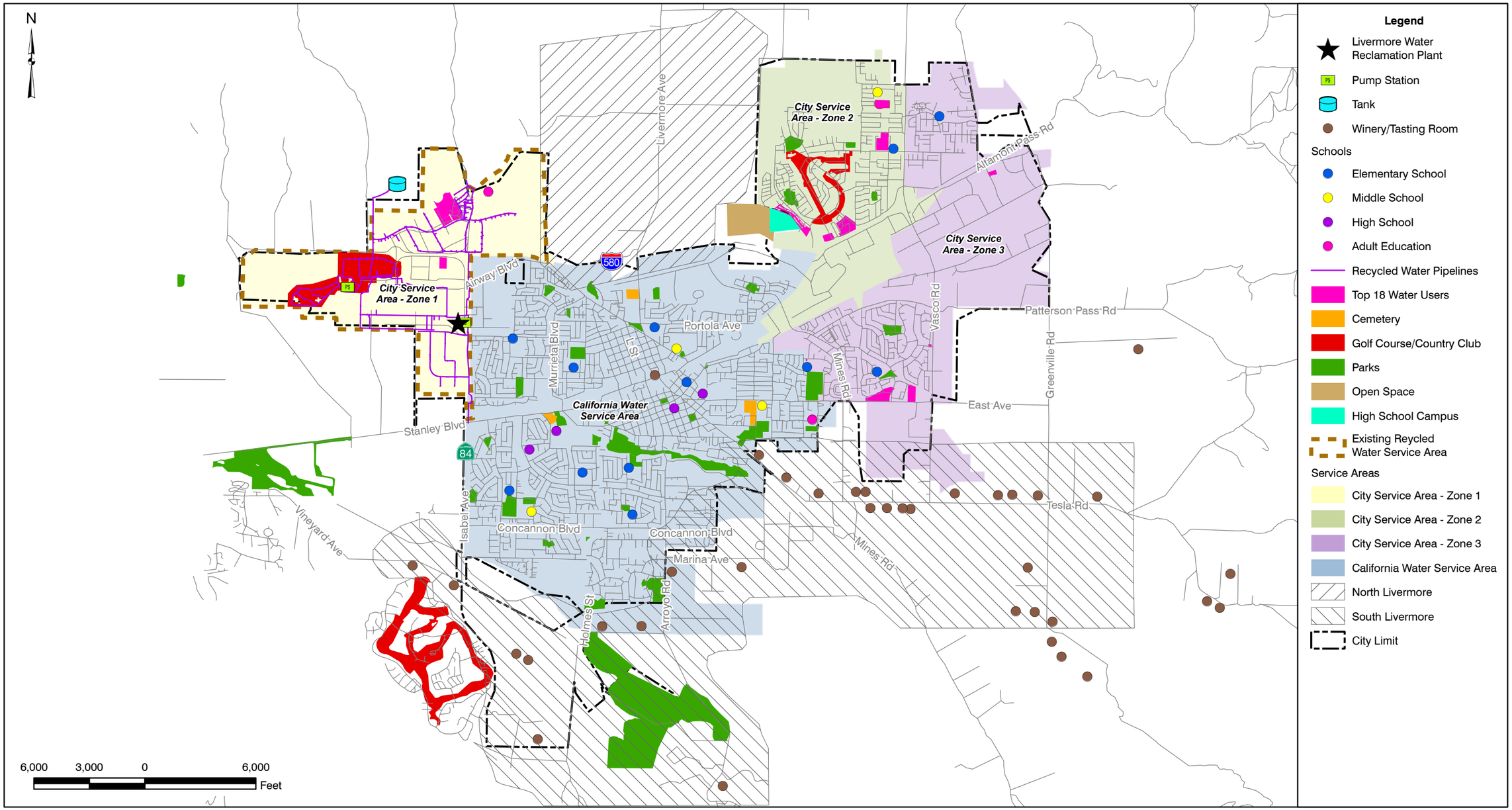
Table ES.1 presents a summary of the number of customers, the use type, the acreage irrigated, and the estimated demand for these existing and potential customers.

As seen from the table, the total estimated maximum month recycled water demand exceeds the ultimate available supply of 9.5 mgd from the Livermore WRP. During the conceptual alternatives development, customers within the various zones were combined along potential recycled water alignments to meet recycled water demands within the available supply.

CONCEPTUAL ALTERNATIVES DEVELOPMENT

The identified potential customers were grouped into conceptual alternatives with the objective of maximizing the use of recycled water and serving as much of the City service area as possible. Each alternative was developed based on the availability of recycled water supply and potential customer proximity to the recycled water transmission main.

Numerous stakeholder, environmental, implementation, and funding criteria were considered in the development of the alternatives. Several small group meetings were conducted with potential recycled water customers such as golf courses, agricultural users, Home Owners Associations (HOA’s), Livermore Area Recreation and Parks District (LARPD), and school districts. Meetings were also conducted with the other water service providers in the area including Zone 7 and Cal Water. The meetings provided insight to the City and WRD staff as to the possible interest and/or concerns of each stakeholder group.



ES.1
POTENTIAL RECYCLED WATER USE SITES
RECYCLED WATER MASTER PLAN
CITY OF LIVERMORE

liv111m1-8145.ai rev 01/18/11

Table ES.1 Total Potential Customer Demands Summary
Recycled Water Master Plan
City of Livermore

Zone	Number of Customers	Type	Acres	Total Annual Demand[1] (afy)	Max Month Demand[1] (mgd)
Zone 1					
Existing[2]	31	Parks, Schools, Golf Course, Airport, Business Parks	N/A[3]	1,131	2.5
Future[2]	13	Parks, Schools, Business Parks	N/A[3]	434	1.0
Zone 2[2]	14	Parks, Schools, Golf Course, Multi Family Irrigation, HOAs	252	618	1.4
Zone 3[2]	13	Parks, Schools, Process, LLNL	70	366	0.8
Cal Water Service Area	54	Parks, Schools, Cemeteries, Vineyards	639	1,193	2.7
Unincorporated City					
North Livermore[4]	2	Agricultural	10,018	12,241	27.3
South Livermore[5]	32	Vineyards, Golf Club	4,357	5,773	12.4
City of Pleasanton	5	Parks	38	481	1.1
Total	**164**	**---**	**15,375[6]**	**22,237**	**49.2**

Notes:
(1) Presented demand is based on estimates using net irrigation requirements. The actual measured use for existing customers is lower than presented due to unmetered use of recycled water at the LWRP as well as volume used for construction, fire, and clean out flows.
(2) Includes one or more City of Livermore large water users.
(3) Acreage for existing and future Zone 1 customers is not available.
(4) North Livermore includes irrigation of 10,000 total potential acres of undeveloped land and 18 acres from another site.
(5) Ruby Hill Golf Club is counted as part of South Livermore.
(6) Total irrigated acreage excludes acreage of Zone 1 customers.

Conceptual alternative analysis resulted in development of the following ten recycled water alternatives:

- Alternative 1 – Zone 1 Buildout - The City's 2004 RWMP identified potential customers within the existing water service area, Zone 1 that could be connected to the system to maximize recycled water use. Some of these customers have

connected to the system since 2004. Alternative 1 consists of connecting the additional customers.

- Alternative 2 – Ruby Hill Route - Alternative 2 is based on delivering recycled water to Ruby Hill Golf Club, one of the largest potential recycled water users, and other surrounding users. For this route, the recycled water pipeline along Kitty Hawk Road would be extended to the south across Stanley Blvd along Isabel Ave to Ruby Hill Golf Club
- Alternative 3 – North Livermore Route - The primary purpose for this route is to deliver recycled water to the currently unincorporated, undeveloped lands north of the City along North Livermore Avenue, north of Highway 580. This alternative assumes the land would be developed into a viable agricultural area.
- Alternative 4 – Springtown Route - This route was developed to deliver recycled water to the Springtown Golf Course and other potential customers in the Springtown area. This alternative could be developed as an extension of the North Livermore route or as an independent route as both extend east from the existing system along Portola Avenue.
- Alternative 5 – Cal Water East Route - This recycled water route was developed to convey flow east from the LWRP through the Cal Water service area. This route captures parks, schools, and cemeteries in the Cal Water service area and then extends to capture the parks, schools, and large volume user Lawrence Livermore National Lab.
- Alternative 6 – Cal Water South Route - This recycled water route was developed to head east and then south along an existing bike path and trail in the Cal Water service area through Robertson Park. This route connects to the existing 18-inch pipeline that terminates at the intersection of Stanley Avenue and Isabel Avenue.
- Alternative 7 – Southeast Livermore Vineyards Route (via Cal Water South Route) - This route was developed to deliver recycled water to the vineyards in south Livermore along Tesla Road. For the construction of this route, it should be noted that either Alternative 5 or Alternative 6 would need to be constructed first.
- Alternative 8 – Satellite Plant at Springtown - This alternative consists of construction of a new sewer scalping/satellite plant in the Springtown area between the proposed Catholic High School and the Springtown Golf Course.
- Alternative 9 – Groundwater Recharge - The groundwater recharge alternative consists of recharging all available effluent flow (minus onsite/LWRP recycled water use and Zone 1 build-out uses) into the groundwater basin.
- Alternative 10 – Recycled Water Partnerships - This alternative consists of entering into partnerships with regional partners such as the Zone 7 and/or the City of Pleasanton (Pleasanton). The alternative for a partnership with Zone 7 would

include the trade of potable water rights for potable water offsets achieved using recycled water. The alternative for a partnership with Pleasanton would include the sale of recycled water to Pleasanton for distribution to some of their east-area customers.

The City has determined that Alternative 1 – Zone 1 Buildout will be completed in the immediate term as the customers identified in the City's previous recycled water master plan complete connection to the existing system. Therefore, the remaining nine alternatives were developed assuming that Alternative 1 – Zone 1 Buildout is a component of the existing system. Thus, a baseline demand of 3.5 mgd was assumed, leaving a remaining potential supply of 6.0 mgd at buildout.

Recycled water demand, potable water offset, estimated capital cost, funding availability, environmental and permitting requirements, and stakeholder considerations were developed for each of the alternatives. The quantitative and qualitative parameters of each of the alternatives were summarized in Table ES.2 and Table ES.3, respectively. These summaries were used as the basis of comparison of alternatives during the conceptual alternatives screening.

ALTERNATIVES SCREENING AND RANKING

Conceptual alternatives screening was conducted to identify the preferred alternatives to be further developed as part of Phase II of this study. The intent of the screening process was to identify those projects that maximize the City's water supply opportunities and are most likely to be implemented. The alternatives were categorized into near and long term projects before the screening process began.

- Near-term alternatives were defined as projects that are likely to be constructed in the next 3 to 10 years and/or projects that require construction prior to expansion of other alternatives.
- Long-term alternatives were defined as projects that are likely to be constructed after the next 10 years and/or projects that require construction of other alternatives prior to implementation.

A direct comparison method for screening was selected by the City, and was conducted in a workshop with City WRD and engineering staff/management. The screening criteria most relevant to the City were identified and categorized as quantitative and qualitative criterion. The near- and long-term alternatives were then compared to each other and ranked based on the quantitative and qualitative criterion.

The primary considerations during the screening process included the recycled water demand and the conversion from potable water customers versus that from raw water customers, the project costs, potential to promote development, likelihood of quick implementation, and support of Council policy objectives. Projects with a greater potable

Table ES.2 Quantitative Conceptual Alternative Comparison
Recycled Water Master Plan
City of Livermore

Alt No.	Alternative Name	Max Month Recycled Water Demand [1] (mgd)			Average Annual Potable Water Offsets [2] (mgd)	Untreated Water Offsets (mgd)	Estimate of Costs	
		Existing	Projected	Total			Capital Cost [3] ($ million)	Cost per Acre Foot [4] ($/af)
APPROVED REUSE PROGRAM								
0	Existing Zone 1	2.5	0.0	2.5	---	---	--	---
1	Zone 1 Buildout	--	1.0	3.5	0.4	---	0.2[5]	34
ADDITIONAL REUSE EXPANSION ALTERNATIVES								
2	Ruby Hill Route	--	4.9	8.4	0.2	1.7	46.3	1,380
3	North Livermore Route [6]	--	6.0	9.5	0.1	---	52.8 to 69.0	1,573 to 2,056
4	Springtown Route [7]	--	1.7	5.2	0.7	0.04	31.9	3,168
5	Cal Water East	--	1.5	5.0	0.6	---	26.8	3,016
6	Cal Water South	--	0.8	4.3	0.3	---	13.3	1,806
7	Southeast Livermore Vineyards (Includes Cal Water South) [8]	--	5.7	9.2	0.3	1.9	59.3	1,044
8	Satellite Plant at Springtown	--	1.6	5.1	0.6	0.0	42.8	4,251
9	Groundwater Recharge	--	6.0	9.5	Up to 6.0	---	140.7	2,722
10	Recycled Water Partnerships [9]	--	0.5	4.0	0.2	---	0.1[10]	27

Table ES.2 Quantitative Conceptual Alternative Comparison
Recycled Water Master Plan
City of Livermore

Alt No.	Alternative Name	Max Month Recycled Water Demand (1) (mgd)			Average Annual Potable Water Offsets (2) (mgd)	Untreated Water Offsets (mgd)	Estimate of Costs	
		Existing	Projected	Total			Capital Cost (3) ($ million)	Cost per Acre Foot (4) ($/af)

Notes:

(1) Demand is based on customers identified and corresponding acreages. Total demand for Alternatives 2 thru 10 equals the projected demand plus Zone 1 demand of 3.5 mgd.

(2) Potable water offsets calculated using average annual recycled water use. Offsets presented are for the alternative and does not include offsets from existing demand.

(3) Capital costs include direct costs, 30% estimating contingency, 20% general contractor overhead and profit, 9.75% sales tax, and 30% engineering,

(4) Capital costs are amortized at 5 percent over 30 years. Dollars per acre-foot calculated using the estimated total annual usage.

(5) Total capital cost estimated at $6.2M. Livermore's portion of $200,000 provided by Joel Waxdeck, City of Livermore, January 2011. Other $6M is planned to be paid by developers for the pipeline extension.

(6) Acreage irrigated adjusted to 2,700 AF to ensure availability of supply during maximum month conditions for existing customers and N. Livermore customers.

(7) Assumes independent route and does not include cost associated with including flow from the N. Livermore Route.

(8) Assumes enlarging of the Cal Water South Route. Potable water offsets are calculated for urban customers only as the vineyards use raw water and non-potable sources do not provide potable offsets.

(9) Recycled Water Partnership alternative assumes a portion of the existing distribution network would need to be upsized and extended.

(10) Livermore's cost of $100,000 for a turnout provided by Joel Waxdeck, City of Livermore, January 2011. Cost of 12" pipeline is planned to be paid by developers.

water offset received a higher ranking than projects converting untreated water usage to recycled water for a number of reasons. Projects with large potable offsets provide a greater water supply benefit and are more likely to receive Zone 7 support and funding. Also, projects to replace untreated water use can be more difficult to implement due to the extremely low cost of untreated water and the lack of incentive for users to convert to recycled water.

The results of the screening process are summarized in Table ES.4.

Table ES.3 Qualitative Conceptual Alternative Comparison
Recycled Water Master Plan
City of Livermore

Alt No.	Alternative name	Potential Funding Sources [1]	Preservation of Open Space (acres)	Regulatory Implications	Possible Long-Term Environmental Considerations	Anticipated Concerns	
						Supplier/Partner	Public/Customers
1	Zone 1 Buildout	- All except Agricultural Water Conservation and Local Groundwater Assistance (Prop 84).	N/A	See Note (4) Below.	- None Anticipated - route in existing built corridor	N/A	Cost
2	Ruby Hill Route	- All except Local Groundwater Assistance (Prop 84). - Potential cost sharing with Zone 7 and Pleasanton.	Approximately 1,400 acres	See Note (4) Below.	- Aesthetics - Cultural Resources	Cal Water Coordination	Cost and GC Board Approval
3	North Livermore Route	- All except Local Groundwater Assistance (Prop 84). - Potential cost sharing with Cal Water and wineries. - CA Department of Food And Agriculture (Farm Bill 2008). - Organic Farming Research Foundation.	Up to 2,150 acres	See Note (4) Below.	- Aesthetics - Cultural Resources - Biological Resources	Cal Water Coordination	Cost
4	Springtown Route [2]	- All except Agricultural Water Conservation and Local Groundwater Assistance (Prop 84). - Potential cost sharing with Cal Water.	Approximately 20 acres	See Note (4) Below.	- None Anticipated - route in existing built corridor	Cal Water Coordination	Cost, GC Board Approval, and HOA Board Approval
5	Cal Water East	- All except Agricultural Water Conservation and Local Groundwater Assistance (Prop 84). - Potential cost sharing with Cal Water.	N/A	See Note (4) Below.	- None Anticipated - route in existing built corridor	Cal Water Coordination	Cost
6	Cal Water South	- All except Agricultural Water Conservation and Local Groundwater Assistance (Prop 84). - Potential cost sharing with Cal Water.	N/A	See Note (4) Below.	- None Anticipated - route in existing built corridor	Cal Water Coordination and Zone 7 Acceptance	Cost
7	Southeast Livermore Vineyards (Includes Cal Water South) [3]	- All except Local Groundwater Assistance (Prop 84). - Organic Farming Research Foundation. - CA Department of Food and Agriculture (Farm Bill 2008). - Potential cost sharing with Cal Water and wineries.	Approximately 1,775 acres	See Note (4) Below.	- Aesthetics - Cultural Resources	Cal Water Coordination and Zone 7 Acceptance	Cost
8	Satellite Plant at Springtown	- All except Agricultural Water Conservation and Local Groundwater Assistance (Prop 84)	Approximately 20 acres	See Note (4) Below.	- Land Use - Aesthetics - Cultural Resources - Transportation and Traffic	Neighborhood Impacts and Additional Staff/Monitoring for New Facility	Cost
9	Groundwater Recharge	- All except Agricultural Water Conservation. - Potential cost sharing with Zone 7.	N/A	See Note (4) Below. In Addition There Are Higher Restrictions for Dilution.	- Dilution and Groundwater Flow Impacts - Aesthetics - Cultural Resources	Zone 7 Acceptance	Public Acceptance
10	Recycled Water Partnerships	- All except Agricultural Water Conservation and Local Groundwater Assistance (Prop 84). - Potential cost sharing with Pleasanton.	N/A	See Note (4) Below.	- None Anticipated - route in existing built corridor	Pleasanton Acceptance and Affordability	Cost

Notes:
(1) Available grants and loans include Water Recycling Program Loan, Water Recycling Program Grant (Prop 13), New Local Water Supply (Prop 82), Agricultural Water Conservation Loan Program, Integrated Regional Water Management Grants Program (Prop 84), Local Groundwater Assistance (Prop 84), USBR Title XVI, and USBR Water for America Initiative.
(2) Assumes independent route and does not include cost associated with including flow from the N. Livermore Route.
(3) Assumes enlarging of the Cal Water South Route.
(4) Permits and regulatory considerations include DPH approval, Caltrans Encroachment Permits, Air Quality and Construction Permits, and additional County Permits.

Table ES.4 Alternatives Ranking Results Recycled Water Master Plan City of Livermore	
	Rank (1)
Near-Term Alternatives	
Alternative 4 - Springtown Route	4th
Alternative 5 - Cal Water East Route	2nd
Alternative 6 - Cal Water South Route	2nd
Alternative 10 - Partnership with Pleasanton	1st
Long-Term Alternatives	
Alternative 2 - Ruby Hill Route	1st
Alternative 3 - North Livermore Route	3rd
Alternative 7 - Southeast Livermore Vineyards Route	2nd
Alternative 8 - Satellite Plant at Springtown	4th
Alternative 9 - Groundwater Recharge	5th

Note:
(1) Results presented above are based on the alternatives screening workshop conducted on December 1, 2010 with City WRD and engineering staff/management.

Based on the results of the ranking, two near-term alternatives and one long-term alternative were selected for further study. City staff selected two near-term alternatives that best met the evaluation criteria and are the most likely to be implemented during next 10 years. One long-term alterative was selected for further study instead of a third near term alternative primarily since the alternative meets the City Council objective of exploring agricultural water use in North Livermore.

- Near-term: Pursuing a recycled water partnership with Pleasanton (Alternative 10) that will help embark on a regional recycled water system.
- Near-term: Serving the Cal Water South customers (Alternative 6) thereby constructing distribution infrastructure that can facilitate future long-term expansion of the recycled water system.
- Long-term: Serving the north Livermore area (Alternative 3), supporting the Council priority of exploring agricultural water use in North Livermore.

The Cal Water South alternative was selected for further study although both Cal Water South and Cal Water East alternatives ranked equally. This is because the Cal Water South alternative provides the greatest future flexibility for expansion. This alternative can be extended south to serve the Southeast Livermore Vineyards or extended north to serve many of the customers along the Cal Water East alternative.

The North Livermore alternative was selected for further study due to the continued community interest in understanding the economic benefit of promoting agricultural development in North Livermore. The more highly ranked alternatives, Alternative 2 – Ruby Hill Route, and Alternative 7 – Southeast Livermore Vineyards were not selected as the long-term alternative for further study as both of these alternatives consist primarily of customers who have existing alternate, more cost effective, water supplies with limited incentive to use recycled water at this time. Thus, their demand for recycled water is uncertain at this time, and service to these areas does not support any critical Livermore policy objectives.

CONCLUSIONS

At the completion of Phase I of the Livermore RWMP, ten viable recycled water alternatives were identified, screened and ranked based on quantitative and qualitative criteria. Although all the alternatives developed in Phase I are considered feasible, three alternatives were identified for further study in Phase II. The three alternatives selected for further study are consistent with the City's policy objectives, and the two near-term projects selected are the most feasible for implementation during the next 10 years.

Phase II of the RWMP is currently underway and planned to be completed by June 2011. During Phase II, the preferred projects will be further developed. The associated implementation considerations, capital, operations, and maintenance costs, and long-term financial sustainability of the three preferred projects will be evaluated. An implementation plan considering technical, regulatory, permitting, stakeholder involvement will be developed for the preferred projects to provide the City a road-map for recycled water system expansion.

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Water Audit Report for: City of Livermore Water
Reporting Year: 2011 1/2011 - 12/2011

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

WATER SUPPLIED << Enter grading in column 'E'

Volume from own sources:	?	10		Million gallons (US)/yr (MG/Yr)
Master meter error adjustment (enter positive value):	?	10	0.000	under-registered MG/Yr
Water imported:	?	10	2,031.000	MG/Yr
Water exported:	?	10	0.000	MG/Yr
WATER SUPPLIED:			2,031.000	MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:	Value:
Billed metered:	?	10	1,700.000	MG/Yr		
Billed unmetered:	?	7	0.000	MG/Yr		
Unbilled metered:	?	10	0.000	MG/Yr		
Unbilled unmetered:	?		25.388	MG/Yr	1.25%	

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION:	?		1,725.388	MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 305.613 MG/Yr

Apparent Losses

					Pcnt:	Value:
Unauthorized consumption:	?		5.078	MG/Yr	0.25%	

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	?	10	17.172	MG/Yr	1.00%	
Systematic data handling errors:	?	10	5.000	MG/Yr		
Apparent Losses:	?		27.249			

Choose this option to enter a percentage of billed metered consumption. This is NOT a default value

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:	?		278.363	MG/Yr
WATER LOSSES:			305.613	MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER:	?	331.000	MG/Yr

= Total Water Loss + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	?	10	146.0	miles	
Number of active AND inactive service connections:	?	10	9,829		
Connection density:			67	conn./mile main	
Average length of customer service line:	?	8	20.0	ft	(pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	?	10	65.0	psi	

COST DATA

Total annual cost of operating water system:	?	10	$10,872,020	$/Year
Customer retail unit cost (applied to Apparent Losses):	?	8	$2.19	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	?	8	$2,901.00	$/Million gallons

PERFORMANCE INDICATORS

Financial Indicators

Non-revenue water as percent by volume of Water Supplied:	16.3%
Non-revenue water as percent by cost of operating system:	8.8%
Annual cost of Apparent Losses:	$79,775
Annual cost of Real Losses:	$807,532

Operational Efficiency Indicators

Apparent Losses per service connection per day:	7.60	gallons/connection/day
Real Losses per service connection per day*:	77.59	gallons/connection/day
Real Losses per length of main per day*:	N/A	
Real Losses per service connection per day per psi pressure:	1.19	gallons/connection/day/psi
? Unavoidable Annual Real Losses (UARL):	60.34	million gallons/year
From Above, Real Losses = Current Annual Real Losses (CARL):	278.36	million gallons/year
? Infrastructure Leakage Index (ILI) [CARL/UARL]:	4.61	

* only the most applicable of these two indicators will be calculated

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 92 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Unauthorized consumption
2: Customer retail unit cost (applied to Apparent Losses)
3: Variable production cost (applied to Real Losses)

For more information, click here to see the Grading Matrix worksheet

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Water Audit Report for: City of Livermore Water
Reporting Year: 2012 1/2012 - 12/2012

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

WATER SUPPLIED << Enter grading in column 'E'

Volume from own sources:	10		Million gallons (US)/yr (MG/Yr)	
Master meter error adjustment (enter positive value):	10	0.000	under-registered	MG/Yr
Water imported:	10	2,150.000	MG/Yr	
Water exported:	10	0.000	MG/Yr	
WATER SUPPLIED:		2,150.000	MG/Yr	

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:
Billed metered:	10	1,861.000	MG/Yr		
Billed unmetered:	7	0.000	MG/Yr		
Unbilled metered:	10	0.000	MG/Yr		
Unbilled unmetered:		26.875	MG/Yr	1.25%	

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 1,887.875 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 262.125 MG/Yr

Apparent Losses

				Pcnt:	Value:
Unauthorized consumption:		5.375	MG/Yr	0.25%	

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	10	18.798	MG/Yr	1.00%	
Systematic data handling errors:	10	5.000	MG/Yr		
Apparent Losses:		29.173			

Choose this option to enter a percentage of billed metered consumption. This is NOT a default value

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 232.952 MG/Yr

WATER LOSSES: 262.125 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 289.000 MG/Yr

= Total Water Loss + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	10	146.0	miles	
Number of active AND inactive service connections:	10	9,888		
Connection density:		68	conn./mile main	
Average length of customer service line:	8	20.0	ft	(pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	10	65.0	psi	

COST DATA

Total annual cost of operating water system:	10	$11,298,680	$/Year
Customer retail unit cost (applied to Apparent Losses):	8	$2.39	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	8	$2,901.00	$/Million gallons

PERFORMANCE INDICATORS

Financial Indicators

Non-revenue water as percent by volume of Water Supplied:	13.4%
Non-revenue water as percent by cost of operating system:	7.5%
Annual cost of Apparent Losses:	$93,207
Annual cost of Real Losses:	$675,794

Operational Efficiency Indicators

Apparent Losses per service connection per day:	8.08	gallons/connection/day
Real Losses per service connection per day*:	64.55	gallons/connection/day
Real Losses per length of main per day*:	N/A	
Real Losses per service connection per day per psi pressure:	0.99	gallons/connection/day/psi
Unavoidable Annual Real Losses (UARL):	60.59	million gallons/year
From Above, Real Losses = Current Annual Real Losses (CARL):	232.95	million gallons/year
Infrastructure Leakage Index (ILI) [CARL/UARL]:	3.84	

* only the most applicable of these two indicators will be calculated

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 92 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Unauthorized consumption
2: Customer retail unit cost (applied to Apparent Losses)
3: Variable production cost (applied to Real Losses)

For more information, click here to see the Grading Matrix worksheet

Appendix D-2: AWWA Audit Water Loss 2013

AWWA WLCC Free Water Audit Software: Reporting Worksheet

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Water Audit Report for: City of Livermore Water
Reporting Year: 2013 1/2013 - 12/2013

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

WATER SUPPLIED << Enter grading in column 'E'

Volume from own sources:	?	10		Million gallons (US)/yr (MG/Yr)	
Master meter error adjustment (enter positive value):	?	10	0.000	under-registered	MG/Yr
Water imported:	?	10	2,193.000	MG/Yr	
Water exported:	?	10	0.000	MG/Yr	
WATER SUPPLIED:			2,193.000	MG/Yr	

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:	Value:
Billed metered:	?	10	1,964.000	MG/Yr		
Billed unmetered:	?	7	0.000	MG/Yr		
Unbilled metered:	?	10	0.000	MG/Yr		
Unbilled unmetered:	?		27.413	MG/Yr	1.25%	

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION:	?		1,991.413	MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 201.588 MG/Yr

Apparent Losses

					Pcnt:	Value:
Unauthorized consumption:	?		5.483	MG/Yr	0.25%	

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	?	10	19.838	MG/Yr	1.00%	
Systematic data handling errors:	?	10	5.000	MG/Yr		
Apparent Losses:	?		30.321			

Choose this option to enter a percentage of billed metered consumption. This is NOT a default value

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:	?		171.267	MG/Yr
WATER LOSSES:			201.588	MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER:	?		229.000	MG/Yr

= Total Water Loss + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	?	10	147.0	miles	
Number of active AND inactive service connections:	?	10	9,967		
Connection density:			68	conn./mile main	
Average length of customer service line:	?	8	20.0	ft	(pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	?	10	65.0	psi	

COST DATA

Total annual cost of operating water system:	?	10	$11,688,990	$/Year
Customer retail unit cost (applied to Apparent Losses):	?	8	$2.40	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	?	8	$2,901.00	$/Million gallons

PERFORMANCE INDICATORS

Financial Indicators

Non-revenue water as percent by volume of Water Supplied:	10.4%
Non-revenue water as percent by cost of operating system:	5.8%
Annual cost of Apparent Losses:	$97,280
Annual cost of Real Losses:	$496,844

Operational Efficiency Indicators

Apparent Losses per service connection per day:	8.33	gallons/connection/day
Real Losses per service connection per day*:	47.08	gallons/connection/day
Real Losses per length of main per day*:	N/A	
Real Losses per service connection per day per psi pressure:	0.72	gallons/connection/day/psi
? Unavoidable Annual Real Losses (UARL):	61.06	million gallons/year
From Above, Real Losses = Current Annual Real Losses (CARL):	171.27	million gallons/year
? Infrastructure Leakage Index (ILI) [CARL/UARL]:	2.81	

* only the most applicable of these two indicators will be calculated

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 92 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Unauthorized consumption
2: Customer retail unit cost (applied to Apparent Losses)
3: Variable production cost (applied to Real Losses)

For more information, click here to see the Grading Matrix worksheet

Appendix D-2: AWWA Audit Water Loss 2014

AWWA WLCC Free Water Audit Software: Reporting Worksheet

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Water Audit Report for: City of Livermore Water
Reporting Year: 2014 (1/2014 - 12/2014)

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

WATER SUPPLIED

<< Enter grading in column 'E'

Volume from own sources:	10		Million gallons (US)/yr (MG/Yr)	
Master meter error adjustment (enter positive value):	10	0.000	under-registered	MG/Yr
Water imported:	10	1,650.000	MG/Yr	
Water exported:	10	0.000	MG/Yr	
WATER SUPPLIED:		1,650.000	MG/Yr	

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:
Billed metered:	10	1,555.000	MG/Yr		
Billed unmetered:	7	0.000	MG/Yr		
Unbilled metered:	10	0.000	MG/Yr		
Unbilled unmetered:		20.625	MG/Yr	1.25%	

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 1,575.625 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

74.375 MG/Yr

Apparent Losses

				Pcnt:	Value:
Unauthorized consumption:		4.125	MG/Yr	0.25%	

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	10	15.707	MG/Yr	1.00%	
Systematic data handling errors:	10	5.000	MG/Yr		
Apparent Losses:		24.832			

Choose this option to enter a percentage of billed metered consumption. This is NOT a default value

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 49.543 MG/Yr

WATER LOSSES: 74.375 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 95.000 MG/Yr

= Total Water Loss + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	10	147.0	miles	
Number of active AND inactive service connections:	10	9,999		
Connection density:		68	conn./mile main	
Average length of customer service line:	8	20.0	ft	(pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	10	65.0	psi	

COST DATA

Total annual cost of operating water system:	10	$12,787,575	$/Year
Customer retail unit cost (applied to Apparent Losses):	8	$2.46	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	8	$2,901.00	$/Million gallons

PERFORMANCE INDICATORS

Financial Indicators

Non-revenue water as percent by volume of Water Supplied:	5.8%
Non-revenue water as percent by cost of operating system:	2.2%
Annual cost of Apparent Losses:	$81,661
Annual cost of Real Losses:	$143,724

Operational Efficiency Indicators

Apparent Losses per service connection per day:	6.80	gallons/connection/day
Real Losses per service connection per day*:	13.57	gallons/connection/day
Real Losses per length of main per day*:	N/A	
Real Losses per service connection per day per psi pressure:	0.21	gallons/connection/day/psi
Unavoidable Annual Real Losses (UARL):	61.19	million gallons/year
From Above, Real Losses = Current Annual Real Losses (CARL):	49.54	million gallons/year
Infrastructure Leakage Index (ILI) [CARL/UARL]:	0.81	

* only the most applicable of these two indicators will be calculated

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 92 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Unauthorized consumption
2: Customer retail unit cost (applied to Apparent Losses)
3: Variable production cost (applied to Real Losses)

For more information, click here to see the Grading Matrix worksheet

Appendix D-2: AWWA Audit Water Loss 2015

AWWA WLCC Free Water Audit Software: Reporting Worksheet

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Water Audit Report for: City of Livermore Water
Reporting Year: 2015 (1/2015 - 12/2015)

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

WATER SUPPLIED

<< Enter grading in column 'E'

Volume from own sources:	10		Million gallons (US)/yr (MG/Yr)	
Master meter error adjustment (enter positive value):	10	0.000	under-registered	MG/Yr
Water imported:	10	1,484.000	MG/Yr	
Water exported:	10	0.000	MG/Yr	
WATER SUPPLIED:		1,484.000	MG/Yr	

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:
Billed metered:	10	1,349.000	MG/Yr		
Billed unmetered:	7	0.000	MG/Yr		
Unbilled metered:	10	0.000	MG/Yr		
Unbilled unmetered:		18.550	MG/Yr	1.25%	

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 1,367.550 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

116.450 MG/Yr

Apparent Losses

				Pcnt:	Value:
Unauthorized consumption:		3.710	MG/Yr	0.25%	

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	10	13.626	MG/Yr	1.00%	
Systematic data handling errors:	10	5.000	MG/Yr		
Apparent Losses:		22.336			

Choose this option to enter a percentage of billed metered consumption. This is NOT a default value

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 94.114 MG/Yr

WATER LOSSES: 116.450 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 135.000 MG/Yr

= Total Water Loss + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	10	148.0	miles	
Number of active AND inactive service connections:	10	10,152		
Connection density:		69	conn./mile main	
Average length of customer service line:	8	20.0	ft	(pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	10	65.0	psi	

COST DATA

Total annual cost of operating water system:	10	$13,043,360	$/Year
Customer retail unit cost (applied to Apparent Losses):	8	$2.90	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	8	$2,901.00	$/Million gallons

PERFORMANCE INDICATORS

Financial Indicators

Non-revenue water as percent by volume of Water Supplied:	9.1%
Non-revenue water as percent by cost of operating system:	3.2%
Annual cost of Apparent Losses:	$86,592
Annual cost of Real Losses:	$273,024

Operational Efficiency Indicators

Apparent Losses per service connection per day:	6.03	gallons/connection/day
Real Losses per service connection per day*:	25.40	gallons/connection/day
Real Losses per length of main per day*:	N/A	
Real Losses per service connection per day per psi pressure:	0.39	gallons/connection/day/psi
Unavoidable Annual Real Losses (UARL):	61.97	million gallons/year
From Above, Real Losses = Current Annual Real Losses (CARL):	94.11	million gallons/year
Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.52	

* only the most applicable of these two indicators will be calculated

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 92 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Unauthorized consumption
2: Customer retail unit cost (applied to Apparent Losses)
3: Variable production cost (applied to Real Losses)

For more information, click here to see the Grading Matrix worksheet

CITY OF LIVERMORE
WATER RESOURCES DIVISION

...Curious where everything goes when you flush the toilet?

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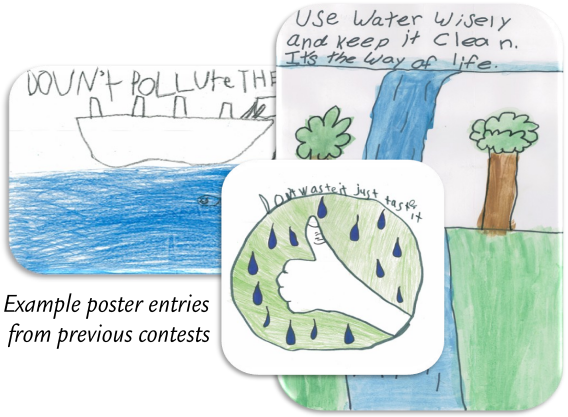

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FREE Water Storm & Wastewater Educational Programs!

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—A modified version of the tour is available for handicap accessibility.

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For questions or to sign up for a classroom presentation or tour, please call or email:

Phone: (925) 960-8100
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PRESENTATION TOPICS

Students will learn about:

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- How individuals affect the health of the San Francisco Bay and waterways
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- The watershed and water cycle
- Sources of pollutants and prevention
- The difference between storm drains and sewers

WASTEWATER

- Wastewater pollutants and treatment
- Which pollutants cannot be removed by wastewater treatment
- How pollutants affect the Bay
- A special kind of recycling — "recycled" water and its uses

POLLUTION PREVENTION

- How some ordinary household products are hazardous to the environment
- How to properly dispose of harmful household products
- Non-hazardous alternatives for some of these products

INFORMATIONAL MATERIALS

Watershed, storm water, wastewater, and pollution prevention materials will be provided to assist students in spreading the word about pollution prevention and ways they can help to protect the environment.

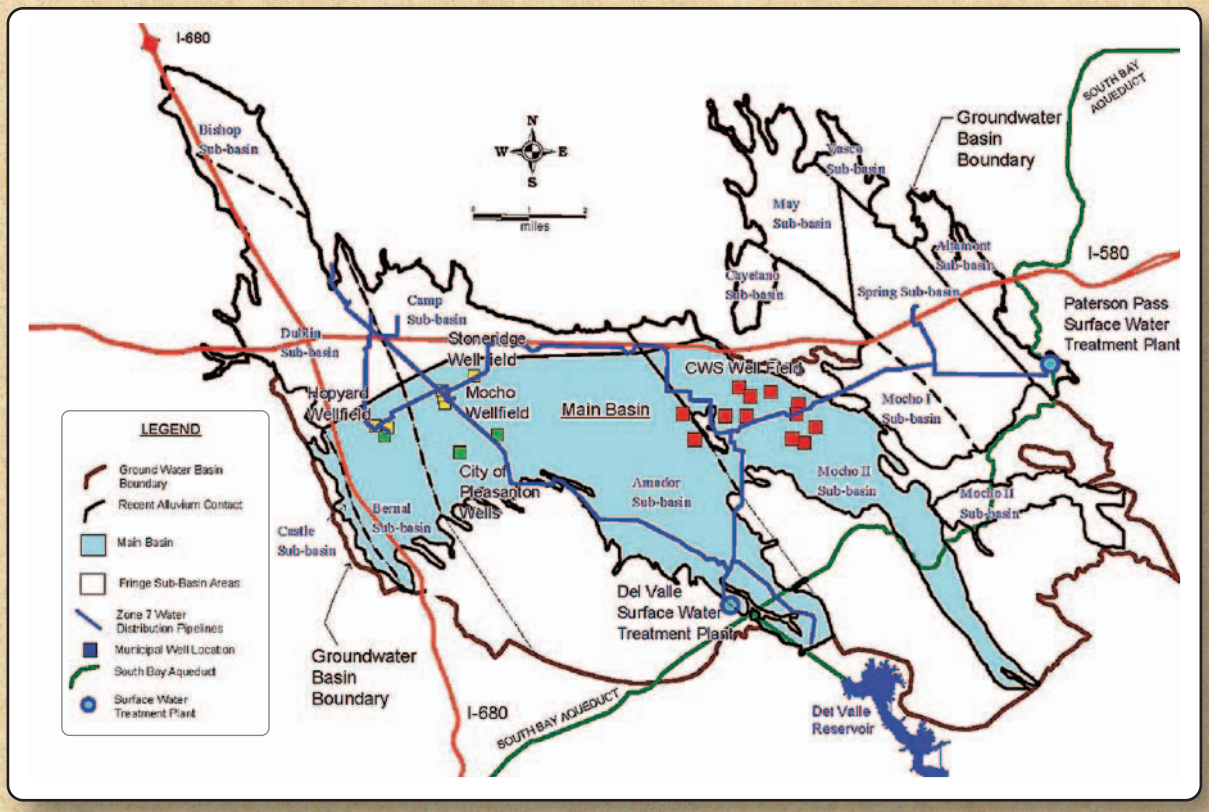
TREATMENT PLANT TOUR: During the two hour tour of the Water Reclamation Plant, students will see the primary, secondary and tertiary wastewater treatment processes, ultraviolet (UV) disinfection system, solids handling area, control room and analytical laboratory. Questions are welcome and handouts will be provided!

Appendix D4: Zone 7 Ground Water Management Plan CD

This item is available on the Zone 7 website and upon request

Groundwater Management Plan

for Livermore-Amador Valley Groundwater Basin



September 2005

Prepared for:

Zone 7 Water Agency

Prepared by:

Jones & Stokes

Groundwater Management Plan for Livermore-Amador Valley Groundwater Basin

Prepared for:

Zone 7 Water Agency
(Alameda County Flood Control and Water Conservation District Zone 7)
100 North Canyons Parkway Livermore, CA 94551

Prepared by:

Jones & Stokes
2600 V Street
Sacramento, CA 95818-1914

September 2005

Jones & Stokes. 2005. G*roundwater Management Plan for Livermore-Amador Valley Groundwater Basin.* September. (J&S 04727.04.) Sacramento, CA. Prepared for Zone 7 Water Agency, Livermore, CA.

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Acronyms and Abbreviations

µg/l	micro grams per liter
1987 GWMP	Statement on Zone 7 Groundwater Management, approved by the Zone 7 Board on August 19, 1987
AB	Assembly Bill
ACEH	Alameda County Environmental Health
ACFCWCD	Alameda County Flood Control and Water Conservation District
af/y	acre-feet per year
afa	acre feet annually
ASR	aquifer storage and recovery
bgs	below ground surface
BMOs	basin management objectives
Board	Alameda County Flood Control and Water Conservation District Zone 7 Board of Directors
BTEX	benzene, toluene, ethylbenzene, xylene
CEQA	California Environmental Quality Act
CIMIS	California Irrigation Management Information System
Corps	U.S. Army Corps of Engineers
CWS	California Water Service Company
Delta	Sacramento–San Joaquin River Delta
DERWA	Dublin–San Ramon Services District–East Bay Municipal Utility District Recycled Water Authority (the JPA that handles the San Ramon Valley Recycled Water Program)
DFG	California Department of Fish and Game
DHS	California Department of Health Services
District Act	California Uncodified Water Act
DSRSD	Dublin–San Ramon Services District
DWR	California Department of Water Resources
DWSAP	Drinking Water Source Assessment and Protection
EC	electrical conductivity
GAMA	Groundwater Ambient Monitoring and Assessment
GMAC	Groundwater Management Advisory Committee
GMP	Groundwater Management Plan (this document)
gpm	gallons per minute
GPP	Groundwater Protection and Projects Section at Zone 7

GWMP	1987 Groundwater Management Policy (Statement on Zone 7 Groundwater Management, adopted August 19, 1987)
LAVWMA	Livermore-Amador Valley Waste Management Agency
LDV	Lake Del Valle
LIA	local implementing agency
LLNL	Lawrence Livermore National Laboratory
LUFT	leaking underground fuel tanks
LWRP	Livermore Water Reclamation Plant
M&I	Municipal and Industrial
MCL	maximum contaminant limit
mg/l	milligrams per liter
MOU	Memorandum of Understanding
MtBE	Methyl tertiary-Butyl Ether (gasoline additive)
NPDES	National Pollutant Discharge Elimination System
O&M	operations and management
PCE	tetrachlorethene
QA/QC	quality assurance/quality control
RMC	Raines, Melton & Carella, Inc.
RWQCB	California Regional Water Quality Control Board—San Francisco Bay Region
SB	Senate Bill
SBA	South Bay Aqueduct
SFPUC	San Francisco Public Utilities Commission
SMMP	Stream Management Master Plan
SMP	Salt Management Plan
State Water Board	State Water Resources Control Board
Supply Reliability Policy	Resolution No. 04-2662, Reliability Policy for Municipal & Industrial Water Supplies, August 18, 2004
SWAMP	State Wide Ambient Monitoring Program
SWP	State Water Project
taf	thousand acre-feet
TAG	technical advisory group
TBA	tertiary-butyl alcohol
TCE	trichloroethene
TDS	total dissolved solids
TPHd	TPH from diesel
TPHg	total petroleum hydrocarbon from gasoline
TVG	Tri-Valley Retail Group
TVRGIS User Group	Tri-Valley Regional Geographic Information Systems User Group

USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VA	Veterans Administration
VOCs	volatile organic compounds
Water Quality Policy	Resolution No. 03-2494, Water Quality Policy for Potable and Non-potable Water, April 16, 2003
WMP	Wastewater Management Plan
WR	Water Rights
WRE	Water Resources Engineering Section at Zone 7
Z7sim	Zone 7's supply and demand simulation model
Zone 7	Zone 7 Water Agency

Executive Summary

The Zone 7 Groundwater Management Plan (GMP) is written to compile and document all of Zone 7's current groundwater management policies and programs in a single document and to satisfy the requirements set forth in the California Groundwater Management Planning Act (Water Code Sections 10750, et seq.). The GMP documents the starting point for local and surrounding agencies that are affiliated with Zone 7 to frame current groundwater management efforts and will be considered in developing future amendments to groundwater management policies and procedures.

Zone 7 works closely with the three tri-valley cities (Livermore, Pleasanton and Dublin), with the County, with agricultural land users, with its four major retail agencies and with other local agencies and groups to manage local groundwater resources. The Tri-Valley Water Retailers Group (TWRG) is a newly formed group, comprised of senior staff representing the four major retail agencies: Dublin–San Ramon Services District, City of Pleasanton, City of Livermore and California Water Service Company. Similarly, the Committee of Valley Water Retailers (CoVWR), composed of two elected officials or members of the governing body of each of the four retail water supply agencies. The TWRG and CoVWR serve as forums for the retailers to discuss regional retail issues. For decades, Zone 7 has actively solicited the cooperation and input of many groups and agencies within the area to most effectively manage the groundwater and to maintain beneficial uses for all residents of the tri-valley.

The GMP provides a detailed description of Zone 7's groundwater management practices throughout the Livermore-Amador Valley Groundwater Basin (DWR Basin No. 2-10) and a description of the regulatory setting that involves a GMP. In addition, this GMP contains the Zone 7 management plan elements, which involve the GMP goals, basin management objectives (BMOs), and stakeholder involvement. A large portion of this document addresses monitoring programs and protocols related to groundwater and conjunctive use of regional water supplies, ranging from groundwater level monitoring to recharge monitoring to groundwater quality monitoring to climatological monitoring to surface water flow and surface water quality monitoring.

Overall, this GMP characterizes the existing groundwater management efforts of Zone 7 to support existing and future beneficial uses of groundwater in the Livermore Amador Groundwater Basin. There are no new programs, policies or procedures in this Plan. Zone 7 considers this to be a compilation of existing policies and procedures as well as to serve as a living document which will provide background to future changes as new policies and procedures are

considered by Zone 7 working collaboratively with area stakeholders such as its four retail agencies.

The Board of Directors adopted a resolution of intent to draft and adopt a GMP pursuant to section 10753.2 of the California Water Code at its Regular Meeting held on August 17, 2005. Adoption of this resolution authorized staff to proceed with final preparation and distribution of this draft Groundwater Management Plan. Zone 7 tentatively plans to finalize the document and adopt the final GMP following a public hearing at its regular board meeting of September 21, 2005.

Table ES-1 provides a road map to this document, clarifying where each Groundwater Management Planning Act requirement (in relation to California Water Code sections) is addressed:

Table ES-1. Groundwater Management Planning Act Requirements

Water Code Reference	Requirement	Location in GMP
§10753.7(a)(3)	Description of groundwater area to be managed	
	• Map	Figures 1-1 and 1-2
	• Description	Overview located in Chapter 1; also see Section 3.1.1.
§10753.7(a)(1)	Basin Management Objectives	Section 1.3
§10753.7(a)(2)	Plan to involve other agencies and the public	Section 4.3
§10753.7(a)(4)	Monitoring protocols	Sections 3.2, 3.3, and 4.4
§10753.8	Plan components	
	• Control of saline water intrusion	Sections 4.6.5 and 5.1.2
	• Identification and management of wellhead protection areas and recharge areas	Sections 3.3, 5.1.4.2, and 5.1.4.4
	• Regulation of the migration of contaminated groundwater	Sections 3.5 and 5.1.4.5
	• Administration of a well abandonment and well destruction program	Section 5.1.4.2
	• Mitigation of conditions of overdraft	Sections 3.2, 3.3, 4.6.2, and 4.6.3
	• Replenishment of groundwater extracted by water producers	Sections 3.3, 4.5.7, 4.6.2, and 4.6.3
	• Monitoring of groundwater levels and storage	Section 4.5.2
	• Facilitating conjunctive use operations	Section 5.1.3
	• Identification of well construction policies	Section 5.1.4.2
	• Construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects	Section 5.1.4
	• Development of relationships with state and federal regulatory agencies	Section 4.4

Water Code Reference	Requirement	Location in GMP
	• Review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination	Section 4.5
§10753.2	Details of Public Hearing(s) and Plan Adoption	Section 5.3

Chapter 1
Introduction

Groundwater is one of California's most valuable natural resources and requires proper protection and management in order to maintain its beneficial uses. The California Department of Water Resources (DWR) defines groundwater management as the planned and coordinated monitoring, operation, and administration of a groundwater basin with the long-term goal of sustainability of the resources. In an average water supply year, groundwater meets about 30% of California's urban and agriculture demand and during drought years, 40% or more.[1] In 1995, approximately 43% of Californians used groundwater for at least a portion of their public supply needs.[2]

Many agencies managing groundwater resources lack the appropriate management and coordination between local agencies to properly manage their local groundwater basin. In the years to come, demand on groundwater is expected to increase significantly as the population in California is projected to reach nearly 46 million. Many agencies throughout California are unable to maintain beneficial uses of groundwater, with problems such as overdraft and poor water quality arising because of lack of management and/or coordination between agencies. The California Groundwater Management Planning Act (Water Code Sections 10750, *et seq.*) was adopted with the intent of encouraging local agencies to work cooperatively to manage groundwater resources within their jurisdictions. This Groundwater Management Plan is a compendium of Zone 7 Water Agency's existing groundwater management policies and programs, documenting Zone 7's compliance with the requirements of the Groundwater Management Planning Act.

1.1 Alameda County Flood Control and Water Conservation District

The Alameda County Flood Control and Water Conservation District (ACFCWCD) was created in 1949 by the state legislature through passage of Act 205 of the California Uncodified Water Act (District Act). ACFCWCD was formed to provide control of flood and stormwater and to conserve and manage local water for beneficial uses. ACFCWCD is vested with the power to store

[1] California Department of Water Resources 2003.
[2] Solley et al. 1998.

water in surface or underground reservoirs within or outside of the district for the common benefit of the district; to conserve and reclaim water for present and future use within the district; to appropriate and acquire water and water rights; and to import water into the district. ACFCWCD is further authorized by statute to prevent interference with or diminution of, or to declare rights in the natural flow of any stream or surface or subterranean supply of waters used or useful for any purpose of the district and to prevent contamination, pollution or otherwise rendering unfit for beneficial use the surface or subsurface water used or useful in the district. ACFCWCD is also authorized to levy replenishment assessments upon the production of groundwater from all water-producing facilities, whether public or private, in the district.

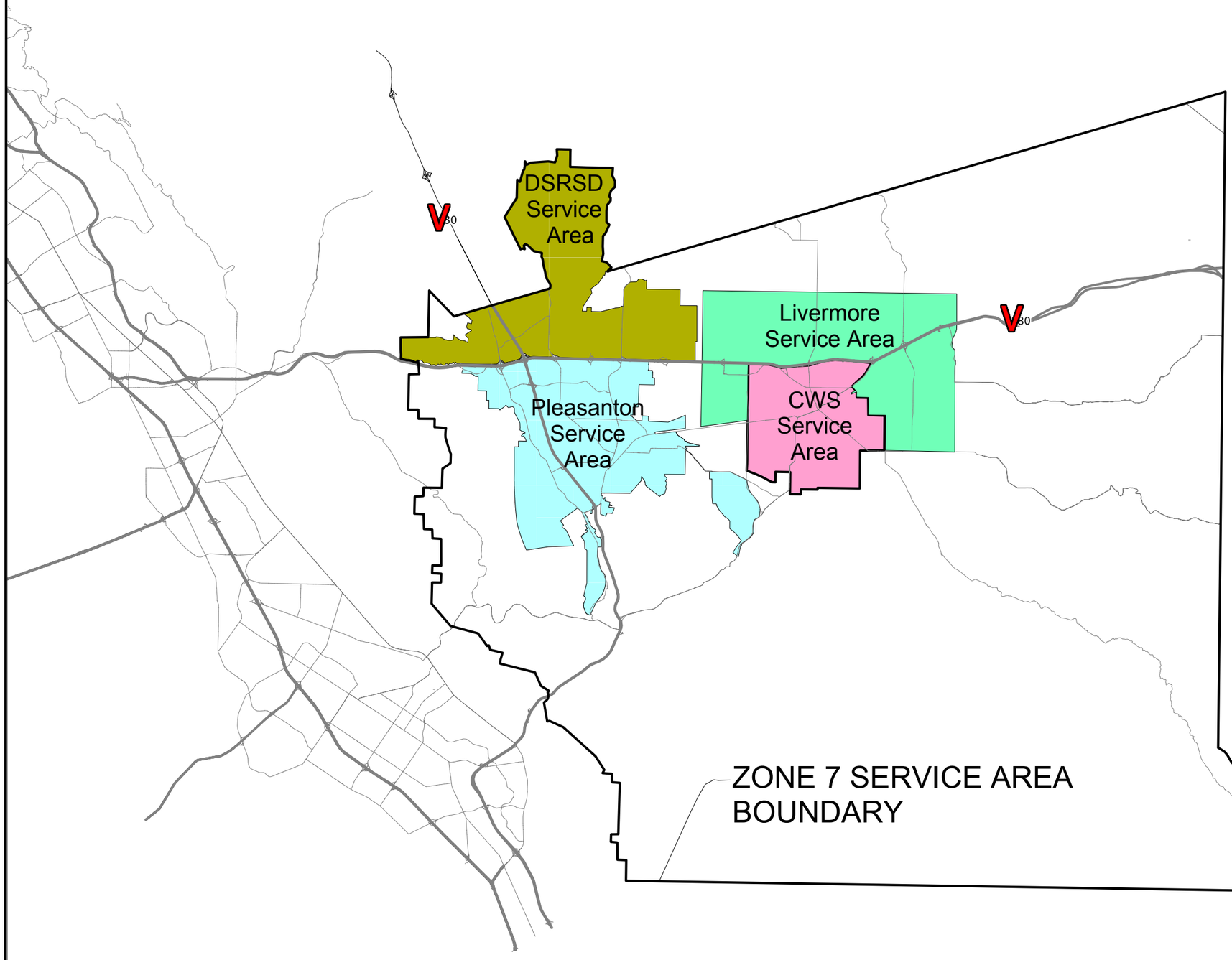
1.2 Zone 7 Water Agency

ACFCWCD comprises 10 active zones, of which Zone 7 covers the eastern portion of Alameda County, which includes the cities of Dublin, Pleasanton, and Livermore. Pursuant to Section 36 of the District Act, Zone 7 of the ACFCWCD (Zone 7 Water Agency, or Zone 7) was established in 1957 to address regional and water supply issues. Zone 7 is governed by an elected seven-member board of directors who, with the passage of Assembly Bill (AB) 1125 in 2003, have full authority and autonomy to govern matters solely affecting Zone 7, independent of the Alameda County Board of Supervisors who govern the other nine zones of the ACFCWCD.

As one of the 29 state water contractors, Zone 7 is the water wholesaler for the Tri-Valley Area (Dublin, Pleasanton, and Livermore; also known as the Livermore-Amador Valley), as well as the area's flood control agency. Zone 7 imports surface water from the State Water Project (SWP) through the South Bay Aqueduct (SBA) for treatment, storage, and recharge. Zone 7 Water Agency supplies treated drinking water to four water retail agencies: Dublin San Ramon Services District, the City of Pleasanton, the City of Livermore, and California Water Service Company (see Figure 1-1). These water retailers deliver water to homes in their specific service areas. The four retail agencies have formed both the Committee of Valley Water Retailers (CoVWR) and, on the staff level, the Tri-Valley Water Retailers Group (TWRG). The water retailers, in turn, deliver water to homes in their specific service areas. Zone 7 also supplies untreated water for local industry and agriculture. Thus, Zone 7 indirectly serves water to an area with a population of approximately 190,000 people.

One of Zone 7 Water Agency's main missions is to serve as guardian of the groundwater in the Tri-Valley (Livermore, Dublin, Pleasanton) area; this role is recognized by the California Regional Water Quality Control Board—San Francisco Bay Region (RWQCB). For more than thirty years, Zone 7 has managed regional water supplies, including DWR Basin 2-10, in a complex, interrelated program that defines groundwater extraction goals for major regional pumpers. Zone 7 also operates local flood control and recharge facilities to optimize instream recharge. In addition, Zone 7 works closely with DWR, which

Figure 1-1



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survey feet

ZONE 7 WATER AGENCY
100 NORTH CANYONS PKWY, LIVERMORE, CA 94551

DRAWN BY: Gerald Gates
DESIGNED BY: Gerald Gates
CHECKED BY:
APPROVED BY:

WATER RESOURCES
ZONE 7 SERVICE AREA BOUNDARY

SCALE: 1" = 6000'
DATE: 18 FEBRUARY 2002
FILE NO.:

manages Lake Del Valle and dam to augment imported water supplies with local watershed runoff.

In summary, Zone 7 Water Agency imports surface water via the SWP's SBA, stores local runoff in Lake Del Valle, maintains flood control, maintains and operates recharge facilities in the area, manages both surface and groundwater supplies to maximize conjunctive use of the supplies, treats regional drinking water, and wholesales potable water to local retail water supply agencies, who in turn retail it to residents and other customers.

1.3 Zone 7's Groundwater Management

Zone 7 manages both surface and groundwater supplies to maximize conjunctive use and reliability of water supplies. Zone 7 has actively managed DWR Groundwater Basin Number 2-10, the Livermore-Amador Valley Groundwater Basin (underlying the Tri-Valley, as shown in DWR Bulletin118 Update 2003; see Figure 1-2, for more than 30 years. Groundwater typically makes up 20–25% of the water supplied by Zone 7 to its retail water supply agencies; in addition, two of the four retailers independently operate supply wells, so total groundwater makes up a higher percentage of the total regional supply (30%).

Over the 30 years of regional groundwater management, Zone 7 Water Agency has developed numerous interrelated programs to monitor, assess, and manage the basin. These programs are outlined below. The various existing programs and resolutions, taken together, satisfy the intent of the Groundwater Management Planning Act.

This document serves to clarify the various components of Zone 7's existing groundwater management and conjunctive use programs and policies, incorporate them by reference in this new Groundwater Management Plan, and to serve as the framework for discussing future changes to groundwater policy and procedures. Any such changes would be developed in a collaborative effort with the Tri-Valley Water Retailers Group (TWRG) and its member agencies.

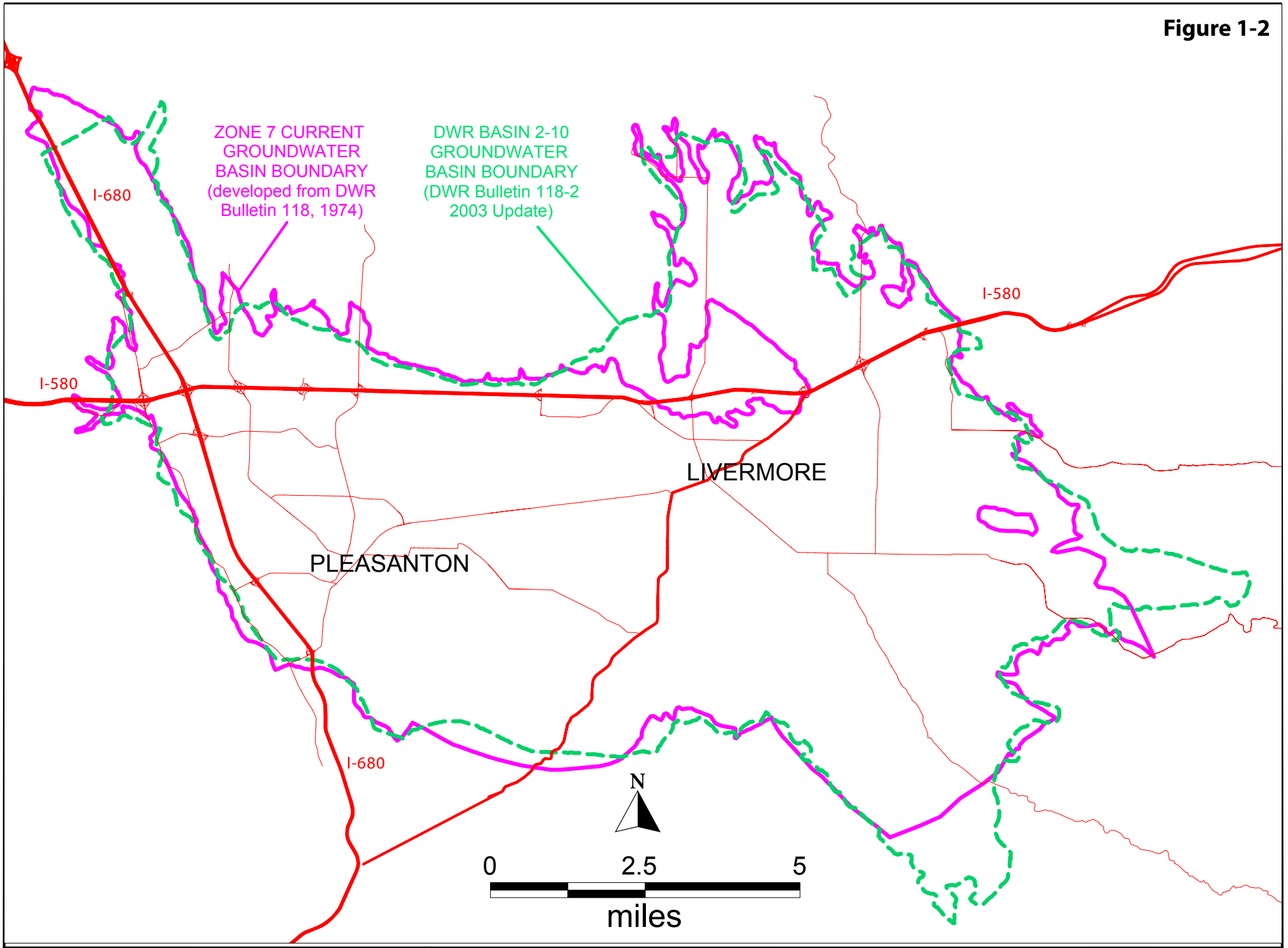
1.4 Groundwater Basin Management Objectives

The primary groundwater Basin Management Objectives (BMOs) of Zone 7 provide for the control and conservation of waters for beneficial future uses, the conjunctive use of groundwater and surface water, the importation of additional surface water, and the use of the groundwater basin to provide water storage for imported surface water used during drought periods.

The primary BMOs implemented by Zone 7 include:

- Monitoring and maintenance of groundwater levels through conjunctive use and management of regional water supplies:
  - maintain the balance between the combination of natural and artificial recharge and withdrawal,
  - maintain water levels high enough to provide emergency reserves adequate for worst credible drought and unplanned import outages,
  - store surface water supplies in the groundwater basin for use during emergencies and drought-related shortages,
  - allow for gravel mining by optimizing groundwater levels to allow for gravel mining while maintaining adequate reserves for municipal supply, and
  - prevent overdraft that would otherwise occur from too much pumping (maintain total pumping at or below sustainable/safe yields);
- Groundwater quality—monitoring and management, as well as tracking and addressing any degradation:
  - protect and enhance the quality of the groundwater,
  - halt degradation from salt buildup,
  - reduce flow of poor quality shallow groundwater into deep aquifers,
  - offset impacts of water recycling and wastewater disposal through integrated Salt Management Plan (SMP),
  - recharge with relatively low total dissolved solids (TDS)/hardness imported or storm/local surface water,
  - manage quality on a regional basis as measured at municipal wells (such as those operated by both the retail water agencies and Zone 7), protecting and improving groundwater quality within the Main Basin (as described in Chapter 3), and
  - minimize threats of groundwater pollution through groundwater protection;
- Monitor and prevent inelastic land surface subsidence from occurring as a result of groundwater withdrawals:
  - protect the storage capacity of aquifer,
  - maintain water levels above historic lows,
  - monitor and minimize any identified impacts of gravel mining on the upper aquifer by encouraging the implementation of mitigation measures by mining companies, and
  - monitor benchmark elevations and shift pumping to other wells if inelastic subsidence is detected;

Figure 1-2



ZONE 7 WATER AGENCY 100 N. CANYONS PARKWAY LIVERMORE CA 94551	DRAWN BY: Gerald Gates DESIGNED BY: Gerald Gates CHECKED BY: APPROVED BY:	WATER RESOURCES LIVERMORE-AMADOR VALLEY GROUNDWATER BASIN BOUNDARIES	SCALE: 1" = 2 MILES DATE: 22 JULY 2005 FILE NO.: MAPINFO\GEODATA\HYDROBASINS\DWR BASINS.WOR	

- Monitor and manage changes in surface flow and surface quality, especially as they affect groundwater levels or quality, or are caused by groundwater pumping in the basin:
  - Augment stream flow through artificial recharge releases to improve groundwater supply and quality, and
  - monitor and protect recharge capacity of local arroyos.

Following is a list of some key Zone 7 objectives and policies that are included in Appendix E and which articulate objectives to:

- provide sustainable water supply,
- provide sustainable water quality,
- minimize operational costs, and
- manage the groundwater basin.

In addition, Zone 7 has adopted policies related to protection of the groundwater basin through wastewater management. These include:

- Wastewater Management Policy (Resolution 1137), and
- prohibition against use of septic tanks for new development zoned for commercial or industrial use (Resolution 1165).

Zone 7's Board of Directors adopted the Water Quality Policy (Resolution 03-2494), as well as the Salt Management Plan, which includes:

- protect and enhance the quality of groundwater,
- offset current and future salt loading,
- maintain or improve groundwater mineral quality,
- provide more comparable delivered water quality to retailers, and
- utilize Water Operations Plan to achieve these goals.

Furthermore, Zone 7's Board of Directors adopted the Reliability Policy for Municipal and Industrial (M&I) Water Supplies (Resolution 04-2662), which includes:

- Meet 100% of its treated water customers' water supply needs in accordance with Zone 7's most current retail contracts.
- Provide sufficient treated water production capacity and infrastructure to meet at least 75% of Zone 7's maximum daily M&I contractual demands should any single one of Zone 7's major supply, production, or transmission facilities experience an extended, unplanned outage.

Zone 7 has also had a long-standing policy of managing the groundwater basin to maximize conjunctive use, reliability and storage opportunities. The "Statement on Zone 7 Groundwater Management" was adopted on August 19, 1987 and is incorporated herein by reference.

The Salt Management Plan (SMP), also incorporated herein by reference (see Executive Summary in Appendix D), was originally prepared in fulfillment of Master Water Recycling Permit Order No. 93-159 Provision D.1.c.ii and General Water Recycling Permit Order No. 96-011 Provision D.4. This document not only provides a comprehensive and effective approach for administering, regulating and encouraging water recycling in the Livermore-Amador Valley, it also provides guidance to the area's agencies in ways to address the historical trend of increasing TDS in the main groundwater basin. It was developed by Zone 7 staff and consultants in partnership with a technical advisory group (TAG) composed of local water retailers, and a Zone 7 citizens committee—the Groundwater Management Advisory Committee (GMAC). The RWQCB accepted the SMP in October 2004.

All Zone 7 objectives include a basic philosophy of working cooperatively with the public, the Tri-Valley Retail Group and the four individual retail agencies (Dublin San Ramon Services District [DSRSD], City of Livermore, City of Pleasanton and the California Water Service Company [CWS]). These objectives include:

- to develop information, policies, and procedures for the effective long-term management of the groundwater basin;
- to inform the public and relevant governmental agencies of the Zone's water supply potential and management policies and to solicit their input and cooperation; and
- to work cooperatively with the gravel mining industry to implement the Chain of Lakes reclamation plan.

1.5 Purpose of Zone 7's GMP

The purpose of Zone 7's Groundwater Management Plan (GMP) is to document and compile in one place all of Zone 7's existing programs and policies that together serve as the basis for successfully manageing groundwater resources and to develop a framework for considering future amendments to policy and procedures collaboratively with other basin users such as the Tri-Valley Retail Group and its member agencies, DSRSD, CWS, Pleasanton and Livermore. Simply put, this GMP revises the Statement on Zone 7 Groundwater Management, approved by the Zone 7 Board on August 19, 1987 (1987 GWMP), incorporating by reference all current related programs and policies at Zone 7 (especially the SMP) and demonstrating overall program compliance with the requirements of the Groundwater Management Planning Act.

1.6 GMP Components

In developing GMP components, the California Department of Water Resources (DWR) recognizes that the goal of a GMP is to ensure a long-term, sustainable, reliable, high-quality groundwater supply. Of the required and recommended

components found in Appendix C of DWR Bulletin 118 Update, this Zone 7 GMP includes:

1. Control of saline water intrusion—although saline water intrusion, per se, is not an issue for Zone 7 (which is inland from bays and oceans), the level of salt and minerals in the groundwater basin is of significant concern to Zone 7. The following address salt management and are incorporated by reference:

    a. Salt Management Plan, approved by the California Regional Water Quality Control Board—San Francisco Bay Region, October 2004;

    b. Salt Management Program Implementation Plan (Zone 7 Resolution 99-2068);

    c. Master Water Recycling Permit (RWQCB–San Francisco Bay Region Order No. 93-159); and

    d. Wastewater Management Plan for the Unsewered, Unincorporated Area of Alameda Creek Watershed Above Niles and Related Policies (Resolutions 1037 and 1165).

2. Identification and management of wellhead protection areas throughout the whole basin and specific requirements for recharge areas. The following address wellhead protection and are incorporated by reference:

    a. Drinking Water Source Assessment and Protection (DWSAP) Plan for each Zone 7 well, as submitted to the California Department of Health Services (DHS) Division of Drinking Water;

    b. groundwater protection ordinance program;

    c. commercial septic tank program and related policy statements and resolutions, including Wastewater Management Plan for the Unsewered, Unincorporated Area of Alameda Creek Watershed Above Niles (WMP);

    d. mapping of known contamination plumes;

    e. referral program which includes ongoing reviews and coordination of proposed development projects through lead local land use and planning agencies (cities and county);

    f. sub-watershed–based monitoring of all recharge areas; and

    g. protection of key stream recharge reaches (i.e., creek cleanups, monitoring, kiosks).

3. Regulation of the migration of contaminated groundwater. The following programs have been developed to address contaminated groundwater:

    a. toxic site surveillance program, assisting lead agencies in groundwater cleanup efforts;

    b. Geotracker program (active participation in development and public outreach elements with Lawrence Livermore National Laboratory (LLNL) and GMAC which assisted Zone 7 in its development of the SMP); and

c. Groundwater Ambient Monitoring and Assessment (GAMA) program (active participation in development and public outreach elements with LLNL and GMAC).

4. Administration of a well-abandonment and well-destruction program:

   a. Well Ordinance Administration (Well Ordinance adopted 1973, County Ordinance No. 73-68; similar City Well Ordinances)—addresses well construction/destruction, soil borings, etc., in compliance with state standards and additional requirements as required (case-by-case basis);

   b. agreements with cities to administer City Well Ordinances; and

   c. identification of abandoned wells through development review process and subsequent issuance of requests for destruction.

5. Mitigation of conditions of overdraft through management, recharge and development of alternate water supplies. The following program components outline Zone 7's approach that has been developed over the years to mitigate historical conditions of overdraft:

   a. initial contractual groundwater pumping quotas established to manage retailer pumping/extractions from the main groundwater basin;

   b. manage Zone 7 pumping so groundwater levels do not fall below historic lows to recover from overdraft conditions;

   c. regional recycled water programs (DSRSD–EBMUD Recycled Water Authority [DERWA] and Livermore);

   d. chain of lakes/mining fees;

   e. SWP imports to reduce demand on groundwater supplies;

   f. use of SWP imports in temporary off-stream recharge facility in the 1960's and '70's (Las Positas Recharge Pit);

   g. instream natural and artificial recharge, latter using imported SWP water, allowing conjunctive use and storage of imported supplies in groundwater basin;

   h. expansion of existing recharge facilities to include off-stream storage and recharge (future Chain of Lakes);

   i. management of local runoff (Lake Del Valle);

   j. water conservation;

   k. maintain records of basin-wide groundwater pumping to guard against future overdraft conditions; and

   l. maintain records of groundwater basin safe/sustainable yield.

6. Replenishment of groundwater extracted by water producers. The following conjunctive use program components outline Zone 7's approach that has been developed over the years to replenish historically depleted groundwater

supplies. Note that Zone 7 has artificially recharged approximately 66,000 acre-feet more than has been extracted:

a. SWP imports,

b. instream recharge (natural and artificial),

c. annual hydrologic inventory monitoring in preparation of following year's water supply operations planning documents,

d. chain of lakes recharge program (future), and

e. groundwater model.

7. Monitoring of groundwater levels and storage (Appendix A). The following monitoring program components outline Zone 7's approach that has been developed over the years to track regional groundwater levels and storage:

   a. continuous monitoring of water levels in certain key wells;

   b. monthly and semiannual well monitoring programs;

   c. climatological monitoring program;

   d. recharge monitoring (both natural and artificial);

   e. metering and data management of groundwater pumping quantities (municipal);

   f. groundwater model and associated databases; and

   g. complete hydrologic inventory of basin supply, use, and storage.

8. Facilitating conjunctive use operations. The following conjunctive use program components outline Zone 7's approach that has been developed over the years to replenish historically depleted groundwater supplies:

   a. multi-year conjunctive use modeling for sustainable water supply report;

   b. water supply forecast to determine possible conjunctive use opportunities;

   c. integrated water supply operations plan to coordinate conjunctive use;

   d. artificial stream recharge program;

   e. flood control management such as Lake del Valle flood releases;

   f. expanded artificial recharge with chain of lakes (future);

   g. reporting of water supply operations and planning;

   h. stream recharge management/reporting (e.g., monthly groundwater supply and utilization report)—using imported water delivered from SWP;

   i. annual water balance/hydrologic inventory/water levels;

   j. monitor new supply well plans through well permit program;

   k. meet with local agency planners periodically; and

l. attend/participate in: agricultural committee meetings, Fisheries Restoration workgroups, Watershed Advisory Committee meetings.

9. Identification of well construction policies:

   a. well ordinance administration—addresses well construction/destruction, soil borings, etc., in compliance with state standards and additional requirements as required (case-by-case basis).

10. Construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects. The following programs have been developed to address contaminated groundwater remediation projects:

    a. monitoring through GPP and providing input/guidance to lead agencies, as necessary;

    b. water quality policy for potable and nonpotable water (Resolution 03-2494);

    c. groundwater demineralization project;

    d. well master plan;

    e. construction of production wells;

    f. construction of aquifer storage and recovery (ASR) wells for evaluation and potential future use;

    g. construction and/or replacement of monitoring wells, as needed;

    h. chain of lakes recharge facilities (future);

    i. investigating feasibility of recycled water storage facility at future chain of lakes site.

11. Development of relationships with state and federal regulatory agencies:

    a. DHS (regulating drinking water and municipal wells);

    b. DWR (state water project contract administrator; contributed to Bulletin 118-2 “Evaluation of Livermore Valley Groundwater Basin 1974; cooperative Well Sampling; joint management of local CIMIS station to enhance weather monitoring and improve water conservation efforts);

    c. RWQCB (lead agency for National Pollutant Discharge Elimination System [NPDES], recycled water, and basin planning; close cooperation over toxic spill sites; contributed to basin plan development; review all NPDES monitoring reports for mining discharges and wastewater dischargers; cooperate in State Wide Ambient Monitoring Program [SWAMP]);

    d. Alameda County environmental health (local implementing agency [LIA] for leaking underground fuel tanks [LUFT] sites where groundwater has been affected; septic tank ordinance update);

e. California Department of Fish and Game (DFG)/U.S. Fish and Wildlife Service (USFWS)—for recharge program operations and facilities;

f. U.S. Army Corps of Engineers (Corps)—for diversion and creek projects; and

g. Lawrence Livermore National Laboratory (LLNL)—for site cleanups, groundwater monitoring and scientific/technical support.

12. Review of land use plans and coordination with land use planning agencies to assess activities that create a reasonable risk of groundwater contamination and to assess groundwater use:

    a. DWSAP for each of Zone 7's wells;

    b. ongoing reviews and coordination through local land use and planning agencies (cities and county);

    c. development referrals; site review reporting, mapping and analysis;

    d. California Environmental Quality Act (CEQA) reviews (for new projects and developments);

    e. well permit and commercial septic tank programs;

    f. tracking and quantifying all groundwater pumping; and

    g. mapping, monitoring, and analyzing all recycled water use.

Chapter 2
Background

During the last few years, California has provided substantial funds to local agencies to enhance local groundwater management programs. One example is Proposition 13 (Water Bond 2000), which allocated $2 billion for groundwater feasibility studies and construction of groundwater recharge facilities. Additionally, the Local Groundwater Management Assistance Act of 2000 (AB 303) resulted in $15 million for groundwater studies and data collection in an effort to improve the quality of groundwater basins. AB 303 authorized grants to help local agencies develop better groundwater management strategies. AB 599 (2001) required the State Water Resources Control Board (State Water Board), in cooperation with other agencies, to develop a comprehensive monitoring program capable of assessing groundwater quality. These bills are significant with respect to groundwater because much of California's new development will rely on groundwater to satisfy its water needs.

Finally, the most relevant legislation passed in 2002 was Senate Bill (SB) 1938. SB 1938 was enacted to provide financial incentives to local agencies for improved groundwater management. The legislation modified the Water Code to require specific elements be included in a GMP for an agency to be eligible for such incentives, including possible award of AB 303 and Proposition 50 grant funds.

Zone 7 has a long history of groundwater basin management and a long history of cooperation with local and state agencies in the implementation of its basin management practices. This report is intended to compile the elements of the existing groundwater management programs and policies in a standardized format similar to other basin plans prepared in California. This Groundwater Management Plan (GMP) simply expands the goal stated in 1987 of "informing the public and relevant governmental agencies of the Zone's supply potential and management policies, and to solicit their input and cooperation" (1987 Statement On Groundwater Management).

2.1 History of Previous Area Investigations

In the early 1900's groundwater provided the majority of agricultural and domestic water demands of the Livermore Valley. Then, the Spring Valley Water Company collected hydrologic data on rainfall, streamflow, and groundwater levels. Spring Valley Water Company also pumped from wells in

Pleasanton and exported the water to provide a water supply for San Francisco. In 1930, San Francisco purchased Spring Valley Water Company. Early reports provide excellent descriptions of the sources and flow of groundwater. Early monitoring and development of the groundwater resources by Spring Valley helped early investigators understand the general structure of the groundwater basin. A key finding of these early studies was that the groundwater supply was not limitless but was actually less than about 20,000 acre-feet per year (af/yr). These early studies also concluded that the majority of supply was derived from stream recharge through the very gravelly streambeds that cross the valley floor. Based on the results of this study, San Francisco decided to look to the Tuolumne River and constructed the Hetch Hetchy system to provide a much larger supply for San Francisco. San Francisco purchased Spring Valley Water Company in 1930 and continues to pump small amounts of water from wells in Pleasanton to provide water for the Castlewood area west of Pleasanton.

In the mid-1940s, significant overdraft in the Livermore Valley resulted in a call from local farmers to the state. DWR's predecessor (Department of Public Works, Division of Water Resources) undertook studies of this area in addition to other similar basin conditions statewide. Report No. 3 was published in 1952 entitled, *Groundwater Basins in California*. Report No. 3 identified 223 alluvium-filled valleys that were believed to be basins with usable groundwater in storage. This report was a major stepping-stone for groundwater investigations in California.[1]

In the 1950s groundwater and small stream diversions were the only source of water supply to the Livermore Valley. The area experienced severe floods in the winter of 1951 and 1955 with excessive water, only to be followed by dry summers with falling groundwater levels. To address these issues of water supply and flood control, the voters of the Livermore Valley formed Zone 7 with powers to manage surface and groundwater resources.

Several cooperative DWR and Zone 7 studies in the 1960s and 1970s established the scientific foundations for the Zone 7 Groundwater Management Plan. In 1963 DWR published Bulletin No. 13, which compiled the results of the Alameda County investigations. In 1966 DWR published the geology appendix to 118-2, and in 1974 DWR published Bulletin No. 118-2, "An Evaluation of Ground Water Resources: Livermore and Sunol Valleys" in cooperation with Zone 7. In the following years, Zone 7 built upon the framework of Bulletin No. 118-2 and the DWR groundwater model. The current hydrologic inventory 1974–2004 is merely an extension of the lessons learned from this early work. The report concluded, "The results of operations-economics studies recommended will be of significant use to local government in making decisions on conservation, development and use of the county's water resources."

In 1975, DWR published its first version of Bulletin 118, *California's Ground Water*, a document that provided state-wide observations and findings. The original Bulletin 118 summarized available information from DWR, the U.S. Geological Survey (USGS), and other agencies dealing with individual

[1] California Department of Water Resources 2003.

groundwater basins. In contrast to basin-specific studies such as DWR Bulletin 118-2, the purpose of Bulletin 118 was to help decision-makers regarding the protection, use, and management of the state's groundwater resources. Subsequent joint investigations with USGS expanded on the monitoring programs. Zone 7 developed an interim groundwater basin management plan in the late 1970s.

Despite California's heavy reliance on groundwater, there was much basic information missing for many groundwater basins. In particular, data necessary to provide for both the protection and optimal beneficial use were not available for many areas. The California Legislature mandated in the Budget Act of 1999 that DWR update Bulletin 118. In response, DWR prepared Bulletin 118 Update 2003, which included important missing regulatory information, updates and data omitted from the original Bulletin 118.[2]

In the Livermore Valley, Zone 7 has built on the work of DWR and has continued to measure and compile important records and knowledge essential to good groundwater basin management. Prior to the 1960s, groundwater had been the only supply of water to meet urban and agricultural demands in the Livermore Valley. ACFCWC District Zone 7 (Zone 7 Water Agency) was created in 1957 by public vote. The intent of the formation was to resolve the water supply and flooding needs of the valley and in part to manage the groundwater basin and reverse the then-existing overdraft condition of the groundwater basin. In 1962 the first SWP water was imported into the watershed, and Zone 7 began providing wholesale treated water and water for groundwater basin recharge via stream recharge and off-site percolation ponds.

Currently, groundwater provides about one third of the urban and agricultural demands of the valley. Zone 7 Water Agency manages the groundwater basin and, through an active conjunctive use program, manages both the supply and demand of water from the basin and the long-term water quality of the basin. Several retail water supply agencies continue to pump water from the basin to supply about 12% of the urban demands, and Zone 7 provides the remaining wholesale supply to meet the full urban and agricultural demands of the valley. Zone 7's supply comes from local runoff captured by the Del Valle dam and imported surface water. The Zone 7 supplies are either used directly or artificially recharged into the groundwater basin for storage and subsequently pumped via Zone 7's production wells.

In the late 1980's Zone 7 developed a Statement on Groundwater Management that was approved by the Zone 7 Board on August 19 1987. See Appendix E.

In the 1990's Zone 7 started a decade-long investigation of basin water quality with the goal of halting the slow degradation of groundwater quality evidenced by rising hardness and TDS levels in the main basin. This resulted in the development of an SMP. The related implementation plan was adopted by the Zone 7 Board in August 1999, expanded in the full SMP in early 2004 and approved by the RWQCB in September 2004. The Groundwater Basin is

[2] California Department of Water Resources 2003.

managed as part of a basin-wide integrated water management process. The goals are implemented primarily through the Zone 7 Water Operations Plan through an adaptive management process that integrates groundwater basin management with the conjunctive use of surface water and other available water resources.

2.2 Zone 7 Water Supply and Management

Zone 7 provides water resources management services to about 190,000 residents of the Livermore Valley. Zone 7 serves a large population as a water wholesaler of potable water to its retail contractors for municipal and industrial (M&I) use. In addition, Zone 7 supplies untreated water for agriculture, golf courses, and other nonpotable uses. The four major retail water supply agencies to which Zone 7 supplies treated water are the City of Pleasanton, the DSRSD, the City of Livermore, and California Water Service Company. Zone 7's water supply comes from three sources: (1) imported surface water from the SWP, (2) local runoff into Lake Del Valle, and (3) surface water stored in the groundwater basin.[3] Several retailers also pump water from the groundwater basin and have been doing so for at least four decades. Zone 7 provides groundwater basin management services to ensure that the historical pumping can continue as a reliable supply for the retailers.

Currently, Zone 7 has a contract with DWR for water deliveries through the SWP facilities. The SWP facilities include imported water from Lake Oroville via the Sacramento River, Sacramento–San Joaquin River Delta (Delta), and the SBA. In 2004, Zone 7 had an annual maximum allocation of 80,619 af/yr. Zone 7 has also contracted with Byron-Bethany Irrigation District and DWR for an additional 2,000–5,000 af/yr through SWP facilities. In addition, Zone 7 has also purchased water storage rights (65 thousand acre-feet [taf]) in the Semitropic Water Storage District groundwater basin located in south-central California, near Bakersfield, which will allow up to 3,250 afa minimum pumpback. Zone 7 is also negotiating for future purchased water storage rights for drought year protection with Cawelo Water District (up to 10,000 afa minimum pumpback).

Zone 7 shares the water rights of local runoff from Lake Del Valle with Alameda County Water District. The average local runoff into Lake Del Valle is about 22,000 af/yr. The average take of Lake Del Valle runoff by Zone 7 is approximately 8,000 af/yr, and is expected to rise to 9,300 af/yr with projected increases in local demand.[4]

The Zone 7 local groundwater basin has a storage capacity of over 240,000 acre-feet, with an annual average natural recharge into the basin of about 13,000 acre-feet. One method of artificial recharge used by Zone 7 is to release water into various streambeds (with extremely high percolation rates) managed by Zone 7.

[3] Salt Management Plan 2004a.

[4] Salt Management Plan 2004a; water can be captured as storage only to the extent that storage is available. Additional water can be captured if there is a place to use the water ("direct use"). The increase is based on a projected increase in demands through "direct use" rather than any change in storage capacity.

The amount of release is carefully monitored and various flows along the streams are measured to quantify the condition of the streambeds and the amount of water being introduced into the groundwater basin. A future recharge project will add the Chain of Lakes system, which are old mining pits where surface water can be stored and recharged. For more information about natural and artificial recharge into the groundwater basin, refer to Section 3.3, Groundwater Recharge.

2.3 Overview of Zone 7's Basin Management

Zone 7 manages the groundwater basin as part of a basin wide–watershed wide integrated water management process. The short-term goals are conveyed to the participants primarily through the Zone 7 Water Operations Plan and through an adaptive management process that integrates groundwater basin management with the conjunctive use of surface water and other available water resources. However, there are six key documents that provide the framework for Zone 7's groundwater management policies and programs, in general, and specifically for the preparation of such operational planning documents. These four documents are included in Appendix E and are incorporated by reference:

1. *Statement on Zone 7 Groundwater Management*, August 19, 1987 (1987 GWMP);
2. Resolution No. 1037, Adoption of *Wastewater Management Plan for the Unsewered, Unincorporated Area of Alameda Creek Watershed Above Niles*, May 19, 1982;
3. Resolution No. 1165, *Prohibition on Use of Septic Tanks in New Commercial and Industrial Developments*, August 28, 1985;
4. Resolution No. 03-2494, *Water Quality Policy for Potable and Non-Potable Water*, April 16, 2003 (Water Quality Policy);
5. Resolution No. 04-2662, *Reliability Policy for Municipal & Industrial Water Supplies*, August 18, 2004 (Supply Reliability Policy); and
6. *Salt Management Plan*, May 2004—note that the SMP Executive Summary is included in the appendix for reference; this document is fairly lengthy and a complete copy of the SMP can be reviewed upon request at the Zone 7 office.

The various programs that make up the overall basin management program of Zone 7 are divided into four focus categories: water supply objectives, water quality objectives, operational goals and groundwater protection objectives.

Water Supply Objectives:

- To maintain the balance between the combination of natural and artificial recharge and withdrawal (1987 GWMP).

- To maintain water levels high enough to provide emergency reserves adequate for the worst credible drought (1987 GWMP).
- Meet 100% of Zone 7's treated water customers' water supply needs, including existing and projected demands for the next 20 years, as set forth in Zone 7's 2005 Urban Water Management Plan (Supply Reliability Policy).
- Provide sufficient treated water production capacity and infrastructure to meet at least 75% of the maximum daily contractual demands with any one major supply, production or transmission facility experience an extended unplanned outage (Supply Reliability Policy).

Water Quality Objectives:

- Zone 7 shall continue to meet all state and federal primary standards for potable water deliveries (Water Quality Policy).
- Zone 7 shall meet all state and federal secondary (aesthetic) standards and, within technical and fiscal constraints, proactively reduce hardness levels to "moderately hard (75 to 150 milligrams per liter [mg/l]).
- Protect, enhance and improve the quality of the groundwater, including mineral quality (1987 GWMP; Water Quality Policy).
- Offset current and future salt loading (2004 SMP).

Operational Goals:

- Pump groundwater for municipal use in a way that, to the extent feasible, provides comparable delivered potable water quality to all retailers in the Zone 7 service area (2004 SMP).
- Utilize the Water Operations Plan to achieve water supply goals (2004 SMP).
- Inform the public and relevant governmental agencies of the Zone's supply potential and management policies, and to solicit their input and cooperation (1987 GWMP)
- Minimize water and operational costs through an adaptive management plan (2004 SMP).

Groundwater Protection Objectives:

- Require adequate well seals between surface level and well completion zone through imposition of appropriate well permitting conditions.
- Require destruction of abandoned wells to eliminate potential to act as a conduit for contaminant migration.

- Prevent build-up of nitrates through implementation of Wastewater Management Plan for the Unsewered, Unincorporated Area of Alameda Creek Watershed Above Niles.
- Identify high risk contamination cases and coordinate with lead oversight agency to require timely assessments and cleanups.

Note that *1987 GWMP* refers to the Board-approved 1987 Statement on Zone 7 Groundwater Management and *2004 SMP* refers to the Board-approved and RWQCB-accepted SMP.

Chapter 3
Water Resources

3.1 Description of Zone 7 Groundwater Basin

3.1.1 Overview

The Livermore Valley, an east-west trending, inland structural basin located in northeastern Alameda County, is surrounded primarily by north-south trending faults and hills of the Diablo Range. The valley covers about 42,000 acres, extends approximately 14 miles in an east-west direction and varies from 3 to 6 miles in width. It is separated from San Francisco Bay by several northwesterly trending ridges of the California Coast Ranges, including the Pleasanton Ridge. The valley floor slopes gently west and southwest from an elevation of approximately 700 feet above sea level in the east to approximately 320 feet above sea level in the southwest.

The Livermore Valley Watershed covers more than 400 square miles (250,000 acres) and extends north almost to Mt Diablo and south almost to Mt Hamilton. Six principal streams flow into and/or through the valley, and join in the southeast where the Arroyo de Laguna flows out of the valley. The other five arroyos, namely the Arroyo Valle, Arroyo Mocho, Arroyo Las Positas, Tassajara Creek, and Alamo Creek, are essentially tributaries to the Arroyo de Laguna. Average precipitation rates range from 16 inches per year at the valley floor to over 20 inches per year in the southeast and northwest portions of the valley.

The Livermore-Amador Valley Groundwater Basin is located in the heart of the Livermore Valley and watershed and extends south into the hills south of Pleasanton and Livermore. It includes 65,000 acres occupied by both the Livermore Valley (42,000 acres) and the Livermore uplands (23,000 acres). The Basin is designated DWR 2-10 in Bulletin 118 and includes the areas occupied by both Livermore Valley and Livermore uplands (see Figure 3-1).

The Main Basin is bounded on the:

- west by northwesterly trending ridges of the California Coast Ranges (including Pleasanton Ridge) and the Calaveras fault,
- north by the Tassajara Uplands and the steeply dipping east west trending Tassajara Formation,

- east by the Greenville Fault and by the marine formations exposed in the Altamont Hills, and
- south by the Verona Fault and Livermore Uplands and the steeper Livermore Highlands.

The Main Basin (described in more detail in the following subsections) is a portion of the Livermore-Amador Groundwater Basin (DWR 2-10). The Main Basin covers 17,000 acres and contains the highest yielding aquifers and best quality water within the DWR Basin 2-10.

3.1.2 Hydrogeology

Structural uplift of the entire Coast Ranges occurred during the late middle Pliocene and Pleistocene, causing extensive folding and faulting of the region. The Livermore Valley, a structural valley, formed by a faulted asymmetric syncline, was created as a result of downwarping of the Miocene-Pliocene sandstones and conglomerates between the western bordering Calaveras Fault and the eastern bordering Greenville Fault. Continued deposition, uplift, and faulting have led to the current Livermore Valley stratigraphy.[1]

The valley is partially filled with Pleistocene-Holocene age (recent alluvium) alluvial fan, stream and lake deposits, which range in thickness from a few feet along the margins to nearly 400 (and possibly 800) feet in the west-central portion. The alluvium consists of unconsolidated gravel, sand, silt, and clay. The southern region of the Livermore Valley, the most important groundwater recharge area, consists mainly of sand and gravel that was deposited by the ancestral and present Arroyo Valle and Arroyo Mocho.

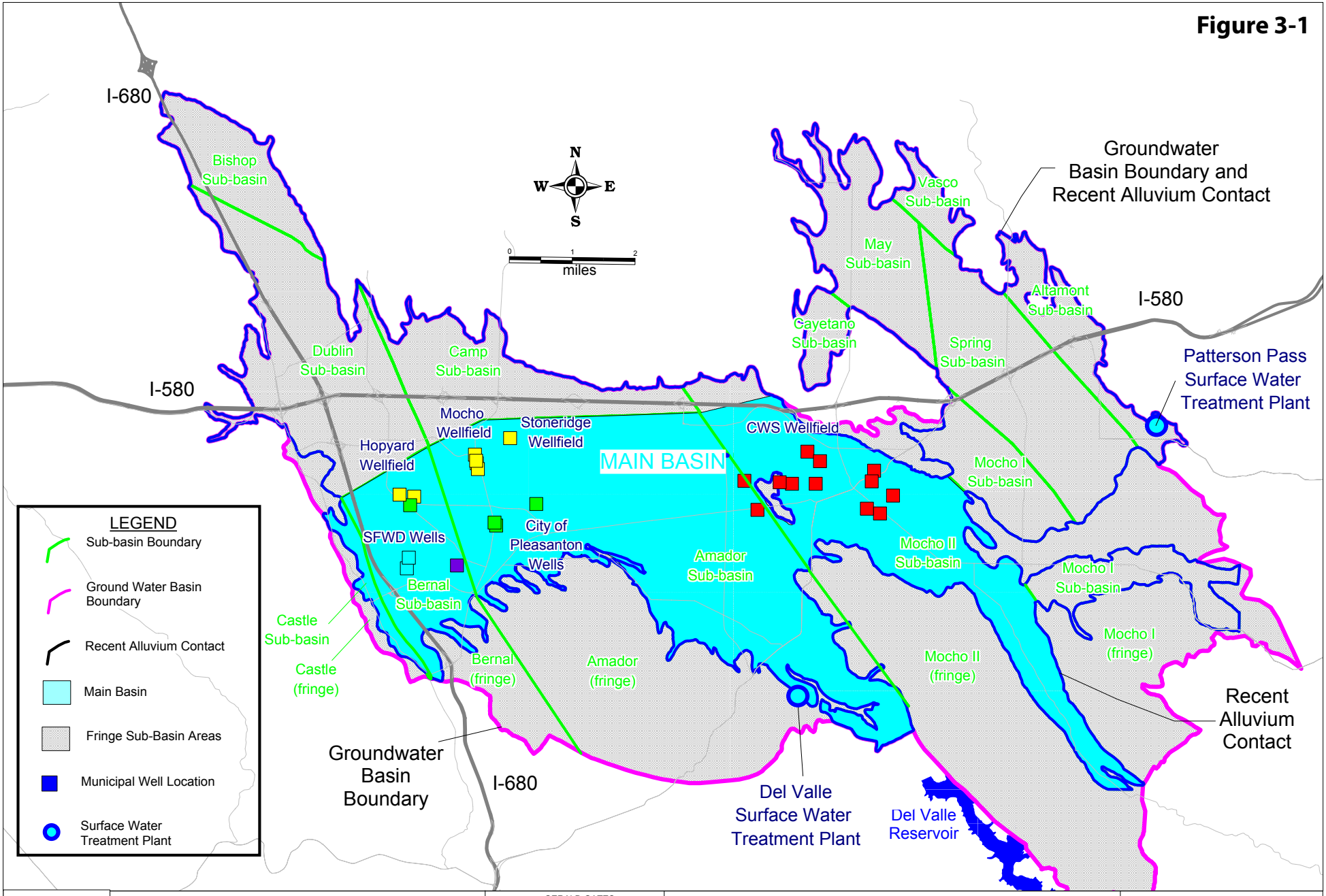
The eastern and northern regions of the valley contain thinner deposits and consist of alternating layers of gravel, sand, silt, and clay that are laterally discontinuous and resulted from the deposition of smaller streams. The western region of the valley has extensive gravel layers alternating with thick clay beds totaling approximately 400 feet in thickness. The alternation of sand/gravel layers and silt/clay layers form the basic aquifers for the area.[2]

In general, multiple aquifers are recognized in the alluvium of the Livermore Valley. The alluvium increases in thickness from east to west across the basin and thins both north and south at its boundaries. The alluvium also thickens from north to south to the central portion of the groundwater basin and then thins from the center toward the south. Although the upper portions of the alluvium appear to be very thick and continuous in the middle of the basin, the deeper aquifers are often discontinuous and/or poorly interconnected.

The Livermore Formation consists of beds of clayey gravels and sands, silt, and clay that are unconsolidated to semi-consolidated and estimated to be 4,000 feet

[1] California Department of Water Resources 1964b, 1974; Crane 1988; Hall 1958.
[2] California Department of Water Resources 1966, 1974, and Zone 7.

Figure 3-1



ZONE 7 WATER AGENCY
100 NORTH CANYONS PKWY, LIVERMORE, CA 94551

DRAWN	GERALD GATES TOM ROOZE
DESIGNED	GERALD GATES STEWART SMITH
CHECKED	DAVID LUNN
APPROVED	DAVID LUNN

GROUNDWATER BASIN MAP

Groundwater Annual Monitoring Report

SCALE	1" = 2 Miles
DATE	October 31, 2003
FILE NO.	E:\monitor\GM\2004wy\Annual\Figures

thick in the southern and western portion of the basin.[3] These sediments display lower yields in the upland areas. Groundwater from this formation is sodium bicarbonate in nature and of moderately good quality. Minor amounts of groundwater are believed to move along the strike of the beds to the northwest and enter the Main Basin (see detailed description below) at the southern portions of the Bernal and Amador sub-basins.

The Tassajara and Green Valley Formations, located in uplands north of the valley, are roughly Pliocene in age and were deposited under both brackish and freshwater conditions. They basically consist of sandstone, tuffaceous sandstone/siltstone, conglomerate, shale, and limestone. Water movement from these formations to the Main Basin is precluded by either structural alteration where beds dip away from the general groundwater flow of the valley or by non-water bearing stringers (tuff and clay particles). The near-vertical structural dip of the Tassajara and Green Valley formations is believed to prevent the commingling of waters among these formations and the alluvium, essentially cutting this water off from the groundwater basin.[4] Groundwater from these formations is sodium bicarbonate in nature and of moderately good quality.

3.1.3 Aquifer Zones

Within the groundwater basin, there is often a difference in water level fluctuations and water quality with depth. This difference is attributable to the existence of multiple aquifers that are poorly interconnected. Although multiple aquifers have been identified, wells have been classified generally as being in one of two aquifer zones, primarily to simplify the description of this complex basin:

- **Upper Aquifer Zone**—The upper aquifer zone consists of alluvial materials, including primarily sandy gravel and sandy clayey gravels. These gravels are usually encountered underneath the surficial clays (typically 20 to 40 feet below ground surface [bgs]) to about 80–150 feet bgs. This aquifer extends throughout the majority of the groundwater basin. Groundwater in this zone is generally unconfined. In the center portion of the groundwater basin, the upper aquifer is underlain by a relatively continuous, silty clay aquiclude up to 50 feet thick which is underlain by the Lower Aquifer Zone. In the eastern portion of the groundwater basin, the Livermore Formation underlies the upper aquifer. In the Zone 7 groundwater model, the Upper Aquifer Zone is referred to as Layer 1.
- **Lower Aquifer Zone**—Because of a lack of detailed hydrostratigraphic evaluation, all materials encountered below the clay aquiclude/aquitard in the center portion of the basin have been known collectively as the Lower Aquifer Zone. The aquifer materials consist of semi-confined to confined, leaky, coarse-grained, water-bearing units interbedded with relatively impermeable, fine-grained units. Based on localized hydrostratigraphic evaluation in the vicinity of Zone 7 well fields and as additional geologic

[3] California Department of Water Resources 1964b.
[4] California Department of Water Resources 1966, 1974; Zone 7 files.

information and hydrologic data become available, it is possible that this zone can be further subdivided into more laterally extensive, distinct hydrostratigraphic units. Currently the Zone 7 groundwater model groups the entire lower aquifer zone into Layer 3, with the aquiclude/aquitard zone as Layer 2.

3.1.4 Main Basin

The groundwater basin has been divided into two major parts based on importance. For the past 20 years the term *Main Basin* has been used for that portion of the groundwater basin covering the 17,000 acres that contain the highest-yielding aquifers and best quality water within the Livermore-Amador Valley Groundwater Basin. The less important area is called the fringe basin. The Main Basin is located in the central and southwestern portion of the groundwater basin. This area has a much larger capacity than the surrounding areas to store and convey groundwater, particularly in the lower zone. Since the early 1900s, this area has been very significant for the local groundwater supply. Between about 1980 and 1988, this area was called the central basin. Since 1988, the central basin, except for the eastern portion of Livermore, has been referred to as the Main Basin (see Figure 3-1).

Several subsurface barriers to lateral groundwater movement form the boundaries of the Main Basin. Observations and investigations by Zone 7 and others continue to confirm the existence of these groundwater barriers. Faults are the major structural features known to have marked effects on the movement of groundwater in this region. Faults in this region tend to act as barriers to the lateral movement of groundwater.

The Main Basin is comprised of the Castle, Bernal, Amador and Mocho II Sub-Basins and is bounded on the:

- north by the Parks Boundary (which was initially considered to be fault-related, but may actually be a depositional boundary between recent alluvium and older material);
- east by shallow bedrock separating Mocho I from Mocho II sub-basins;
- south by shallow bedrock and the Livermore Uplands; and
- west by the Coastal Ranges and the Calaveras Fault.

Particular Sub-Basin boundaries and features are shown on Figure 3-1 and described in more detail, below.

The portion of the groundwater basin that is outside the Main Basin is called the fringe basin. The majority of the connectivity between the fringe and Main Basins is through the Upper Aquifer Zone. Subsurface inflow from the Lower Aquifer Zone is considered negligible.

3.1.5 Main Basin Sub-Basins

3.1.5.1 Castle Sub-Basin

The Castle sub-basin is a thin strip that extends along the southwestern portion of the Main Basin. It is bounded to the south, west, and north by marine sediments of the Coastal Range and to the east by the Calaveras Fault. While usually included in the Main Basin, this sub-basin is not used for municipal groundwater production. Only small production wells are located in this area. Water occurs in both shallow valley fill sediments and the Livermore Formation. The water from the Livermore Formation is of a sodium bicarbonate nature. This sub-basin functions as a westward extension of the Bernal sub-basin.

3.1.5.2 Bernal Sub-Basin

The Bernal sub-basin is located in the southwestern portion of the groundwater basin and is bounded to the west by branches of the Calaveras Fault, to the east by the Pleasanton Fault, to the north by the Parks Boundary, and to the south in part by contact with non-water-bearing formations and partly by contact with the Verona Fault. Both unconfined and confined aquifers exist in the water-bearing sediments. Waters from the northern and central portions of this sub-basin are of fair to excellent quality. However, much of the upper aquifer water has high TDS exceeding 600 mg/l. The water from the northern and southern portions of the sub-basin are of sodium bicarbonate nature, while the central portion is of the magnesium bicarbonate type and the western and south-central portions are of calcium bicarbonate character.

The area overlying the Bernal sub-basin is the point of convergence for all major streams that drain the Livermore Valley. The area overlying the sub-basin is subsequently drained by the Arroyo de la Laguna. Like surface water, groundwater also historically converges in this sub-basin, which allows for the mixing of the dominant cations of sodium, magnesium, and calcium.

The Quaternary alluvium is estimated to have a thickness of at least 800 feet in this sub-basin and overlies the Livermore Formation. Well production (primarily by Zone 7) in this sub-basin currently ranges up to 3,500 gallons per minute (gpm), and specific capacities range from 3 to 260 gpm per foot of drawdown. Other basin pumpers include the City of Pleasanton (although much of City of Pleasanton's pumping has shifted to the West Amador sub-basin, discussed below), San Francisco PUC (supplying the Castlewood area) and the Alameda County Fairgrounds. Historically, this Sub-Basin was overdrafted but has since been partially refilled and is used less for regional supply due to Zone 7's groundwater management efforts, including the importation of surface water from the SWP.

3.1.5.3 Amador Sub-Basin

The Amador sub-basin is located in the west central portion of the groundwater basin and is bounded to the west by the Pleasanton Fault, to the east by the Livermore Fault, to the north by a permeability barrier of inter-fingering of alluvial deposits and partly by the Parks Boundary, and to the south by the drainage divide and partly by contact with non-water-bearing formations. This sub-basin is host to the majority of high production wells and has both unconfined and confined aquifers. Waters from this sub-basin are of good to excellent quality, characterized by sodium bicarbonate, magnesium bicarbonate, and calcium bicarbonate with few instances of elevated levels of boron and nitrate.

This sub-basin of Quaternary alluvium has a maximum thickness of approximately 800 feet and overlies the Livermore Formation, which may be up to 4,000 feet thick. Well production (primarily by Zone 7 and the City of Pleasanton) in this sub-basin ranges from 42 to 2,820 gpm and specific capacities of 1.1 to 217 gpm per foot of drawdown.

3.1.5.4 Mocho II Sub-Basin

The Mocho sub-basin has been divided into two distinct areas, Mocho I and Mocho II, by a line of very low hills thought to be exposures of the Livermore Formation. The basins are further distinguished by a change in aquifer characteristics from a sodium bicarbonate (Mocho I) to a magnesium bicarbonate water type (Mocho II).

Of the entire Mocho sub-basin, only a portion of the Mocho II sub-basin is in the Main Basin. This portion of the Mocho II sub-basin is located in the east central portion of the groundwater basin and is bounded to the west by the Livermore Fault, to the east by thinning young alluvium and exposed Livermore Formation, to the north by the Tassajara Formation that is not hydraulically connected to the sub-basin and the Parks Boundary, and to the south by the Livermore Uplands and contact with non-water-bearing marine formations.

Both unconfined and confined aquifers exist in the water-bearing sediments. Waters from this sub-basin are of fair to excellent quality sodium bicarbonate (Mocho I) and magnesium bicarbonate character (Mocho II), with some instances of elevated boron and sodium ions.

The recent alluvium ranges in thickness from approximately 10–50 feet in Mocho I and up to 150 feet in Mocho II. In both sub-basins the alluvium overlies the Livermore Formation, both conformably and unconformably. The silty/clayey overburden is mostly missing. The Upper Aquifer is exposed at the surface in much of the area. Mocho I and Mocho II appear to be hydraulically connected only in the shallow alluvial deposits. Well production in this sub-basin (primarily by CWS) ranges up to 950 gpm with specific capacities of 2 to 50 gpm per foot of drawdown.

3.2 Groundwater Levels and Storage

Historically, much of the Main Basin experienced artesian conditions. In the late 1800s, the pre-development groundwater levels in the basin created a gradient, causing groundwater to flow from east to west and naturally exit the basin as surface flow in the Arroyo de la Laguna. In the early and mid-1900s, groundwater began to be extracted in appreciable quantities, causing groundwater levels to drop throughout the basin. As a result, groundwater levels dropped below the point where groundwater would naturally rise into Arroyo de la Laguna and exit the basin via streamflow.[5] Water levels continued to drop in the Main Basin through the 1960s. The trend began to reverse in 1962 when Zone 7 Water Agency began importing water from the State Water Project (SWP) and later in the 1960s when Zone 7 began capturing and storing local runoff in Lake Del Valle. The first imports were utilized in an off-stream recharge facility called Las Positas Pit. This facility was operated from 1962 until the late 1970s and again, briefly, in the 1980s.

Thus, after experiencing historical groundwater lows in the 1960s (see Figure 3-2), Main Basin water levels stabilized in the late 1960s and started to rise in the early 1970s with the advent of regional groundwater management programs. Groundwater levels approached the "historic low" again during the 1977 and 1987–1992 droughts, although 1992 water levels in many monitoring wells were significantly below the previous historic lows of the 1960s.

Today groundwater in both aquifer zones generally follows a westerly flow pattern, like the surface water streams, along the structural central axis of the valley toward municipal pumping centers. The majority of subsurface inflow, however, occurs across the northern boundaries of the Main Basin—in particular the Dublin and western Camp sub-basins—and flows in a southerly direction.[6] These sources of groundwater commingle in the Bernal and Amador sub-basins and have a general flow toward municipal or gravel mining company groundwater pumping wells or pits.[7]

The relatively low hydraulic conductivity of the aquitard layers impedes the vertical movement of groundwater between the Upper and Lower Aquifer Zones. The exchange between the two aquifers, as indicated by the groundwater monitoring data, varies depending upon the thickness and permeability of the separating aquitard and the potential gradient. Even though the movement of water and salts from the upper aquifer to the lower aquifer is slow, it is still the major sources of recharge to the lower aquifer.[8]

The Main Basin has a storage capacity of more than 250,000 acre-feet. The Main Basin was full in early 1900 and full again in 1983. Groundwater has been withdrawn down to historical low storage in 1962 and 1966 with an estimated remaining storage of 128,000 acre-feet. (Groundwater levels approached the

[5] Zone 7 2004b.
[6] Zone 7 2004b.
[7] Zone 7 2004b.
[8] Zone 7 2004b.

"historic low" in some parts of the basin during the droughts of 1977 and 1987–1992.) In 1987, Zone 7 adopted a Groundwater Management Policy (see Appendix E) that included maintaining groundwater levels high enough to provide emergency reserves adequate for the worst credible drought. For planning purposes, Zone 7 maintains this reserve above historical lows. The remaining half of the groundwater (that portion above historical lows) is actively managed for supply reliability and is used for water supply storage, and recovery during times of drought or emergency.[9] In 2002, as part of the development of Zone 7's Well Master Plan, Zone 7 further defined "historic lows" as a piezometric surface used to manage groundwater levels.

3.3 Groundwater Recharge

Management of groundwater recharge involves both quantity and quality aspects. The annual average natural recharge into the groundwater basin is approximately 13,400 af/y. Zone 7 artificially recharges the basin with additional surface water supplies by releasing water into the Arroyo Mocho and Arroyo Valle. The existing artificial recharge capacity ranges from 12,300 af/y to 20,000 af/y. In years when the streams are dry, there is more capacity. Adding artificial recharge essentially doubles the natural yield of the basin.[10] In addition, Zone 7 actively monitors the quality of water at many of the key stream recharge areas to ensure the protection of the quality of both surface and ground water.

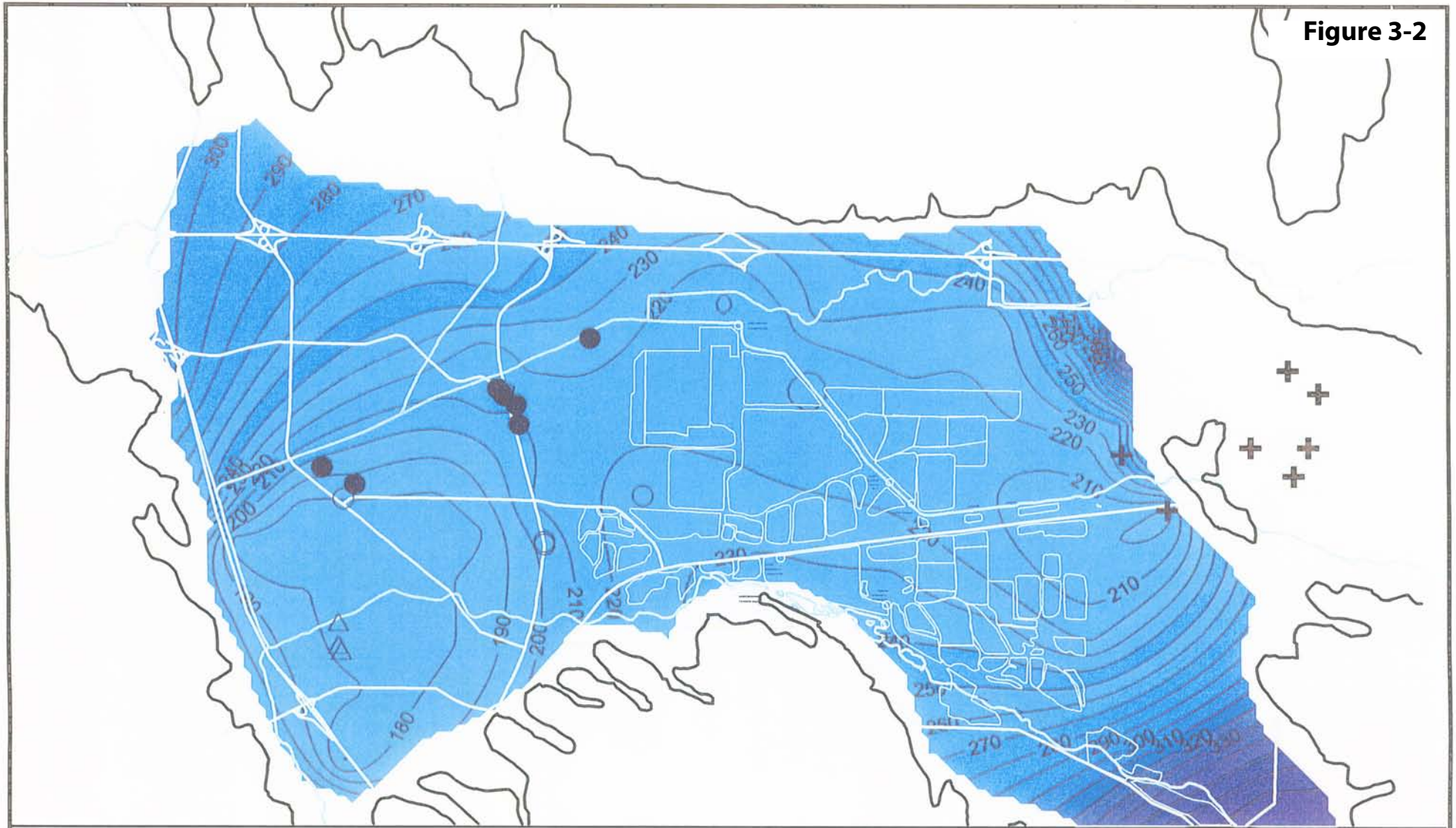
Groundwater recharge from streams has the following components:

- natural recharge—rain runoff into streams,
- artificial recharge—releases from the SBA or Lake Del Valle into recharge streams, and
- gravel mining recharge—recharge from gravel mining pits or discharges into the streams.

Figure 3-3 shows the relative groundwater recharge capacity associated with each major stream in the watershed and the associated water quality (represented as concentration of TDS in mg/l). Note that the dashed lines represent areas of rising groundwater rather than areas of stream recharge. TDS in the local surface water varies significantly throughout the watershed from approximately 350 mg/l TDS to more than 1,000 mg/l. The highest quality surface water recharging the basin occurs through Arroyo Mocho and Arroyo Valle where the TDS is generally less than 500 mg/l. The poorest quality surface water recharging the basin has a TDS of approximately 1,000 mg/l and occurs in Arroyo Las Positas. On average, given 1997 land use conditions, approximately 2,700 af/y of natural recharge occurs via Arroyo Mocho, 1,200 af/y via Arroyo Las Positas, and 2,700 af/y via Arroyo Valle.

[9] Zone 7 2004b.
[10] Salt Management Plan 2004a.

Figure 3-2



LEGEND

- Zone 7 wells
- City of Pleasanton wells
- City of San Francisco wells
- Cal-Water wells

N

0 feet 5280 feet 10560 feet 15840 feet

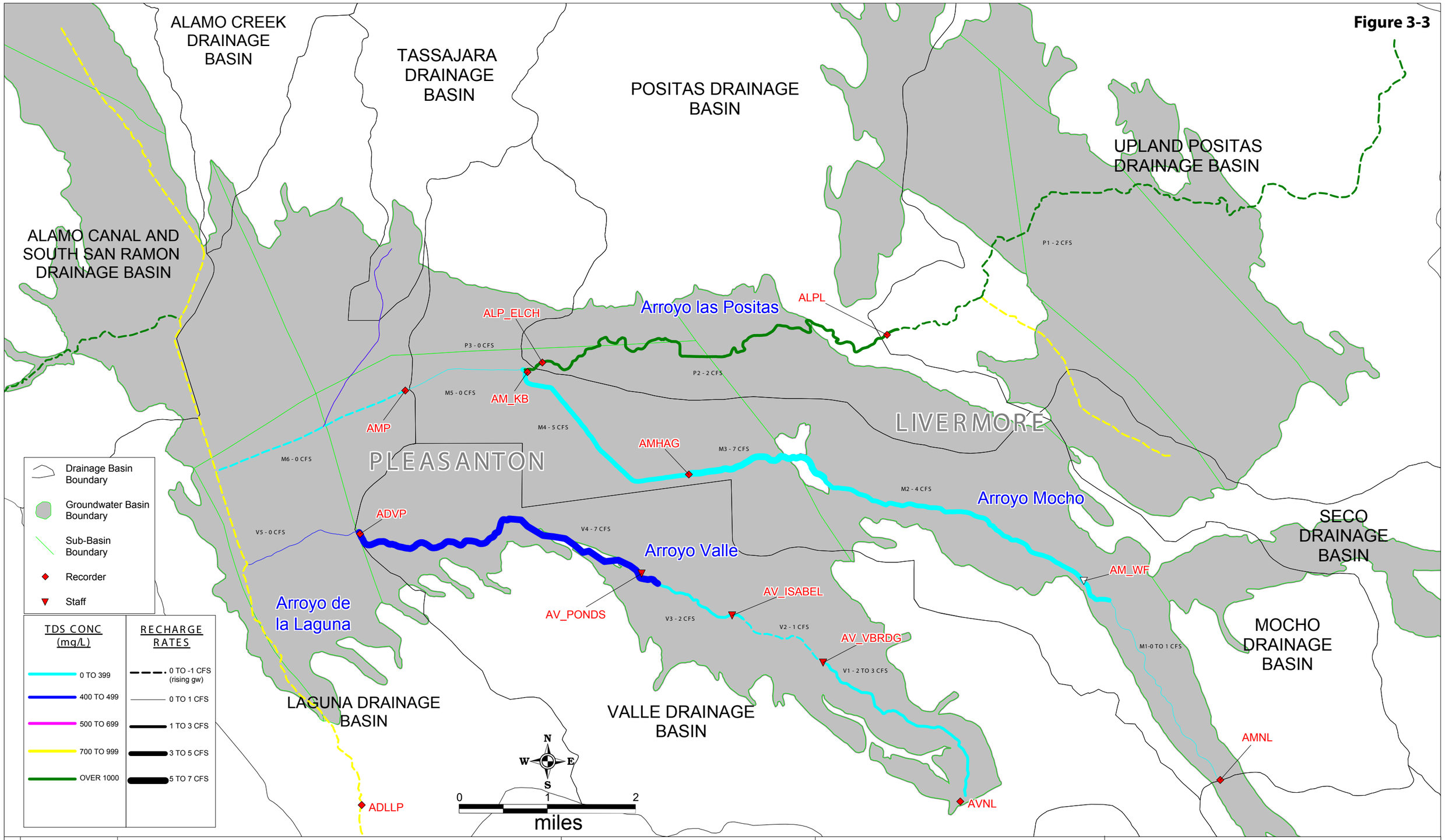
HISTORIC LOW WATER LEVELS IN THE DEEP AQUIFER

ZONE 7 WATER AGENCY
WELL WATER PLAN

CH2MHILL

163304.WM.06_W102003001SFO_Z7 FIGURE ES-2-2_10/10/03_ccc

Figure 3-3



ZONE 7 WATER AGENCY

100 NORTH CANYONS PKWY, LIVERMORE, CA 94551

DRAWN BY: GG/TR	SCALE: 1" = 1 MILE
DESIGNED BY: GERALD GATES	Apr 7, 2005
CHECKED BY: DAVID LUNN	REVISED BY: TR
FILE: E:\MONITOR\SW\2004wy\annual\FigsTbls\Fig2-StreamRecharge.wor	

WATER RESOURCES ENGINEERING

STREAM RECHARGE RATES AND TDS

The Proposed Chain of Lakes Recharge Project will provide benefits by creating additional surface water storage and recharge capacity. This is a long-term project that involves Zone 7 acquisition of quarry pits dug by local mining companies. These former mining pits, as they get turned over to Zone 7, are incorporated into the regional water management programs. During wet weather, potentially low-cost, low-TDS surface water and/or runoff could be purchased/captured and stored/ recharged for future treated or untreated supply. Demineralized recycled water could potentially be stored in the Chain of Lakes area. The first two former mining pits, Lake-H and Lake-I, became available in May 2003. Plans for a diversion structure (to divert water from the stream into the Chain of Lakes) are still needed and are not anticipated to be completed until 2008. The complete Chain of Lakes (all nine lakes) will not be available until about 2030.

3.4 Water Use

Zone 7 monitors water usage to ensure that sufficient supply and adequate quality is delivered to all its water retailers. Stored water pumped from the groundwater basin (resulting from the artificial recharge program discussed above) is a critical component of Zone 7's water supply. On average, 25% of the potable water produced by Zone 7 is this groundwater supply. However, including pumping by other entities, on the average, over 35% of Valley-Wide potable water is from the groundwater basin. A conceptual diagram of the Livermore-Amador Valley water supply and use is included in Figure 3-4. This figure demonstrates how Zone 7's water sources are integrated with other pumping to meet regional water demands.

In addition to Zone 7's groundwater pumping (about 12,000 af/y), groundwater extractions from the basin include:

- Evaporative losses of mining water from the gravel pits (~3,000 af/average year);
- municipal pumpage (~7,200 af/y) by several retailers;
- private pumpage (Fairgrounds, San Francisco Public Utilities Commission [SFPUC], industrial supply, domestic supply, others, ~1,200 af/y); and
- agricultural pumpage for irrigation (~500 af/y);

3.5 Groundwater Quality

In general, groundwater quality throughout most of the Main Basin is suitable for most types of urban and agriculture uses with some minor localized water quality degradation. The primary constituents of concern are high TDS (or hardness), nitrate, boron, and organic compounds.[11] In the western Main Basin,

[11] California Department of Water Resources 2003.

groundwater is a calcium-magnesium-bicarbonate water type and has historically been considered "hard." The rising salinity is associated with several factors (see Section 4.6.5, Salt Balance) but is primarily associated with the saline fringe basin shallow groundwater flowing into the basin or flowing into recharging streams. Imported water brings additional salts into the basin some of which are left in the soil as evapotranspiration occurs (subsequent leaching with rain or further application of irrigation water transports salts to the groundwater table). Increased salinity attributable to irrigation in a semi-arid region is another major issue (see Salt Balance Section).

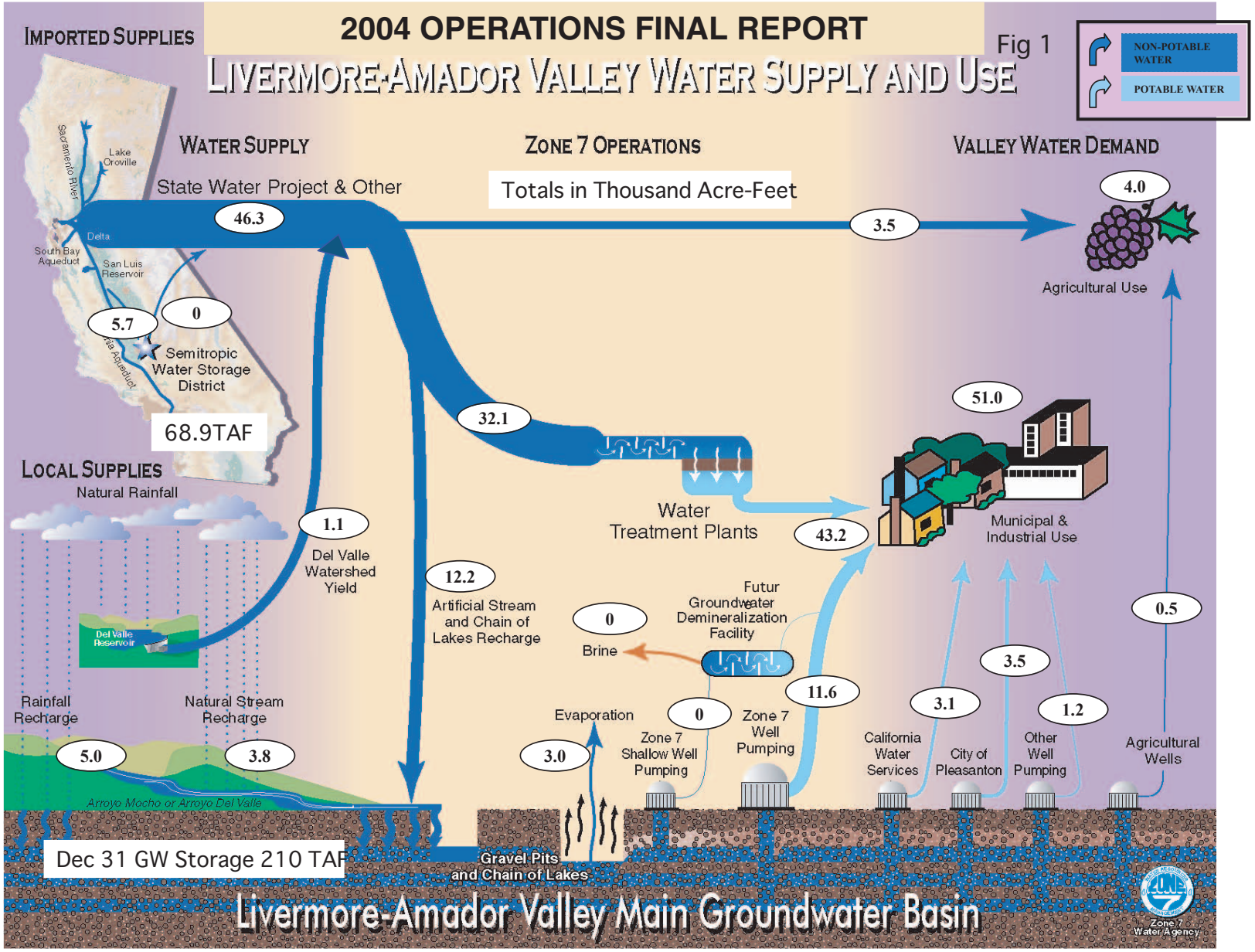
Trace amounts of boron are present in the eastern fringe basins (associated with marine formations) and with shallow groundwater in the northern fringe basins. High boron levels and lower yields can limit the use of some fringe basins for extensive agricultural irrigation.[12] Zone 7 monitors all the wells in its groundwater quality monitoring program for major minerals and select metals, including boron. Water quality samples are analyzed by the Zone 7 Water Quality Laboratory located at the Del Valle Water Treatment Plant.

The northern extent of the Livermore-Amador Valley is dominated by a sodium-rich water, while much of the western part of the basin near Pleasanton has a magnesium-sodium characteristic (i.e., both magnesium and sodium are dominant cations). The area along the eastern portion of the basin, beneath the Livermore area, has magnesium as the predominant cation.[13] Local impairments include some areas with boron concentrations exceeding 2 mg/l.

Nitrates have also impaired portions of the Main Basin, especially in the east. Nitrate levels between 30 and 65 mg/l have been identified in the nitrate study area, which covers an area of 670 acres of unincorporated residential and agricultural land in the South Livermore area. Nitrates from in-Basin wastewater disposal (less common since 1980) contributed to this problem historically. This issue is discussed in more detail in Section 5.1.4.4, Wastewater Management.

Releases of fuel hydrocarbons from leaking underground storage tanks and spills of organic solvents at industrial sites have caused minor-to-significant groundwater impacts in specific parts of the region. Detailed discussion is presented in Section 5.1.4.5. Zone 7 participated in the development of the GAMA project, which analyzed water from municipal wells for volatile organic compounds (VOCs) at ultra-low levels not detectable by standard laboratory analysis. The results showed that very low levels of MTBE and other gasoline components were detected in a handful of wells. There are five fuel contamination sites within 2,000 feet of a municipal supply well that are being closely monitored. Proactive cooperation with regulatory agencies on prevention, early detection and site cleanup is helping to protect the basin from fuel contamination (additional information on the Toxic Site Program is presented in Section 5.1.4.5, Toxic Site Management).

[12] California Department of Water Resources 2003.
[13] California Department of Water Resources 2003.



04727.04 GMP Final 08/05

Jones & Stokes

Figure 3-4
Water Operations Plan

Chlorinated organic solvent releases to soil and groundwater are an issue in the region,[14] primarily in fringe basins and in upper aquifers. Again, detailed description is provided in Section 5.1.4.5. Cleanup programs at LLNL are in place to remediate this large superfund site from a 50-year-old plume associated with World War II activities. Zone 7 assisted LLNL during the initial year of cleanup and has been working cooperatively with them since. During the past decade LLNL has been providing valuable assistance to Zone 7 in the monitoring and analysis of groundwater conditions within the basin. The GAMA project and the Geotracker project have made significant contributions to groundwater basin monitoring and to the groundwater protection effort. The GAMA project detected tetrachloroethene (PCE), a chlorinated solvent commonly used in dry cleaning, in nine of the 12 municipal wells tested in Livermore. Two of these wells have PCE levels detectable by standard laboratory procedures. The water from these two wells is currently either blended with clean water or treated at the well head to reduce the levels of PCE. One supply well at the Alameda County Fairgrounds in Pleasanton has been impacted by PCE. The water from this well is treated to remove the PCE prior to use.

Zone 7 samples approximately 250 wells under the groundwater quality monitoring program (described in Chapter 4) and reviews results from site cleanup projects made available through Geotracker and from cleanup reports routinely sent to Zone 7 for review (again, additional information on the Toxic Site Program is presented in Section 5.1.4.5, Toxic Site Management).

[14] California Department of Water Resources 2003.

Chapter 4

Management Plan Elements

4.1 Groundwater Management Goal

The management elements of this GMP include the primary goal of adequately addressing Zone 7's Groundwater Basin Management Objectives or BMOs (see Section 1.4): to provide for the control and conservation of waters for beneficial future uses, the conjunctive use of groundwater and surface water, the importation of additional surface water, and the use of the groundwater basin to serve as water storage for drought periods. This is accomplished through a set of Resource Management and Other Planning Efforts (described below) and a group of management plan components that identify the necessary actions for meeting goals and objectives. The purpose of this GMP is to compile and document the existing successful programs and policies for management of groundwater resources and to develop a framework for the implementation of future activities to ensure reliability and quality of regional groundwater.

4.2 Resource Management and Other Planning Efforts

Zone 7's primary groundwater BMOs provide for control and conservation of waters for beneficial future uses, conjunctive use of groundwater and surface water, importation of additional surface water, and use of the groundwater basin to serve as water storage for drought periods. According to the 1987 "Statement on Zone 7 Groundwater Management" located in Appendix E, Zone 7's groundwater management goals include:

- to maintain the balance between the combination of natural and artificial recharge and withdrawal;
- to maintain water levels high enough to provide emergency reserves adequate for the worst credible drought;
- to protect and enhance the quality of the groundwater;
- to develop information, policies and procedures for effective long-term management of the groundwater basin; and

- to inform the public and relevant governmental agencies (including the TVG) and the four individual retailers, DSRSD, CWS, Livermore and Pleasanton) of the Zone's water supply potential and management policies, and to solicit their input and cooperation.

Examples of current groundwater basin management operations include:

- **Monitoring and maintenance of groundwater levels**—a long-term conjunctive use program at Zone 7. Underneath the Tri-Valley lies a groundwater basin that contains about 250,000 acre-feet of usable groundwater. An acre-foot is about 326,000 gallons, enough water to supply two households for a year. The groundwater basin provides the community with a "water savings account," which serves as a hedge against a prolonged dry period or a temporary inability to import surface water. In the event of a prolonged drought, this amount of water is enough to sustain the entire Tri-Valley for up to 6 years, depending on the amount of surface water available and the conservation efforts of water users.

  Zone 7 accesses the groundwater through wells at aboveground pumping facilities. Zone 7 pumps more groundwater during peak demand periods or in dry years when imported supplies are low. Local water retailers also access the groundwater basin for drinking water.

- **Artificial Recharge Program**—The groundwater basin is naturally refilled, or "recharged," by streamflow, underground flows, rainfall, and applied irrigation water seeping into the ground. Zone 7's groundwater management program ensures that water levels in the basin will remain at or above acceptable levels.

  In addition to natural recharge, Zone 7 manages an artificial recharge program. During spring, summer, and fall when the streams are typically dry, Zone 7 releases some of its purchased imported water into the Arroyo Valle and Arroyo Mocho. By allowing the water to flow through sections of these arroyos where the creek bottoms are very porous, the water quickly seeps into the ground, replenishing the groundwater basin. By artificially refilling or recharging the groundwater basin, and monitoring water levels throughout the valley, Zone 7 ensures that the water demands of the community are met.

  Specific objectives include managing the groundwater basin to:

  - maintain "emergency reserve" by keeping water levels above historical lows,
  - allow for gravel mining,
  - prevent overdraft from pumping (maintain total pumping at or below sustainable/safe yields), and
  - reserve storage for drought events.

- **Groundwater quality**—monitoring and management, as well as protection against any degradation:

  - mitigate degradation from salt buildup;

- minimize flow of poor quality shallow groundwater into deep aquifers;
- offset impacts of water recycling and wastewater disposal through integrated SMP;
- recharge with low TDS/hardness water;
- manage quality on a regional basis as measured at municipal wells, thus allowing localized degradation as long as the overall basin is protected
- minimize threats of groundwater pollution through groundwater protection;
- monitor and prevent inelastic land surface subsidence; and
- monitor changes in surface flow and surface quality, especially as they affect groundwater levels or quality or are caused by groundwater pumping in the basin.

4.3 Stakeholder Involvement

4.3.1 Involving the Public

A key purpose of this Groundwater Management Plan is to compile and document existing groundwater management plans and policies. One of the more recent contributions to this groundwater management toolbox is the development of the Salt Management Plan (SMP).

The SMP, incorporated herein by reference (a copy of the executive summary is included in Appendix D), was prepared in fulfillment of Master Water Recycling Permit Order No. 93-159 Provision D.1.c.ii and General Water Recycling Permit Order No. 96-011 Provision D.4. This document not only provides a comprehensive and effective approach for administering, regulating and encouraging water recycling in the Livermore-Amador Valley, it also provides guidance to the area's agencies on ways to address the historical trend of increasing TDS in the main groundwater basin. It was developed by Zone 7 staff and consultants in partnership with a TAG composed of local water retailers, and a Zone 7 citizens committee—the GMAC. The RWQCB approved the SMP in October 2004.

As with the formal process utilized in developing the SMP, Zone 7 actively involves the public in all its programs through a variety of meetings, and through media such as the Internet. This approach has been included as an explicit operational policy in Zone 7's 1987 Statement on Groundwater Management (again incorporated herein by reference; a copy is included in Appendix E). Zone 7 holds monthly Board meetings that are open to the public and conducts frequent meetings with its water retailers. The public can also access the Zone 7 website for general information or download reports on a variety of topics. In addition, the public can get involved with Zone 7 planning and management through the RWQCB Basin Planning process. The Zone 7 website can be accessed at <http://www.zone7water.com>.

Examples of the different types of public involvement in Zone 7's groundwater management programs include:

- retailer contracts (including pumping quotas);
- meetings with retail water agencies (DSRSD, CalWater, Pleasanton and Livermore);
- Memorandum of Understanding (MOU) for well ordinance administration within respective city limits;
- stakeholders meetings (e.g., Alameda Creek Watershed Management Program);
- data-sharing with retailers, public and other agencies (RWQCB, DHS, and County Environmental Health);
- reports at public board meetings (three formal presentations to Board and public in 2004 on groundwater basin management);
- website postings, including annual reports, quarterly groundwater reports and water awareness fact sheets;
- kiosk stations (watershed, groundwater basin and artificial stream recharge information along footpaths that border key recharging streams), county fair booths, Earth Day events, etc.;
- press releases, Water Ways newsletter;
- Groundwater Management Advisory Committee or GMAC—10-member citizens committee formed 1995–2002 primarily in relation to the demonstration RO/groundwater injection project; however also assisted in the major review and update of the 1987 GMP, as reflected in the newly created Salt Management Plan or SMP;
- Technical Advisory Committee or TAC (technical staff from the four retail water agencies) formed in 1995–2002 in conjunction with GMAC to assist in the development of the SMP which included major review and update of the 1987 GMP;
- elementary school (K-8) program, using consultants; and
- secondary school science program—cooperative program with Zone 7 staff, LLNL, retailers, Tri-Valley ROP; brings water science and water industry career information into the high schools.

4.4 Development of Relationships with State, Federal, and Local Agencies

Working relationships between Zone 7 and the state, federal, and local agencies are critical to developing and implementing the various groundwater management strategies and actions detailed in this GMP.

Zone 7 has, and will continue to develop, an excellent working relationship with DWR, RWQCB and any relevant federal agency for the necessary means of protecting the beneficial uses of the Livermore-Amador Valley groundwater basin. For example, Zone 7 in conjunction with DWR wrote *Evaluation of the Groundwater Resources: Livermore and Sunol Valleys* in 1974. In addition, Zone 7 plans to continue working with DHS on regulating drinking water and municipal wells; the RWQCB on NPDES and Basin Planning (such as the SMP); Alameda County Environmental Health on issues where groundwater has been affected; DFG and USFWS on recharge program operations; and the Corps on diversion and creek projects.

Over the years, Zone 7 has fostered excellent working relationships with local entities through contracts, policies and resolutions such as those included in Appendix E of this document. In particular, Zone 7 solicits input from the TVRG and its four member agencies, DSRSD, CWS, Pleasanton and Livermore. As with the SMP, any future changes to this Groundwater Management Plan and Zone 7's existing groundwater management policies and procedures would be the result of collaboration with the TVRG and its member agencies.

Zone 7 also maintains relationships with the local water retailers and Planning Agencies (such as the County and the City of Dublin) to ensure that adequate land use planning and protocols are up to date to ensure the beneficial use of the groundwater basin. Zone 7 reviews CEQA documents for all new developments and coordinates with cities and counties to ensure accurate planning.

In addition, Zone 7 is a member of the Tri-Valley Regional Geographic Information Systems User Group (TVRGIS User Group). The TVRGIS was formed to address the electronic sharing of spatial data (e.g., parcel base-maps, centerlines, public trails, drainages, ortho-photography, zoning and general plan land use) and to minimize the overlap in spatial data that each agency uses. The TVRGIS, which includes GIS coordinators from the Town of Danville, City of Dublin, City of Livermore, City of Pleasanton, and Zone 7, addresses the sharing of spatial data for local and regional planning, management, and public safety purposes.

4.5 Monitoring Programs and Protocols

Zone 7 currently monitors the conditions of the groundwater basin. This section of the GMP describes Zone 7's monitoring programs. Standard Operating Procedures (SOPs) can be seen in Appendix C. Table 4-1, below, summarizes details regarding these programs.

Table 4-1. Monitoring Programs and Protocols

Monitoring Type	Location	Measurement Type	Date Started	Frequency	Notes
Climatological Monitoring Program					
Precipitation	9 stations including 8 with storage gages and 5 with recorders	Storage Gage (8) Recorder (5)	Jan 1871	Daily Continuous	Reported in: Climatological Reports (monthly/annually) and Stream Reports (daily/monthly/annually)
Evaporation	Lake Del Valle	Pan Evaporation	October 1969	Daily	Reported in: Climatological Reports
Evapotranspiration	CIMIS Station (Fairgrounds, Pleasanton)	Automated active weather station	June 2004	Daily	Reported in: Climatological Reports
Surface Water Monitoring Program					
Streamflow	47 Stations including 10 recorder stations on three streams: Arroyo Valle Arroyo Mocho Arroyo De Las Positas	 Stream Gages Meters Recorders	1912	 Daily Daily Continuous	Reports: Annual Stream Recharge Report; Daily Stream Flow Reports; Quarterly Water Supply Report; Monthly Groundwater Supply and Utilization Report
Surface Water Quality	16 stations		1948	Annually	Monitoring performed by Zone 7 beginning in 1974; Stormwater Quality Management Plan and Program, as required by RWQCB Orders R2-2003-0021 and 93-159; reported in SW Annual Report
Recharge	Three streams: Arroyo Valle Arroyo Mocho Arroyo Las Positas	Metered and gaged records	1974	Monthly	DWR calculated various forms of stream, artificial and natural recharge in 1966; currently reported in Monthly Groundwater Supply and Utilization Report
Groundwater Monitoring Program					
Well Inventory	By Township/Range: 2S/1E, 2S/2E, 2S/1W, 3S/1E, 3S/2E, 3S/1W	Data Base and Hard Copies	1973 Historic from 1906	Ongoing	Zone 7 began collecting and maintaining well inventory information in about the mid-1970's; information was initially collected by DWR for regional studies published in 1953, 1955, 1963, 1966 and 1974. Zone 7 obtained all historic well records and since 1973 has obtained all well records through the drilling permit process.

Monitoring Type	Location	Measurement Type	Date Started	Frequency	Notes
Groundwater Levels	Currently 224 wells measured semi-annually; 80 wells measured monthly; 9 wells continuously monitored	Pressure transducers Steel and electrical tapes	1946 Historic from 1900	Recorder, monthly and semiannual	Data collection began with three wells in about the mid-1940's when multi-year drought resulted in groundwater level drops and DWR began taking an interest in the area; Zone 7 has managed the program for the last 30 years, adding other wells to its growing program; reported in Groundwater Level Report (monthly/semi-annual)
Groundwater Quality	Currently 218 wells sampled and analyzed for TDS, major minerals and metals.	Analytical	1946 Historic to 1908	Annually	Focus has been on salt (mineral) concentrations, as represented by TDS levels; subsequently, program expanded to included pollutants and other WQ parameters; reported in Annual Groundwater Report, semiannual Groundwater Quality Summary; Monthly Municipal Groundwater Quality Report
Land Surface Elevation Monitoring Program					
Land Surface Elevations	50 Benchmarks	Surveying	Historic 1912 Elastic seasonal 2002	Periodic and Semiannually	Land Surface Elevation Report
Groundwater Production Monitoring Program					
Pumpage	Major pumping wells (Zone 7, retailers, etc.)	Metered	1974	Monthly	Reported in Water Users Reports; Annual groundwater Supply and Use Forecast Report; Monthly Municipal Water Supply Reports
Other Programs					
Wastewater Export/Disposal			1979	Monthly	Outside Agency Jurisdiction (Managed by DSRSD and City of Livermore; data includes flow, TDS, major minerals & metals)
Recycled Water Production & Use		Metered		Monthly	Outside Agency Jurisdiction (Managed by DSRSD and City of Livermore)

Zone 7's key monitoring programs include (and are described in detail below and on Table 4-1):

- climatological monitoring,
- groundwater elevation and quality monitoring,
- surface water flow and quality monitoring,
- land surface elevation and inelastic subsidence monitoring,
- mining area monitoring,
- land use monitoring,
- groundwater production monitoring, and
- wastewater disposal.

Figure 4-1 shows the entire basin well-monitoring program.

4.5.1 Climatological Monitoring

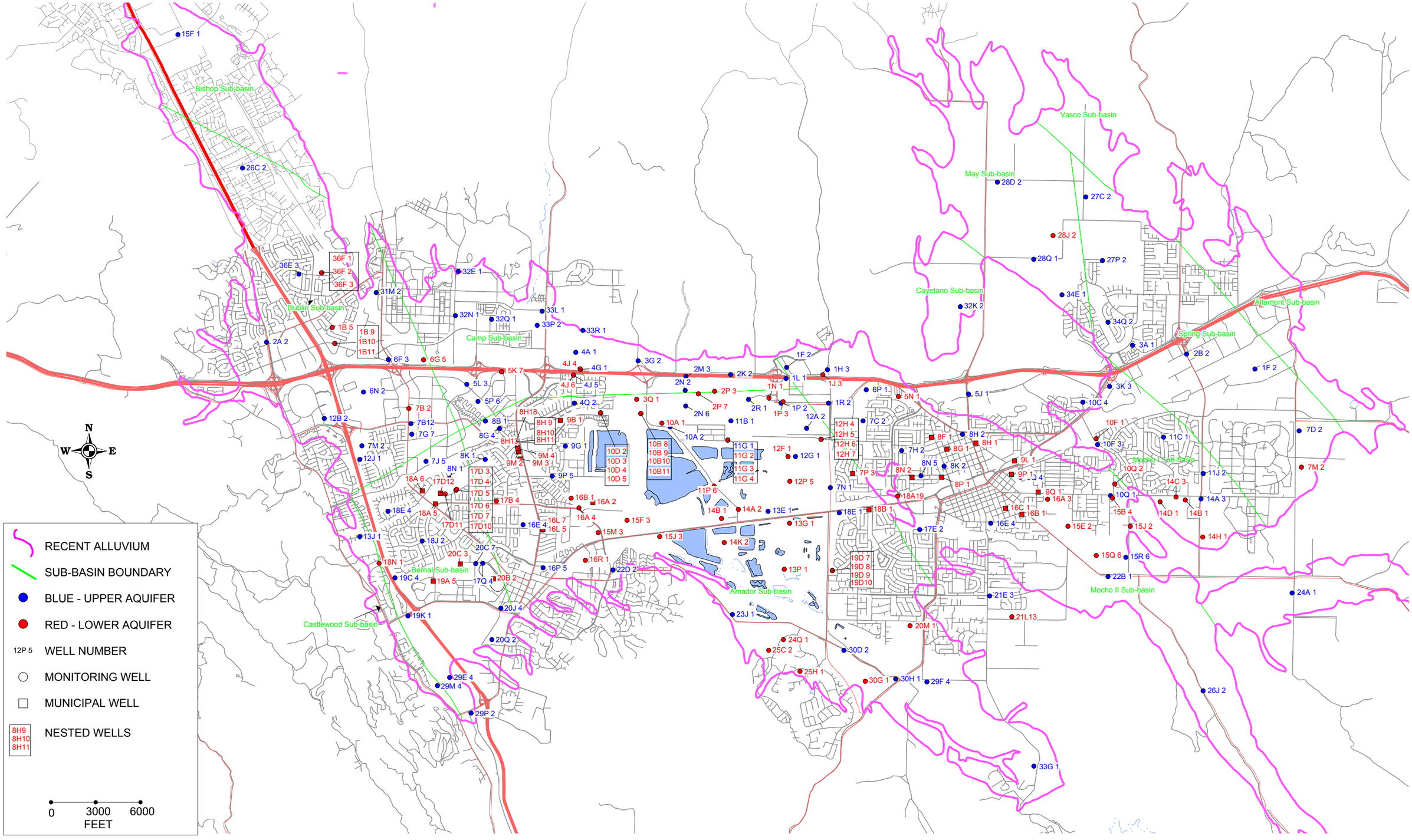
4.5.1.1 Background/Introduction

Zone 7 actively monitors and compiles climate data from a network of rainfall and evaporation stations throughout the Livermore-Amador Valley watershed. Climatological data are used to calculate specific components of the annual recharge totals, evaporative losses, and evapotranspiration demands.

4.5.1.2 Program Description

The Zone 7 climatological monitoring program network consists of nine rainfall stations and two pan evaporation stations located within the 400-square-mile Livermore Valley watershed (Tables 4-2 and 4-3). The locations of the stations and the lines of equal mean annual rainfall (isohyetals) are shown in Figure 4-2. There are three types of precipitation stations in the network:

- Four Daily Record Stations—consist of a storage gage that measures the depth of rain that has fallen during the preceding 24 hours. Three of these stations are operated by private observers.
- Four Recorder Stations—consist of a storage gage (same as those described above) and a computerized tipping bucket recorder that continuously record hourly rainfall. All four stations are operated by Zone 7.
- One California Irrigation Management Information System (CIMIS) Station—installed and operated with assistance from DWR, this station collects/records/calculates data for precipitation, air temperature, soil temperature, wind speed, wind direction, solar radiation and evapotranspiration



ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE, PLEASANTON CA 94588

DRAWN BY: G GATES/T ROOZE

DESIGNED BY: GERALD GATES

FILE NO.: \\Zone7-file\wre\MONITOR\GM\2003wy\Annual\Figures\Fig3ProgramWells.WOR

WATER RESOURCES

GROUNDWATER PROGRAM WELLS

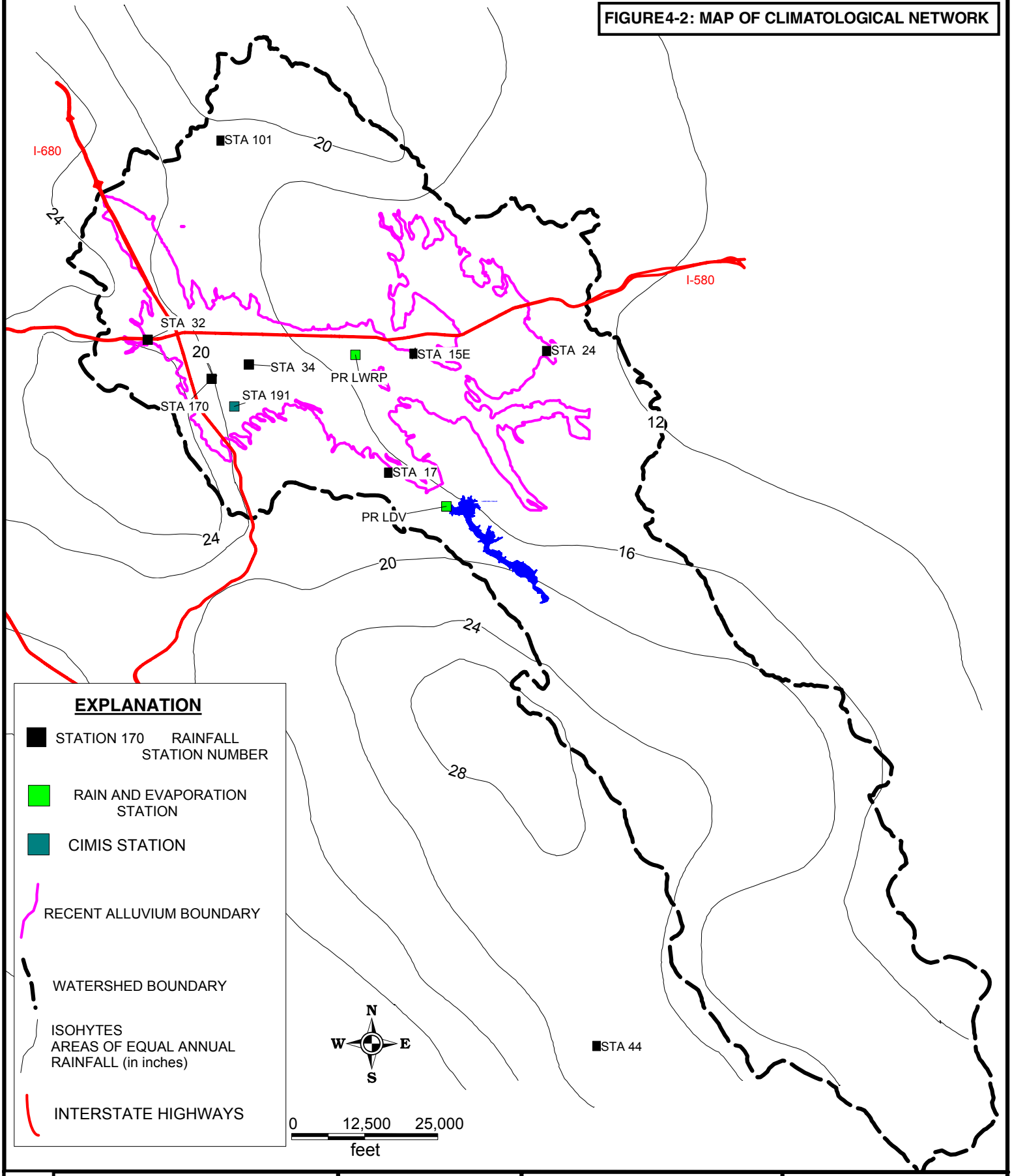
2003 WATER YEAR

SCALE: 1" = 6000'

DATE: August 9, 2004

FIGURE 4-1

FIGURE4-2: MAP OF CLIMATOLOGICAL NETWORK



ZONE 7 WATER AGENCY 5997 PARKSIDE DRIVE, PLEASANTON CA 94588	DRAWN BY: MIKE GARGUILO DESIGNED BY: MIKE GARGUILO CHECKED BY: GERALD GATES APPROVED BY:	WATER RESOURCES CLIMATOLOGICAL MONITORING NETWORK 2004 WATER YEAR	SCALE:1" = 24,000' DATE: 21 NOVEMBER 2003 FILE NO.: E:\MONITOR\PR\NETWORK03X.WOR

The program also includes two evaporation stations that collect data with an evaporation pan. The Lake Del Valle (LDV) station, operated by DWR is a part of LDV operations. The Livermore Water Reclamation Plant (LWRP) operates the LWRP station as part of their wastewater treatment plant operations.

Table 4-2. Precipitation Network

Station ID	Site ID	Station Name	Location	Observer	Elevation	Station Established		Mean Annual Precipitation Inches
						Storage Gage (Daily)	Recorder Record	
15E	CM_STA 15E	NOAA Livermore	Wellingham Drive, Livermore CCN: 2077172 CCE: 6194524	Mr. Ron Hafner	480	1871	–	14.60
17	CM_STA 17	Del Valle Plant	Vallecitos Road, Livermore CCN: 2054906 CCE: 6189667	Zone 7 Staff	640	1974	1978	16.26
24	CM_STA 24	Patterson Plant	Patterson Pass Road, Livermore CCN: 2077605 CCE: 6219168	Zone 7 Staff	680	1963	1969	13.09
32	CM_STA 32	Dublin Canyon	Dublin Canyon Road, Pleasanton CCN: 2079706 CCE: 6144577	Mr. H.W. Kolb	450	1937	–	23.27
34 and 34TB	CM_STA 34	Mocho Well Field	Santa Rita Road, Pleasanton CCN: 2075106 CCE: 6163467	Zone 7 Staff	340	1968	1970	17.88
44	CM_STA 44	Mt Hamilton	Lick Observatory, Mt Hamilton CCN: 1947881 CCE: 6228576	Lick Observatory Staff	4209	1881	–	24.63
101	CM_STA 101	Tassajara	Camino Tassajara Road, Danville CCN: 2116905 CCE: 6158368	Mrs. Joan Hansen	800	1912	–	18.34
170	CM_STA 170	Zone 7 Office - old	Parkside Drive, Pleasanton CCN: 2072426 CCE: 6156517	Zone 7 Staff	330	1986	1986	20.63

Station ID	Site ID	Station Name	Location	Observer	Elevation	Station Established: Storage Gage (Daily)	Station Established: Recorder Record	Mean Annual Precipitation Inches
191	CM_STA 191	CIMIS Station	Alameda County Fairgrounds, Pleasanton CCN: 2067061 CCE: 6161028	DWR and Zone 7 Staff	335	–	2004	19.39

Table 4-3. Evaporation Network

Station ID	Site ID	Station Name	Location	Observer	Elevation	Station Established	Mean Annual Evaporation Inches
LDV	CM_EV_LDV	Lake Del Valle	Arroyo Road, Livermore CCN: 2048605 CCE: 6200367	DWR Staff	760	1969	65.84
LWRP	CM_EV_LWRP	Livermore Water Reclamation Plant	Kitty Hawk Road, Livermore CCN: 2076905 CCE: 6183367	LWRP Staff	405	1967	73.01

4.5.1.3 Reporting

Throughout the water year several reports are generated to display, review, and discuss the data that was gathered:

- Climatological Data Monthly Report,
- Climatological Monitoring Annual Report, and
- Climatological Monitoring Program Design Report—Annual Program Update.

The results of this monitoring program are used for operational decisions, monitoring decisions, and in recharge calculations (Section 4.6.2).

4.5.2 Groundwater Elevation and Quality Monitoring

4.5.2.1 Background/Introduction

Since the early 1900s there has been a long history of groundwater use, level measurements, and water quality testing in the Livermore-Amador Valley. Zone 7 has compiled a historical database of available water level and quality

data pertaining to the groundwater basin. Zone 7's historical database contains records compiled from many sources consisting of major mineral water quality data from 1,122 wells and groundwater level data from 2,319 wells.

Zone 7's groundwater monitoring program includes the monitoring of:

- groundwater elevations to determine the volume and movement of groundwater within the basin, and
- groundwater quality to determine the status of current water quality and long-term trends.

4.5.2.2 Program Description

Zone 7 monitors approximately 225 wells in the Main Basin. Groundwater wells in this program are defined as one of the following types:

- monitoring—used only for monitoring (i.e., no groundwater extraction), including at least 11 nested well sets for monitoring specific water bearing units;
- municipal—municipal water supply well owned by Zone 7, San Francisco Water District, City of Pleasanton, or Cal Water Service;
- potable—drinking water supply well for residences (potable domestic) or non-municipal public supply (potable public); or
- agriculture—extraction well for agriculture use.

Zone 7's Groundwater Monitoring Program includes monitoring for the following reasons:

- **Monthly basin levels**—includes a network of wells that are monitored, reported, and reviewed monthly for groundwater levels. These data are used for ongoing studies of subsurface inflow, identification and confirmation of hydrostratigraphic units, monitoring of groundwater extraction by others, tracking pumping and static water levels, and determining pumping costs.
- **Groundwater basin seasonal extremes**—to determine basin-wide water levels at the two extremes of the annual cycle.
- **Groundwater basin quality**—to track water quality in the groundwater basin and migration patterns of minerals and metals towards pumping wells.
- **Geologic Evaluation**—to identify geologic conditions of the basin and surrounding areas. This evaluation is preformed constantly and includes compiling historic geologic maps by others, evaluation of drilling logs and elogs, identifying water level and quality trends, and making outcrop field visits.
- **Water rights**—The conditions of this permit require that Zone 7 conduct a groundwater investigation that includes sampling of four groundwater wells along the Arroyo Valle semi-annually, measuring water levels from a

specific set of wells collected monthly, and collecting water level recorder measurements from two wells.

- **DWR**—in a cooperative agreement with the DWR, Zone 7 takes split groundwater samples from some wells to supply DWR with groundwater quality data and to supply quality assurance/quality control (QA/QC) data for Zone 7 sampling.

All of the wells to be monitored in the program fulfill some of the needs for a basin evaluation or a regulatory objective. Some wells are assigned to multiple purposes depending on the suitability of the well.

The program includes the monthly measurement of groundwater levels in about 80 wells and semiannual measurements in about 224 wells. Approximately 200 wells are sampled annually. These samples are tested in the field for EC, pH, and temperature. The samples are then submitted to the Zone 7 laboratory and are analyzed with various minerals, metals, and other parameters including those seen in Table 4-4.

Table 4-4. Water Quality Monitoring Constituents

Minerals	Metals	Other
Calcium	Boron	Total Dissolved Solids
Magnesium*	Arsenic	Total Hardness
Sodium	Chromium	Electrical Conductivity
Potassium	Manganese	Alkalinity
Bicarbonate*	Selenium	Calcium Hardness
Sulfate	Iron	
Chloride	Lead	
Nitrate	Copper	
Silica	Mercury	
Carbonate*	Others	
* Calculated		

The Monitoring Protocols Table (Table 4-1) identifies the number of wells that are measured for groundwater levels and sampled for groundwater quality and the associated objective.

4.5.2.3 Reporting

Throughout the water year several reports are generated to display, review, analyze, and discuss the data that were gathered both internally and with interested stakeholders:

- Key Well Report—submitted to Zone 7 Board quarterly

- Groundwater Level Monitoring Monthly Report
- Quarterly Municipal Groundwater Quality Report
- Semi-Annual Groundwater Level Report
- Groundwater Annual Monitoring Report
- Groundwater Program Design Report—annually

Internal reports are also generated to review the data:

- Groundwater Level Hydrograph Report
- Groundwater Hydrochemograph Report (semiannually)
- Groundwater Quality Summary Report (semiannually)

The results of this program are used for groundwater storage calculations, supply and demand inventory, recharge calculations, salt management, and groundwater modeling.

4.5.3 Surface Water Flow and Quality Monitoring

4.5.3.1 Background/Introduction

Surface water in the Livermore-Amador Valley consists of:

- watershed runoff into Lake Del Valle;
- local natural runoff into four major streams (Arroyo Valle, Arroyo Mocho, Arroyo Las Positas, and Arroyo de la Laguna);
- rainfall and urban runoff;
- water from several quarry ponds (mining area);
- applied irrigation water seepage and runoff; and
- imported water conveyed in the SBA and released into local arroyos.

As part of its Groundwater Management Program, Zone 7 operates a surface water–monitoring program in the valley to measure the quantity and quality of stream water recharging the groundwater basin and to provide sufficiently detailed data to manage the local water supply. The monitoring program focuses on the streams that recharge the groundwater basin (Arroyo Valle, the Arroyo Mocho, the Arroyo Las Positas, and the Arroyo de la Laguna; see Figure 4-3) and the diversions and accretions that affect the flow along them. Zone 7 has compiled water flow data from these streams back to 1912 and water quality data back to 1948.

Zone 7, which is also responsible for streamflow management of controlled releases to various streams, has implemented a surface water monitoring program that includes a network of recorder, meter, and staff gage sites that monitor the

quality and quantity of stream flow 365 days a year. This network characterizes the flow and water quality in all major tributaries of the watershed.

4.5.3.2 Program Description

There are about 120 existing surface water monitoring sites in the Livermore Valley. For its surface water program, Zone 7 monitors 47 of these sites for flow and 16 for quality (see Figure 4-3 and Table 4-1). Sites are classified as:

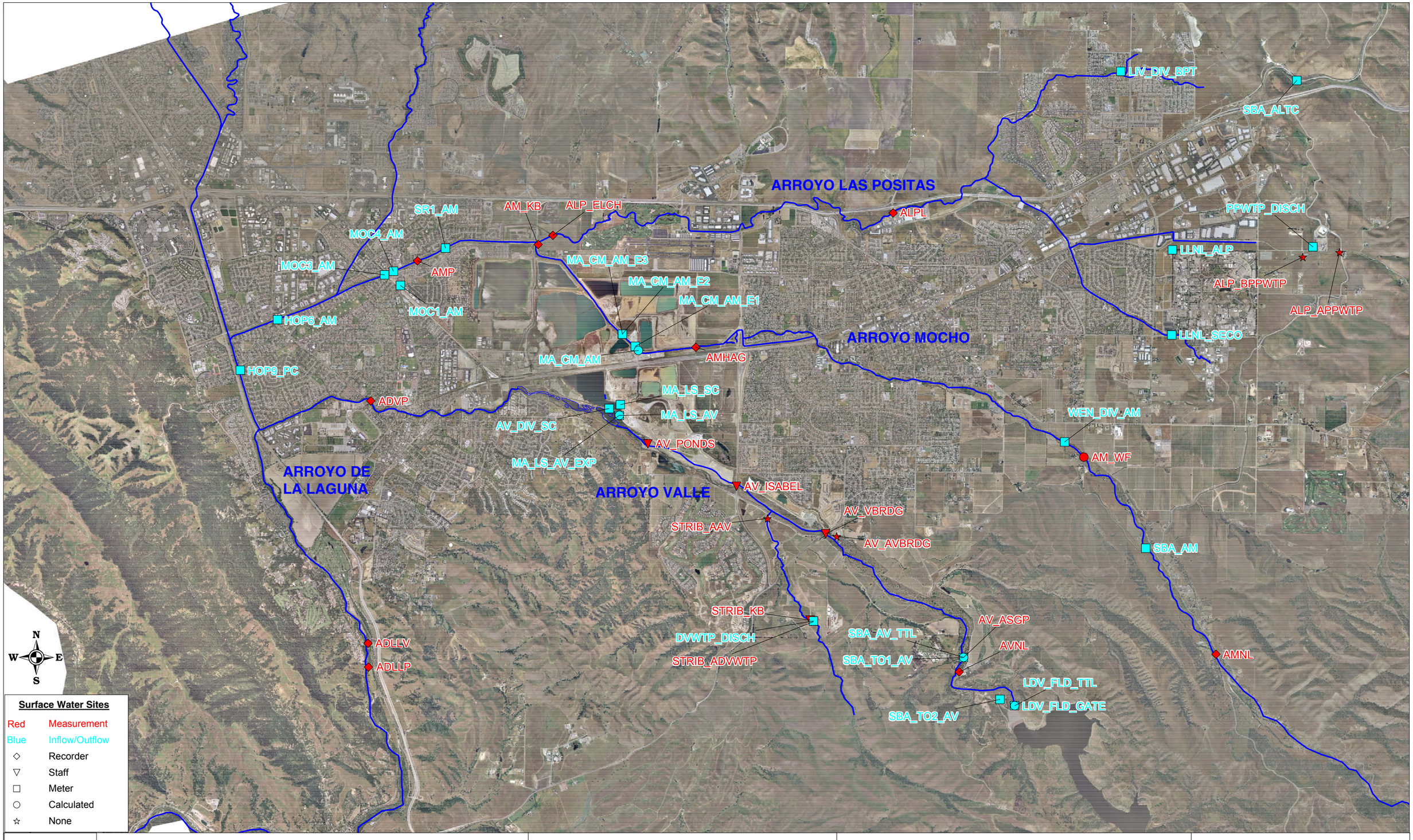
- inflow/outflow—represents discharge or diversion sites where there is an inflow into or outflow from the stream, or
- monitoring—represents sites where flow and/or water quality monitoring occurs in the stream.

Sites have a measurement device to directly or indirectly record flow and/or water quality. These are listed in Figure 4-3 and Table 4-5 as:

- continuous recorder station—produces a continuous (15-minute) record of stream gage height and/or quality,
- meter—meter that records the volume of water flow,
- staff gage—a graduated tape or pole that measures the stream gage-height,
- calculated—virtual site where flow or quality is calculated,
- none/other—none of the above.

Table 4-5. 2004 Surface Water Program Sites

				Objectives					
				Std		Wtr Rts		NP	
Site	Location	Type	Device	Flw	Qlty	Flw	Qlty	Qlty	Notes
Arroyo De La Laguna—Line B									
HOP9_PC	Hopyard 9 Waste to Pleasanton Canal (ADLL)	Inflow/ Outflow	Meter	D					
ADLLV	Arroyo De La Laguna at Verona	Measurement	Recorder	R	A				Started in 2004. Std Analysis
ADLLP	Arroyo De La Laguna near Pleasanton	Measurement	Recorder	R					Discontinued in 2004
Arroyo Las Positas—Line H									
ALP_APPWTP	Arroyo Las Positas above PPWTP	Measurement	None					A	Dry in 2004
PPWTP_DISCH	PPWTP Discharge to Arroyo Las Positas	Inflow/ Outflow	Meter	D					
ALP_BPPWTP	Arroyo Las Positas Below PPWTP	Measurement	None					A	Dry in 2004



ZONE 7 WATER AGENCY

100 NORTH CANYONS PKWY, LIVERMORE CA 94551

DRAWN BY: MG/TR

DESIGNED BY: MIKE GARGUILO

FILE: \\Zone7-file\wre\MONITOR\SW\2004wy\annual\FigsTabls\Fig4-2004SWStations.WOR

Locations of Sites in 2004 Surface Water Program

SCALE: 1" = 1 MILE

DATE: Apr 7, 2005

FIGURE 4-3

Site	Location	Type	Device	Objectives: Std Flw	Objectives: Std Qlty	Objectives: Wtr Rts Flw	Objectives: Wtr Rts Qlty	Objectives: NP Qlty	Notes
LLNL_ALP	LLNL Treatment Effluent Discharge to ALP	Inflow/ Outflow	Meter	D	D				EC only, supplied by LLNL & annually by Zone 7 lab
LLNL_SECO	LLNL Treatment Effluent Discharge to SECO	Inflow/ Outflow	Meter	D	D				EC only, supplied by LLNL & annually by Zone 7 lab
ALPL	Arroyo Las Positas at Livermore	Measurement	Recorder	R	A				Std Analysis, Also EC Recorder data
ALPL_ELCH	Arroyo Las Positas at El Charro	Measurement	Recorder	R	A				Std Analysis
Altamont Creek—Line R									
SBA_ALTC	SBA Turnout to Altamont Creek	Inflow/ Outflow	Meter	D					
LIV_DIV_BPT	Livermore Diversion from Brushy Peak Trib	Inflow/ Outflow	Meter	D					
Arroyo Mocho—Line G									
AMNL	Arroyo Mocho near Livermore	Measurement	Recorder	R	A				Std Analysis, Also EC Recorder data
SBA_AM	SBA Turnout to Arroyo Mocho	Inflow/ Outflow	Meter	D					Std Analysis, Also EC Recorder data
AM_WF	Arroyo Mocho at Wente Ford	Measurement	Calculated	D					
WEN_DIV_AM	Wente Diversion from Arroyo Mocho	Inflow/ Outflow	Meter	D					
AMHAG	Arroyo Mocho at Livermore (Hagemann)	Measurement	Meter	R	A				Std Analysis, Also EC Recorder data
MA_CM_AM_E1	Calmat Discharge to AM at Site E1	Inflow/ Outflow	Recorder	D					Quality monitored at source in MA Program
MA_CM_AM_E2	Calmat Discharge to AM at Site E2	Inflow/ Outflow	Meter	D					Quality monitored at source in MA Program

				Objectives					
				Std		Wtr Rts		NP	
Site	Location	Type	Device	Flw	Qlty	Flw	Qlty	Qlty	Notes
MA_CM_AM_E3	Calmat Discharge to AM at Site E3	Inflow/ Outflow	Meter	D					Quality monitored at source in MA Program
MA_CM_AM	Calmat Discharge to Arroyo Mocho	Inflow/ Outflow	Calculated	D					Quality monitored at source in MA Program
MA_CM_AM_EXP	Calmat Discharge to AM—Exported from basin	Inflow/ Outflow	Calculated	D					Quality monitored at source in MA Program
AM_KB	Arroyo Mocho at Kaiser Bridge	Measurement	Calculated	R	A				Std Analysis
SR1_AM	Stoneridge 1 Waste to Arroyo Mocho	Inflow/ Outflow	Recorder	D					
AMP	Arroyo Mocho near Pleasanton	Measurement	Meter	R	A				Std Analysis; also EC Recorder
MOC1_AM	Mocho 1 Waste to Arroyo Mocho	Inflow/ Outflow	Recorder	D					
MOC3_AM	Mocho 3 Waste to Arroyo Mocho	Inflow/ Outflow	Meter	D					
MOC4_AM	Mocho 4 Waste to Arroyo Mocho	Inflow/ Outflow	Meter	D					
HOP6_AM	Hopyard 6 Waste Arroyo Mocho	Inflow/ Outflow	Meter	D					
Arroyo Valle—Line E									
AVBLC	Arroyo Valle below Lang Canyon	Measurement	Recorder	R	A				Std Analysis
LDV_FLD_GATE	LDV Flood Gate	Inflow/ Outflow	Meter	D					
LDV_FLD_TTL	LDV Total Flood Release	Inflow/ Outflow	Calculated	D					
SBA_TO2_AV	SBA Turnout 2 to Arroyo Valle	Inflow/ Outflow	Meter	D					
AVNL	Arroyo Valle Near Livermore	Measurement	Recorder	R	A	R	Q		Std Analysis
SBA_TO1_AV	SBA Turnout 1 to Arroyo Valle	Inflow/ Outflow	Meter	D					
SBA_AV_TTL	SBA Turnouts to Arroyo Valle Total	Inflow/ Outflow	Calculated	D					
AV_ASGP	Arroyo Valle above	Measurement	Calculated	D					

				Objectives					
				Std		Wtr Rts		NP	
Site	Location	Type	Device	Flw	Qlty	Flw	Qlty	Qlty	Notes
	Sycamore Grove Park								
AV_AVBRDG	Arroyo Valle above Vallecitos Bridge	Measurement	None	D					
AV_VBRDB	Arroyo Valle at Vallecitos Bridge	Measurement	Staff	D					
AV_ASTRIB	Arroyo Valle above South Trib	Measurement	None	D					
AV_ISABEL	Arroyo Valle at Isabel	Measurement	Staff	D					
AV_PONDS	Arroyo Valle at Ponds	Measurement	Staff	D					
MA_LS_SC	Lonestar Discharge to Shadow Cliffs	Inflow/ Outflow	Meter	D					
MA_LS_AV	Lonestar Discharge to Arroyo Valle	Inflow/ Outflow	Meter	D					
AV_DIV_SC	Arroyo Valle Diversion to Shadow Cliffs	Inflow/ Outflow	Meter	D					
MA_LS_AV_EXP	Lonestar Discharge to AV—exported from basin	Inflow/ Outflow	Calculated	D					
ADVP	Arroyo Valle at Pleasanton	Measurement	Recorder	R	A	R	Q		Std Analysis, Also EC Recorder data
South Tributary									
STRIB_ADVWTP	South Trib above DVWTP	Measurement	None					A	Dry in 2004
DVWTP_DISCH	DVWTP Discharge to South Trib	Inflow/ Outflow	Meter	D					Sample in February 2004
STRIB_KB	South Trib at Kalthoff Bridge	Measurement	Staff					A	Sample in February 2004
STRIP_AAV	South Trib above Arroyo Valle	Measurement	None	W					Sample in February 2004
Number of Sites in 2004 Programs: 51			**Totals:**	**47**	**12**	**2**	**2**	**4**	

Abbreviations: Objectives: Std = Standard; Wtr Rts = Water Rights; NP = NPDES; Flw = Flow; Qlty = Quality. Frequencies: A =Annual; Q = Quarterly; M = Monthly; W = Weekly; D = Daily; R = Recorder (15 minutes). Std Analysis = EC, T, pH, Minerals; EC = Electrical Conductivity, T = Temperature.

Updated Friday, May 20, 2005.

Zone 7's Surface Water Monitoring Program includes the monitoring of surface water stations for the following reasons and/or regulatory objectives:

- **Watershed Monitoring (Std in Table 4-5)**—to calculate the quantity and quality of surface water (natural and artificial) recharging into the main

basin, characterize seasonal water quality variations, and develop a historical database of base-flow water quality.

- **Water Rights (Wtr Rts in Table 4-5)**—The conditions of Zone 7's water rights permit require that Zone 7 conduct a groundwater investigation that includes quarterly sampling and continuous flow recording at two surface water recorder stations.
- **NPDES (NP in Table 4-5)**—The conditions of Zone 7's Water Treatment Facilities General NPDES permit and NPDES Storm Water (Non-Point Discharge) permit require that Zone 7 sample above and below existing treatment plant discharges to the streams and at other relevant points in the watershed.

Ten sites in the program are equipped with recorders that produce a continuous gage-height record (15-minute intervals), seven of which are operated by Zone 7, and the other three are owned and operated by the USGS. The other sites in the program (staff gages, meters, calculated, or other) have daily values for flow (except for STRIB_AAV which has weekly values).

Currently three recorder sites record 15-minute data sets for electrical conductivity (EC). Because of the recent relocation and maintenance issues, four other recorder stations are currently not configured to record EC, but are expected to be updated soon. The three USGS recorder stations are not configured for recording EC because they are in areas that have limited impacts on basin water quality.

Grab samples are taken monthly from all stations and field tested for EC. All ten recorder sites and four NPDES sites in the program are sampled annually and submitted to the laboratory for analysis. Zone 7 also collects an annual grab sample from two Lawrence Livermore National Laboratory (LLNL) discharge sites for laboratory analysis in addition to reviewing weekly EC data and monthly laboratory data reported by LLNL. Most of the LLNL water used on site for irrigation and is of adequate quality to be used off-site for irrigation of parks, landscaping or vineyards, if desired by the community.

As necessary, Zone 7 also performs synoptic studies designed to monitor the exchange of ground and surface waters, the rates of recharge along stream reaches, and the areas of basin or sub-basin groundwater outflow. These studies consist of a series of measurements made during periods of stable flow. The variations in flow from station to station generally represent steady-state groundwater recharge or discharge (rising water). Flow and water quality data are collected as part of each synoptic study.

4.5.3.3 Reporting

As part of the surface water program, Zone 7 compiles available current and historical data. The following reports are generated to present the data:

- Daily Stream Flow Report (internal use—primarily to manage the artificial stream recharge program),
- Weekly Surface Water Report (internal use only),
- Monthly Surface Water Report (includes a summary of stream flows from recorder stations, averaged and recorded daily, and a tabulation of stream conductivity),
- Surface Water Annual Monitoring Report, and
- Program Design Report for Surface Water Program.

The results of this program are used for the supply and demand inventory, recharge calculations, salt management, and groundwater modeling.

4.5.4 Land Surface Elevation and Inelastic Subsidence Monitoring

4.5.4.1 Background/Introduction

In accordance with DWR requirements for GMPs, Zone 7 established a formal Land Surface Elevation Monitoring Program in November 2002. The program, which focuses on identifying possible changes in land surface elevations resulting from groundwater pumping, is designed to document long-term land surface elevation changes and determine whether these changes are elastic and/or inelastic.[1]

4.5.4.2 Program Description

The program includes:

- compiling historical records of benchmark elevations;
- compiling any records of infrastructure failures that could possibly be associated with subsidence. This has included monitoring for surficial signs of possible subsidence (e.g., hardscape cracking, well casing failures, damaged pipelines); and
- semiannual surveying of a network of about 80 benchmarks and other survey points.

The majority of the points consist of a main circuit (A1) that:

- begins on Livermore Formation on the west side of the valley floor (Site A1-1.0),

[1] Zone 7 2004e.

- transverses the main basin across the Bernal and West Amador sub-basins to the northern boundary of the Main Basin (to Site A1-9.0), and then
- traverses to the southern boundary of the Main Basin on Livermore Formation (to Site A1-17.0).

Several smaller circuits (B1 to B7) branch off of this main circuit. Table 4-5, above, lists the sites in the programs. Figure 4-4 shows the locations of the circuit benchmarks and active municipal pumping wells in the area.

For groundwater elevation reference points, Zone 7 also surveys small circuits in and around Zone 7 pumping wells. These small circuits, described in Table 4-6, branch off of the circuits discussed above. For map clarity, these points are not shown on Figure 4-4.

Table 4-6. Land Surface Elevation Monitoring Survey Points and Descriptions

Sites Monitored by Keir and Wright				Additional Well Sites Monitored by Zone 7			
Site ID	Well ID	Survey Points	Description	Site ID	Well ID	Survey Points	Description
A1-1.0*		G972	Brass disk located in sidewalk	AW1-P	3S/1E 8H 2	Army Well 1, Pedestal	Army Well 1 well pedestal
A1-2.0		Foot-La-Pos	Chisel mark on bridge footing	AW1-RP	3S/1E 8H 2	Army Well 1, RP	Army Well 1 reference point
A1-3.0		C972	Brass disk mounted on bridge platform	AW2-P	3S/1E 8H 3	Army Well 2, Pedestal	Army Well 2 well pedestal
A1-4.0		Mocho-Chabot	Brass disk located on access road	AW3-P	3S/1E 8H 4	Army Well 3, Pedestal	Army Well 3 well pedestal
A1-5.0		Mocho-Tass-W	Brass disk located on access road	H6-C	3S/1E 18A 6	Hopyard 6, Casing	Hop 6 casing/flange
A1-6.0		Mocho-Tass-E	Brass disk located on access road	H6-D	3S/1E 18A 6	Hopyard 6, Drain	Hop 6 drain
A1-7.0		Mocho_CB	Chisel mark on catch basin	H6-F	3S/1E 18A 6	Hopyard 6, Floor	Hop 6 chisel mark on pumphouse floor
A1-8.0		M1257	Brass disk mounted on bridge platform	H6-P	3S/1E 18A 6	Hopyard 6, Pedestal	Hop 6 well pedestal
A1-9.0*		Tass_Rose	Proposed disk on bridge foundation	H6-RP	3S/1E 18A 6	Hopyard 6, RP	Hop 6 reference point Hop 9 transformer pad
A1-10.0		L1257	Disk	H9-T	3S/1E 17D12	Hopyard 9, Transformer	
A1-11.0		Vine-Pipe	Brass disk in concrete	H9-C	3S/1E 17D12	Hopyard 9, Casing	Hop 9 casing/flange
A1-12.0		Mohr-RR	Spike at Mohr Ave and RR	H9-F	3S/1E 17D12	Hopyard 9, Floor	Hop 9 chisel mark on pumphouse floor
A1-13.0		TBM2		H9-P	3S/1E 17D12	Hopyard 9, Pedestal	Hop 9 well pedestal
A1-14.0		Bush-Valley	Brass disk (?) City benchmark	H9-RP	3S/1E 17D12	Hopyard 9, RP	Hop 9 reference point

Figure 4-4

LEGEND

- Benchmark Location
- Active Municipal Well

0 1000 2000
FEET

A1- 9.0
A1- 8.0
B5- 3.0
B5- 2.0
B5- 1.0
B1- 1.0
B1- 8.0
MOCHO 4
B1- 3.0
B4- 2.0
STONERIDGE_1
B1- 9.0
B6- 2.0
B1- 2.0
B4- 1.0 S
A1- 7.0
B2- 2.0
B6- 1.0
B2- 3.0
B1- 6.0
B1- 4.0
B2- 1.0
A1- 6.1
B1-11.0
B7- 3.0
B1-12.0
B1-14.0
MOCHO 1
B2- 4.0
B7- 2.0
A1-10.0
A1- 5.0
B6- 3.0
B1-16.0
MOCHO 2
MOCHO 3
A1- 6.0
A1- 4.0
B1- 7.0
B1- 5.0
A1-12.0
A1- 3.0
B1-10.0
HOP 9
B1-13.0
A1-13.0
A1- 1.0
HOP 6
B3- 3.0
B3- 1.0
B7- 1.0
PLEAS #8
A1- 2.0
B3- 2.0
A1-14.0
PLEAS #6
PLEAS #5
A1-15.0
SFWD A11
SWP_3S1E20C3
SFWD A10
SFWD A3
SWP_3S1E20B2
A1-16.0
A1-17.0

ZONE 7 WATER AGENCY

Benchmark Locations

BY:	DATE:	
GG/TR	Mar 1, 2004	E:\monitor\em\2003wy\Annual\Fig1EMLocations.wor

Sites Monitored by Keir and Wright				Additional Well Sites Monitored by Zone 7			
Site ID	Well ID	Survey Points	Description	Site ID	Well ID	Survey Points	Description
A1-15.0		D8	Brass disk on bridge foundation	M1-C	3S/1E 9M 2	Mocho 1, Casing	Mocho 1 casing/flange
A1-16.0		V1	Brass disk	M1-P	3S/1E 9M 2	Mocho 1, Pedestal	Mocho 1 well pedestal
A1-17.0*		K2	Brass disk (?) NGVD Benchmark	M1-RP	3S/1E 9M 2	Mocho 1, RP	Mocho 1 reference point
B1-1.0		Mocho-san MP3	Proposed disk on bridge Platform	M1-T	3S/1E 9M 2	Mocho 1, Transformer	Mocho 1 transformer pad
B1-2.0		Mocho-san MP2	Proposed disk on bridge Platform	M3-C	3S/1E 9M 4	Mocho 3, Casing	Mocho 3 casing/flange
B1-3.0		Mocho-san MP1	Proposed disk on bridge Platform	M3-P	3S/1E 9M 4	Mocho 3, Pedestal	Mocho 3 well pedestal
B1-4.0	3S/1E 8H 3	Army Well 2, Floor	Chisel mark on pumphouse floor	M3-RP	3S/1E 9M 4	Mocho 3, RP	Mocho 3 reference point
B1-5.0	3S/1E 8H 18	Mocho 4, Floor	Shiner at entrance door	M3-T	3S/1E 9M 4	Mocho 3, Transformer	Mocho 3 transformer pad
B1-6.0	3S/1E 8H 2	Army Well 1, Floor	Chisel mark on pumphouse floor	M4-C	3S/1E 8H18	Mocho 4, Casing	Mocho 4 casing/flange
B1-7.0		Mocho-Stone MP1	Proposed disk on bridge Platform	M4-P	3S/1E 8H18	Mocho 4, Pedestal	Mocho 4 well pedestal
B1-8.0		Mocho-Stone MP2	Proposed disk on bridge Platform	M4-RP	3S/1E 8H18	Mocho 4, RP	Mocho 4 reference point
B1-9.0		Mocho-Stone MP3	Proposed disk on bridge Platform	M4-T	3S/1E 8H18	Mocho 4, Transformer	Mocho 4 transformer pad
B1-10.0		Mocho-Stone MP4	Proposed disk on bridge Platform	S-D	3S/1E 9B 1	Stoneridge, Drain	Stoneridge drain
B1-11.0	3S/1E 8H 4	Army Well 3, Floor	Chisel mark on pumphouse floor	S-P	3S/1E 9B 1	Stoneridge, Pedestal	Stoneridge well pedestal
B1-12.0	3S/1E 8H 13	Obs. Well, Casing	Chisel mark on casing	S-RP	3S/1E 9B 1	Stoneridge, RP	Stoneridge reference point
B1-13.0	3S/1E 9M 4	Mocho 3, Shiner	Shiner at entrance door	S-C	3S/1E 9B 1	Stoneridge, Casing	Stoneridge casing/flange
B1-14.0	3S/1E 9M 2	Mocho 1, Floor	Chisel mark on pumphouse floor				
B1-16.0	3S/1E 9M 3	Mocho 2, Floor	Chisel mark on entrance door				
B2-1.0		Tass-Las-Pos MP1	Proposed disk on bridge Platform				
B2-2.0		Tass-Las-Pos MP2	Proposed disk on bridge Platform				
B2-3.0		Tass-Las-Pos MP3	Proposed disk on bridge Platform				
B2-4.0		Tass-Las-Pos MP4	Proposed disk on bridge Platform				
B3-1.0		Mocho-Park	Brass disk on concrete vault				
B3-2.0		1H ALA	County Benchmark				
B3-3.0	3S/1E 17D12	Hop 9 BM	Benchmark, rod in access road				

Sites Monitored by Keir and Wright				Additional Well Sites Monitored by Zone 7			
Site ID	Well ID	Survey Points	Description	Site ID	Well ID	Survey Points	Description
B4-1.0		AMP-Ctl S	Brass Disk on Control				
B4-2.0	3S/1E 9B1	Stoneridge, Floor	Chisel mark at entrance door				
B5-1.0		OSRR-BC	New Monument Disk				
B5-2.0		OSRR-Andrew	New Monument Disk				
B5-3.0		OSRR-Café	New Monument Disk				
B6-1.0		5608 Belleza	New Monument Disk				
B6-2.0		FLORA-end	New Monument Disk				
B6-3.0		Belleza-Verd	New Monument Disk				
B7-1.0		Larame-Larame	New Monument Disk				
B7-2.0		Suttr-Larame	New Monument Disk				
B7-3.0		Suttr-Jones	New Monument Disk				
* Probable bedrock sites.							

Measurement Frequency	
Circuit	Frequency
A1 Circuit	Semi-annually
B1 Mocho loop	Semi-annually
B2 Tassajara loop	Semi-annually
B3 Hopyard wells loop	Semi-annually
B4 Stoneridge well loop	Semi-annually
B5 Tassajara—Rosewood	Semi-annually
B6 Verona loop	Discontinued in 2004
B7 Suttergate loop	Discontinued in 2004
Additional Well Sites	Semi-annually

4.5.4.3 Reporting

Throughout the water year several reports are generated to display, review, and discuss the data that were gathered:

- Land Surface Elevation Semiannual Monitoring Report,
- Land Surface Elevation Monitoring Report—annually, and
- Land Surface Elevation Monitoring Program Design Report—annually.

The results of this monitoring program are used to measure and document any changes in land surface elevation that could possibly be associated with elastic or inelastic subsidence. The oldest benchmark in the program dates back to 1912 and has moved possibly about 3 inches. These records are used to help identify whether there are any negative impacts from groundwater pumping on ground surface elevations.

4.5.5 Mining Area Monitoring

4.5.5.1 Background/Introduction

Mining of sand and gravel in the Livermore-Amador Valley began prior to 1900. As demands continued to grow, and larger areas and volumes of sand and gravel were removed, the need for a regulatory system became apparent. In 1956 the County of Alameda adopted Ordinance 181 N.S. Ordinance 181 N.S. prohibited

pollution or contamination of usable water-bearing strata.[2] In addition, the early permits, as well as later permits, limited the mining to the uppermost aquifer. More recent permits, beginning in 1965, contained more specific language for protecting water resources and reclamation plans. In 1977, Alameda County adopted a new surface mining ordinance updating the 1956 Quarry Ordinance and incorporated reclamation requirements.[3]

In 1980 a gravel mining reclamation plan was adopted by Alameda County and local mining companies. The plan called for the completion of a "chain of inter-connected ponds which would allow routing of storm waters through the mining area and subsequent recharge in the west." This plan was designed to mitigate the loss of stream recharge capacity, loss of groundwater basin storage, loss of water through increased evaporation and loss of groundwater transport through the upper aquifer towards the sub-basins on the west side of the basin. When completed in 2030, Zone 7 will own and operate this "Chain of Lakes" for groundwater basin management purposes.

4.5.5.2 Program Description

Since gravel-mining operations have had an appreciable effect on groundwater levels and quality in the main groundwater basin, Zone 7 has incorporated a mining component into the monitoring network. A pit numbering system was developed by Zone 7 staff in 1972 and is still used today to identify active and inactive pit areas.

The current program consists primarily of monthly and semiannual monitoring. Monthly observations include determination of water surface elevations and water quality from twelve major pits. In addition, monthly observations included recording any change in mining operations. Water surface elevations and EC readings are done for each of the monthly pits. A TDS value is estimated based on the EC readings. Twice a year, in the spring and fall, all monthly monitored ponds are sampled for a complete mineralogical analysis at the Zone 7 laboratory. Monthly monitoring also includes a review of stream discharge reports received from the mining companies, which includes a compilation of daily and monthly stream discharge meters and data. The semiannual monitoring consists of a more extensive inventory of all significant pits and ponds in the mining areas. Semiannual monitoring includes surface water elevation measurements, EC, and determination of evapotranspiration rates. In addition, a water quality sample for laboratory analysis is collected from each pond on an annual basis. Figure 4-5 shows the location of the gravel mining pits.

[2] Alameda County 1981.
[3] Alameda County 1981.

4.5.5.3 Reporting

Throughout the water year several reports are generated to display, review, and discuss the data that were gathered:

- Gravel Mining Groundwater Export and Evaporation Report—monthly,
- Mining Area monthly and semiannual reports (internal), and
- Mining Area Annual Report.

The results of this program are used for the supply and demand inventory, recharge calculations, salt management, and groundwater modeling.

4.5.6 Land Use Monitoring

4.5.6.1 Background/Introduction

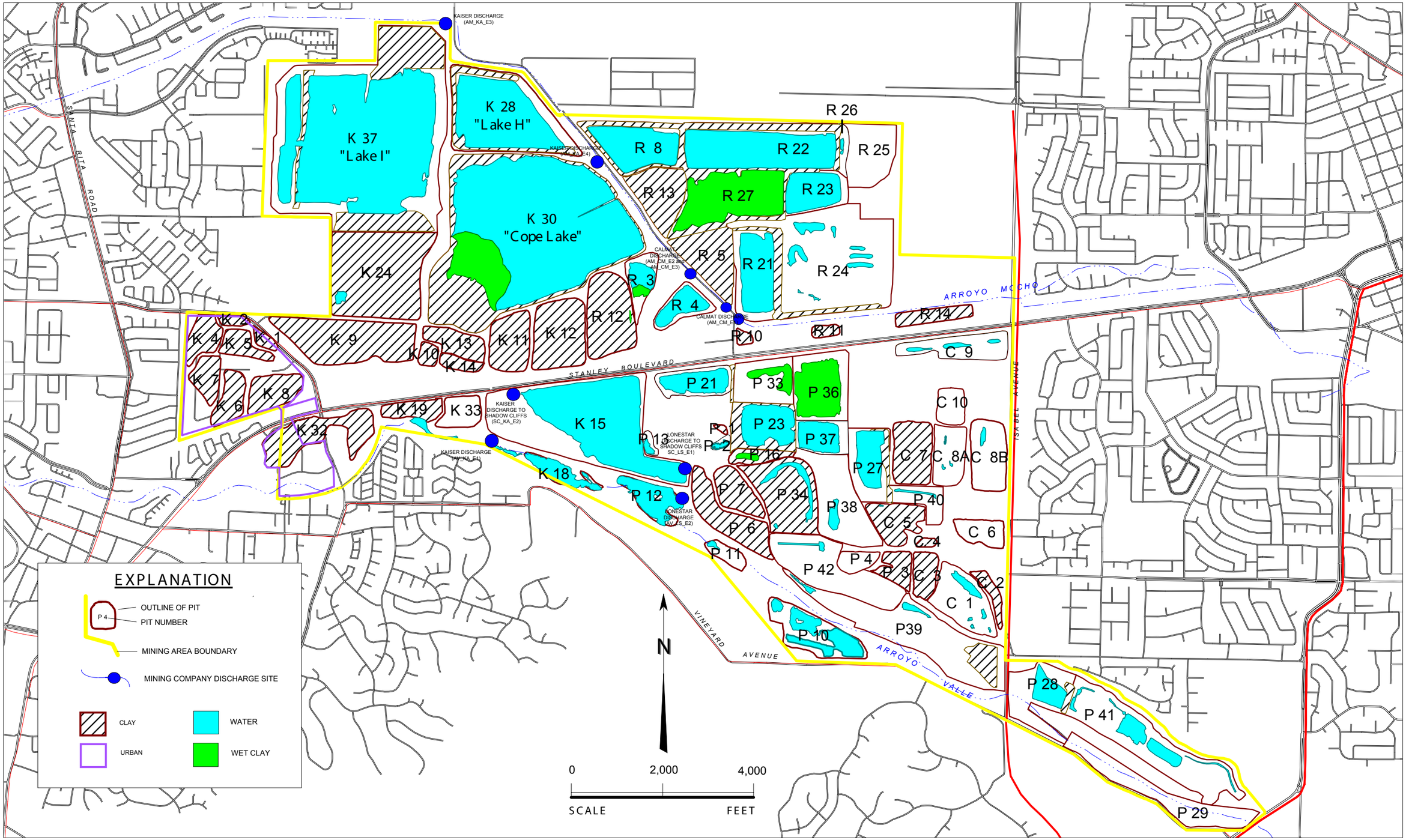
Collection of land use data is essential in understanding changes in land and water use over time that may affect infiltration and water quality in the groundwater basin. To properly assess water supply and water quality conditions and trends in the groundwater basin, accurate records of land and water use changes are needed. Zone 7 identifies and quantifies different types of land uses with irrigation significant enough to contribute groundwater recharge and affect the salt loading of the Main Basin. The program also identifies the type of water (potable, groundwater, or recycled) for use in the computation of salt loading to the Main Basin.

4.5.6.2 Program Description

As part of Zone 7's long-term monitoring program, land use in the Livermore-Amador Valley is monitored. Zone 7's Land Use Monitoring Program includes the identification of the following different land use type (see Figure 4-6):

- **Urban** land use includes residential and commercial areas, which typically are irrigated. Small vacant lots, non-irrigated fields and other undeveloped areas are included as urban land if they are smaller than about 20 acres and are located in urban areas.[4] Each urban classification is composed of several subcategories. For example, Urban Reclaimed Water lands are urban areas subject to reclaimed wastewater irrigation. Such urban areas include landscaped regions surrounding the valleys, two wastewater treatment facilities, the Livermore Airport, the Dublin Sports Grounds, parts of east Dublin and the area north of Interstate 580 along Canyons Parkway, including Las Positas College. Golf courses are included in the urban category and are divided into three subcategories: golf course groundwater, golf course surface water, and golf course reclaimed water.

[4] Zone 7 2003, 2004f.



ZONE 7 WATER AGENCY 5997 PARKSIDE DRIVE PLEASANTON CA 94588	*DRAWN* TODD WENDLER *DESIGNED* T.WENDLER *CHECKED* JARNAIL CHAHAL *APPROVED*	WATER RESOURCES MINING AREA MONITORING PROGRAM LOCATION OF GRAVEL MINING PITS	SCALE 1" = 2,000' DATE 12 January 2003 FILE NO. B - h:\ma\2003\maF03.mapinfo

Figure 4-6

EXPLANATION

NODE NUMBER
NODE BOUNDARY
MAIN BASIN / NODE BOUNDARY
MAIN BASIN NODE NUMBER

LAND USE CATEGORIES

- URBAN
- URBAN RECLAIMED WATER
- GOLF COURSE GROUNDWATER
- GOLF COURSE SURFACE WATER
- GOLF COURSE RECLAIMED WATER

IRRIGATED AGRICULTURE — BY PRIMARY IRRIGATION SOURCE

- GROUNDWATER
- SURFACE WATER

MINING AREA

- LAKES
- WET CLAY
- RECLAIMED URBAN

N

0' 3000' 6000'
SCALE

LAKE DEL VALLE RESERVOIR

ZONE 7 WATER AGENCY
5997 PARKSIDE DRIVE PLEASANTON CA 94588

DRAWN	TODD WENDLER
DESIGNED	TODD WENDLER
CHECKED	
APPROVED	

WATER RESOURCES
LIVERMORE VALLEY LANDUSE 2004 WATER YEAR

SCALE	1" = 6000'
DATE	29 November 2004
FILE NO.	B-140 | LU_04.WOR

- **Irrigated/Agriculture** land use consists of irrigated farmland such as vineyards, field crops, vegetable crops and pastures. Excluded from this category is agricultural land that is dry-farmed or minimally irrigated during the growing season. Irrigated areas, also shown in Figure 4-6, have been subdivided by primary water sources as groundwater or surface water. The vineyard areas are irrigated primarily with surface water obtained from the SBA. Some groundwater can be used in the vineyards to supplement the SBA water, but because the amount used is proportionally small, these areas are listed as surface water irrigated. Beginning in 2001, Zone 7 maps included agricultural lands irrigated with recycled water.
- **Gravel Mining Area** land use includes all lands that have been mined or are scheduled to be mined. Mining area "ponds" include all areas of ponded water or wet silt. The wet silt areas are counted as ponded area because evaporative losses from wet silt are similar to evaporation that occurs in open ponds. Mining area "reclaimed" includes all lands mined and refilled or partially refilled with clay. Mining area "urban" includes lands within the mining area that have been reclaimed and developed into industrial parks or similar urban uses. The "irrigated agriculture" category is located outside of the mining area. Mining area "other" includes excavations, earthworks, and undisturbed lands within the mining area that do not belong in any other mining area classification.

Land use data are derived from aerial photography (annual), interviews with landowners, and field observations. Land use changes are monitored and evaluated in a monthly site review report. This report tracks all new land use changes and is used to coordinate Zone 7 concerns to the land use planning agencies.

4.5.6.3 Reporting

The Livermore Valley Land Use Report is generated annually to display, review, and discuss changes in land use and water use that may impact the regional water supply or the groundwater basin. In addition, a site review report of all potential land use changes that may impact the groundwater basin is compiled and reviewed each month. The results of this program are used for the recharge calculations (of rainfall recharge and applied water recharge).

4.5.7 Groundwater Production

4.5.7.1 Background/Introduction

The extraction of groundwater for municipal, industrial, domestic and agricultural use represents more than 80% of the groundwater flow through the basin. Maintaining accurate records of the quantity and location of all groundwater extractions is critical for basin evaluations and modeling. This program compiles daily, monthly, and annual records of groundwater extraction

from all significant wells within the groundwater basin. More specifically, this program includes groundwater levels, monthly production amounts, and water quality analyses for all municipal supply wells to determine the amount and quality of water that is being extracted from the groundwater basin for municipal and/or agricultural use.

Accurate records have been kept on monthly production quantities since 1974. The records are vital to accounting of groundwater use and to the proper allocation of waters recharged artificially and subsequently pumped by Zone 7 versus waters naturally recharged into the groundwater basin and subsequently pumped by retailers or others.

Historical records prior to 1974 are incomplete and use prior to the 1960s must be estimated based on land use mapping and limited pumping records.

4.5.7.2 Program Description

Zone 7 collects and compiles monthly records for all large pumping wells within the Main Basin. Zone 7 meters all Zone 7 pumping and requires metered pumping records from all retailer wells. Records of other pumping wells are obtained from well owners when available. Pumping records from smaller wells or wells without meters are calculated from power records or from land use data. Zone 7 obtains these records as part of the land use mapping program and the groundwater level-monitoring program.

4.5.7.3 Reporting

Zone 7 tracks and reviews Zone 7 pumping each day and reports the amount in a daily production report. The Monthly Municipal Water Supply report compiles reviews of municipal pumping from all wells valley-wide. Any discrepancies or lapses in the data stream are resolved to prevent the loss of well pumping data. The records from local retailers are compared to contractual pumping limits (formerly referred to as Independent Quotas) and, in the event of overpumping, the retailers are billed for the excess water.

4.5.8 Wastewater and Recycled Water Monitoring

4.5.8.1 Background/Introduction

Wastewater disposal from domestic and commercial sites can have a significant impact on water resources and a groundwater basin. While wastewater disposal can contribute a significant quantity of water to recharging the basin, it can also be a potential source of contamination, primarily from salts, nitrates and chlorides.

Zone 7 completed numerous studies of wastewater disposal and water quality management including an early study entitled, "Water Quality Management Plan for the Alameda Creek Watershed above Niles," in September 1972. Subsequent joint studies by USGS and Zone 7, along with actions by the California Regional Water Quality Control Board—San Francisco Bay Region and the Zone 7 Board resulted in the creation of the Livermore Amador Valley Water Management Agency (LAVWMA) which eventually constructed an export pipe. Since 1979, the LAVWMA export pipe has exported most urban wastewater out of the watershed and into the San Francisco Bay. The remainder of the locally-sewered water receives tertiary treatment and is currently distributed as recycled water for landscape irrigation (for additional discussion of wastewater management, see Section 5.1.4.4).

Figure 4-7 shows the land use and wastewater disposal changes over the past 35 years. Note that prior to the LAVWMA pipeline construction, all urban wastewater was disposed in the valley with significant amounts of wastewater either flowing out of the basin via the local arroyos or percolating into the groundwater basin. The Wastewater Management policies established by Zone 7 in the 1970s successfully supported regional sewering for the majority of developed lands overlying the entire groundwater basin and for essentially all of the lands overlying the Main Basin. Thus wastewater from the majority of sewered areas is exported out of the basin via the LAVWMA export pipeline.

As discussed in Sections 3.5 and 5.1.4.4, there is a groundwater contamination plume containing high levels of nitrates existing in the eastern portion of the Main Basin. There have been several evaluations suggesting a variety of sources for these nitrates. There remain a few localized unsewered areas with a high density of residential septic tanks (i.e., Buena Vista Avenue near the upper end of this plume, along with both the Happy Valley and Sunol areas which are separate from the above-described plume) that may or may not be contributing to nitrate loading within the basin. Since these areas are relatively rural and are typified by various livestock (both currently and historically), nitrate remains a concern.

In some areas, large tracts of land have been dedicated as permanent open space, which is unlikely to generate much urban wastewater on site (although application of recycled water for landscape or agricultural irrigation is potentially possible, as are on-site septic tanks, fertilizer applications, winery wastes used to augment irrigation water, etc.). These lands include large regional parks and areas within agricultural land trusts. The other large area within the Main Basin that is excluded from significant in-valley wastewater disposal is the Mining Area, which will either be developed and sewered (with wastewater exported from watershed) or be left as permanent open space.

4.5.8.2 Program Description

Zone 7 currently tracks wastewater disposal on a monthly basis. NPDES permits for the City of Livermore and the DSRSD wastewater treatment plants are reviewed monthly. Flow and quality data are evaluated for impacts to the groundwater basin. In the future the wastewater flows will be tracked on a daily

basis so that the Concentrate from the Groundwater Demineralization projects can be coordinated with wastewater discharges into the LAVWMA pipeline. Recycled water use is also tracked monthly for water use, flow and location of use. Additional description of Zone 7's wastewater management program is contained in Section 5.1.4.4.

4.5.8.3 Reporting

The flow and quality data is compiled in a monthly Wastewater and Recycled Water Report for internal use by Zone 7 staff and the location of recycled water applications are mapped in the Land Use Annual Report. The data are used for hydrologic inventory calculations, salt balance calculations, and groundwater modeling.

4.6 Basin Evaluation Programs

4.6.1 Introduction

The data and results of Zone 7's monitoring programs are used to evaluate the conditions of the groundwater basin. This section of the GMP describes Zone 7's programs designed to evaluate the conditions of the basin using data collected from the monitoring described above. Following data collection and reporting for the monitoring programs, Zone 7 performs detailed evaluations and analyses that include data from more than one monitoring program. These data are described below and include:

- recharge calculations,
- hydrologic inventory,
- groundwater basin storage,
- salt balance calculations, and
- municipal water supply.

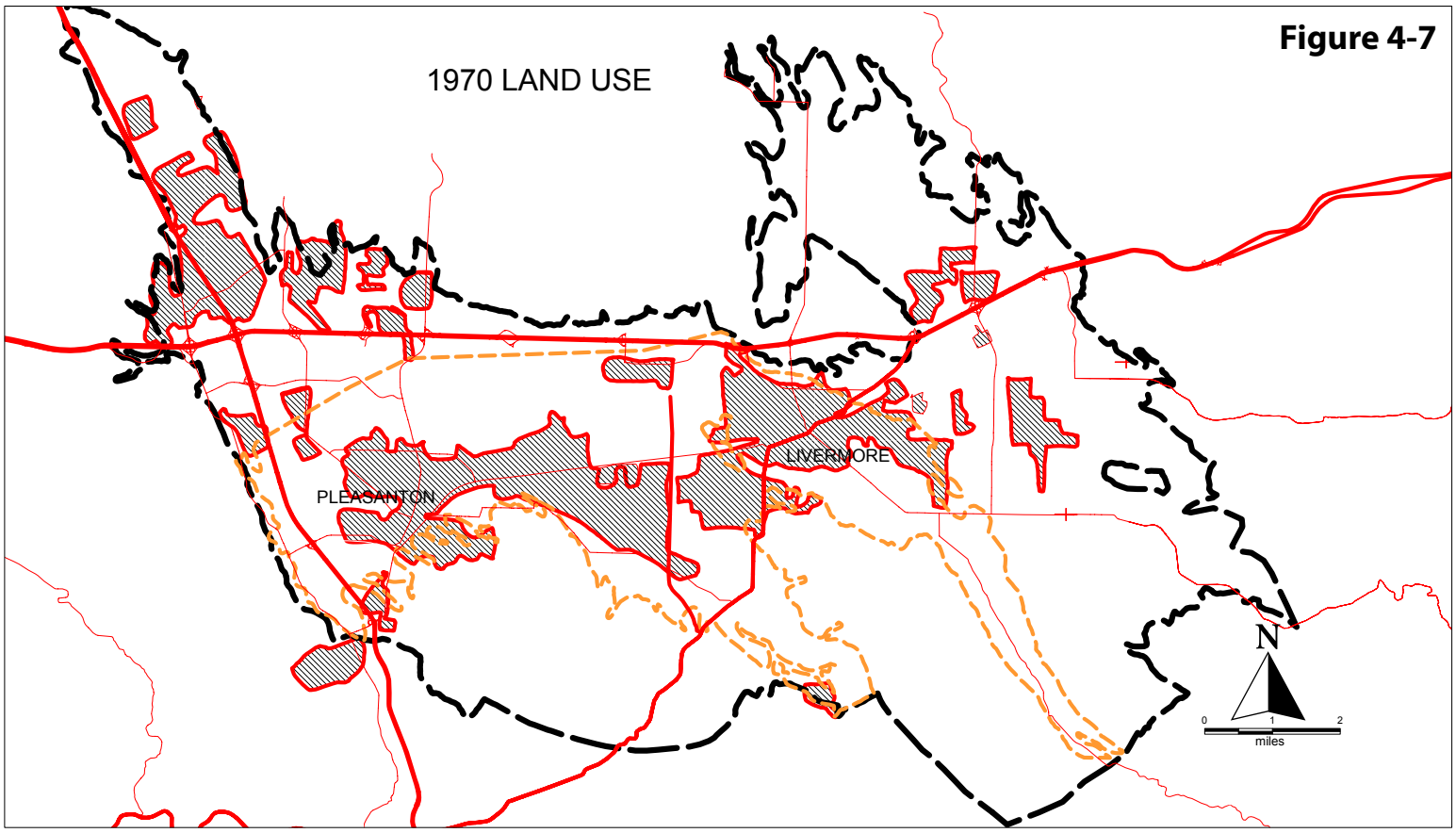
4.6.2 Recharge Calculations

Groundwater recharge occurs from rainfall, applied water, and streams, all of which are calculated by Zone 7. In the future, Zone 7 also plans to use mining area lakes as recharge ponds.

Zone 7 has developed a recharge calculation model that calculates both rainfall and applied water recharge rates for all locations in the groundwater basin. The recharge model, which includes results from the climatological and land use monitoring programs, includes parameters for soil type and hydrologic conditions

LAND USE & WASTEWATER DISPOSAL CHANGES OVER 35 YEARS

Figure 4-7

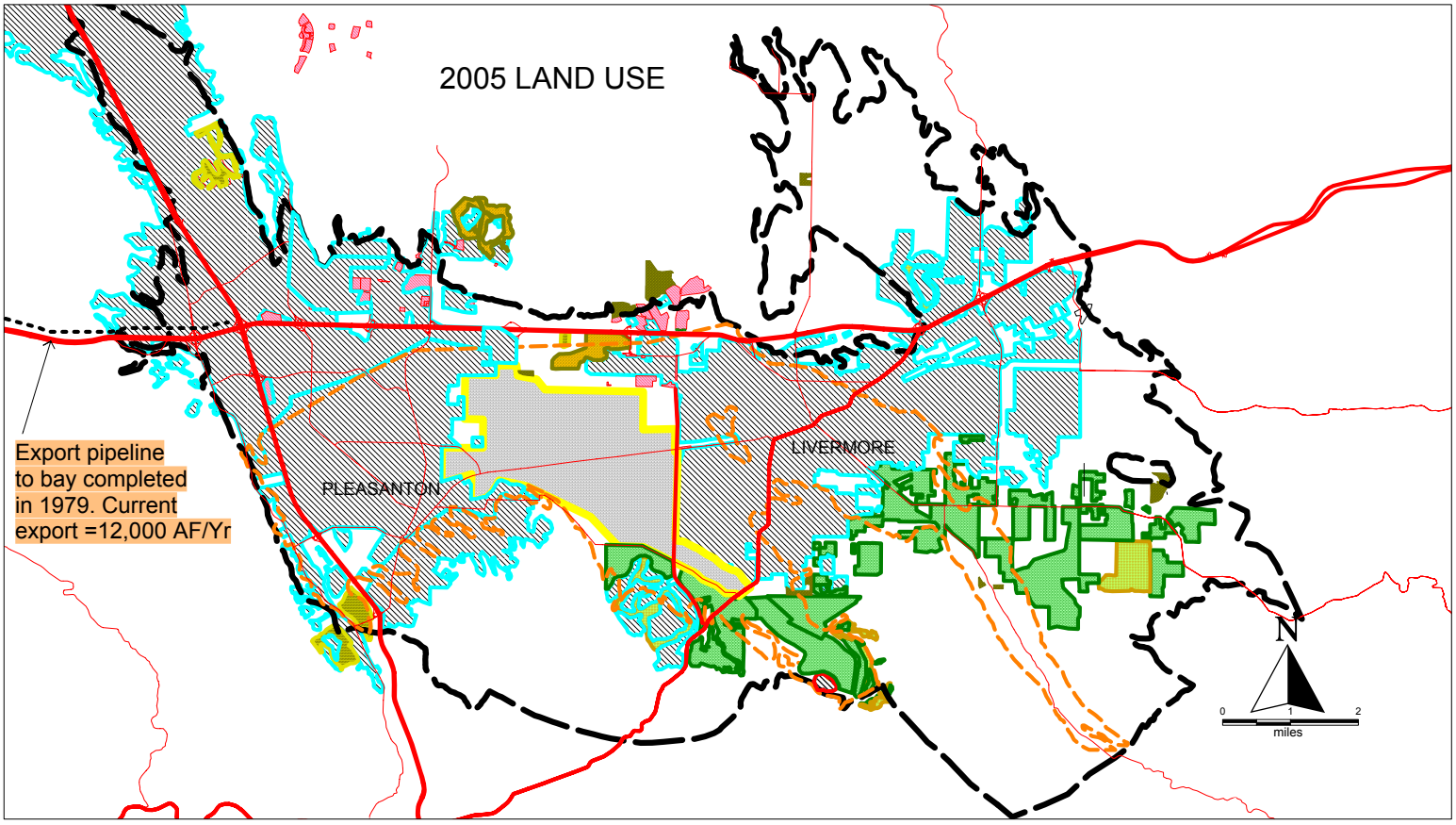


SEWERED- In Valley Disposal

SEWERED- Exported from Watershed

DEDICATED OPEN SPACE

MINING AREA (OPEN SPACE)



throughout the valley. For modeling the groundwater basin, rainfall and applied recharge are combined as a real recharge.

Groundwater recharge from streams includes the following components:

- natural recharge—rain runoff into the streams, including both urban runoff from rainfall and upper watershed runoff that recharge into the streambeds;
- artificial recharge—SBA or Lake del Valle water that is released into the streams; and
- gravel-mining recharge/discharge—recharge from gravel mining pit discharges or discharges into the streams.

Stream recharge is calculated from daily streamflow and stream discharge records. The three primary recharge streams have upstream and downstream gages, and the recharge typically is calculated as the difference between upstream inflows and downstream outflows.

4.6.3 Hydrologic Inventory and Water Balance

Zone 7 compiles a detailed hydrologic inventory or water balance of monthly and annual supply and demand components for the Main Basin. The hydrologic inventory represents the water balance between groundwater supply and groundwater demand. The inflow and outflow components of the Main Basin budget are presented in Table 4-7. Monthly inventory summaries are compiled each quarter and reported in the quarterly water supply report that is presented to the Zone 7 Board each quarter. The hydrologic inventory is the easiest way to keep track of changes in groundwater storage. Experience gained through the analysis of the hydrologic inventory allows Zone 7 staff to predict and model long-term basin response to changing hydrologic conditions.

Table 4-7. Annual Supply and Demand

	2003 Water Year (acre-feet)	Normal Water Year (acre-feet)
Inflows		
Natural Stream Recharge	4,629	4,766
Artificial Stream Recharge	9,588	11,379
Rainfall Recharge	2,041	3,910
Applied Water Recharge	949	1,719
Subsurface Inflow	720	756
Inflow Total	17,926	22,530
Outflows		
Municipal Pumping	13,471	13,456
Agricultural Pumping	118	1,066
Mining Use	2,233	2,236
Subsurface Outflow	0	405
Outflow Total	15,822	17,163
Net Recharge (Inflow – Outflow)	**2,104**	**5,367**

4.6.4 Groundwater Basin Storage

The amount of water in storage is a critical component of water supply management and drought planning. Zone 7 computes groundwater storage using two methods. The inventory method uses the hydrologic inventory to calculate storage changes. The groundwater level method uses groundwater level data and geologic information on aquifer properties to compute storage. Zone 7 has been using both methods for more than 20 years, and they are in close correlation. Each year Zone 7 completes a storage report that reviews the storage calculation based on the inventory method and the groundwater level measurement. Zone 7's experience with these methods allows staff to report with confidence the amount of water within the basin. Knowledge of this information allows Zone 7 staff to plan for extracting a known volume of water without risking lowering the basin below historical lows.

4.6.5 Salt Balance

Saline waters can slowly degrade the quality of groundwater (represented by a rise in basin salinity and/or hardness) and ultimately render part or all of a groundwater basin unusable. In the semi-arid Livermore Valley, multiple sources can contribute to increased salinity in groundwater: use and reuse of the water supply, lateral or upward migration of saline water, downward seepage of industrial or agricultural water, downward seepage of mineralized surface water from streams or lakes, interaquifer migrations of saline water and especially the

evapotranspiration of irrigation water (some of which is relatively high TDS recycled water). The primary purpose of the salt balance evaluation is to investigate the change in the amount of salt in the basin and calculate the basinwide change in water quality.

The Livermore groundwater basin has been experiencing slowly degrading water quality each decade, as evidenced by increasing TDS levels. Preventing the buildup of salts (calcium, magnesium, sodium, chloride, and other minerals) is a key Zone 7 water quality objective. Zone 7 calculates a salt balance to determine whether it is meeting long-term water quality objectives of non-degradation. Under full implementation of the Salt Management Plan (SMP), Zone 7 will increase recharge, increase pumping and bring the salt balance into a non-degradation range.

A salt balance is a calculation of the amount of salts and minerals entering or leaving a groundwater basin. If the balance is positive, the regional water quality will degrade. If the balance is negative, then basin quality will improve. However, for decades, the Groundwater Basin Salt Balance has been positive, confirming the reason basin water quality has continued to decline. Multiple sources can contribute to increased salinity in groundwater. In the semiarid Livermore Valley, the evapotranspiration of irrigation water, especially higher-TDS recycled water, has been the greatest long-term concern from a salt-management perspective.

Currently, the salt balance calculations are based on results from:

1. 45 monitoring wells to track groundwater levels and quality.
2. Six surface water recorder stations to track streamwater flow and quality in three major waterways in the watershed (Arroyo Valle, Arroyo Mocho and Arroyo Las Positas).

Additional wells and surface water recorder stations are under consideration to improve Zone 7's understanding of salt migration from fringe basins and concentration in the Main Basin.

All wells and surface waters used for the evaluation are sampled and analyzed annually for major ions (e.g., Ca, Mg, Na, K, HCO_3, SO_4, Cl, NO_3, SiO_2), boron, manganese, selenium, chromium, arsenic, EC, pH, TDS, alkalinity, and hardness. As surface water monitoring stations are upgraded with automated water quality measuring instruments, EC, temperature, and pH will be recorded on a nearly continuous basis.[5]

Sources of salt loading to the main basin for the 1998 water year are shown in Table 4-8. The table shows that urban irrigation represents a significant portion of the potentially "controllable" portion of the total salt loading to the basin. There is a limit to which the other sources can be controlled, with the possible exception of shallow groundwater pumping that might reduce high TDS subsurface inflow and recharge on Las Positas.

[5] Zone 7 2004a.

Table 4-8. Main Basin Relative Salt Loading Sources, 1998 Water Year Controllable Portion of the Total Salt

Sources	Relative Salt Load on the Basin
Urban Irrigation	33%
Natural Recharge on Arroyo Mocho	18%
Subsurface Inflow	13%
Natural Recharge on Arroyo Las Positas	14%
Natural Recharge on Arroyo Valley	13%
Agricultural Irrigation	3%
Artificial Recharge	6%

Reports summarizing results of the salt balance evaluation are planned to be generated initially on a quarterly and annual basis. The data collected as part of the salt balance evaluation will be used to identify changes in groundwater quality throughout the watershed, to refine salt loading estimates, and to provide input to the water resource allocation and groundwater models.

Given that the salt balance evaluation program was established in part to identify and fill existing data gaps and to provide a venue to evaluate the long-term effectiveness of the SMP, an annual critique and refinement of the monitoring and data collection effort is anticipated.

Data collected as part of this evaluation will be used to critically evaluate the usefulness of the data collected relative to making salt management control measure decisions. The groundwater model and this monitoring program will be used in a complementary fashion, where monitoring program results are used as input to the model and the monitoring program subsequently uses the output from the model to help determine additional (or reduced) data needs. This approach will help achieve long-term SMP goals without consuming excessive resources that could otherwise be used directly to implement salt management measures.

4.7 Basin Management

4.7.1 Introduction

A groundwater basin is a large natural complex reservoir. Zone 7 regulates more than half of the inflow and outflow from the basin and strives to make the basin function indefinitely to provide a sustainable supply of high quality water to the residents of the Tri Valley.

The basin needs to be managed as a system in order to be operated in an optimal way but the groundwater basin is just a part of a larger complex system that includes the SWP, local watershed runoff, Semitropic storage and treatment

plants. A community of about 190,000 people depend upon optimal use and proper management of the groundwater basin.

Zone 7 uses the information and knowledge gained from monitoring and from conducting the basin evaluation programs to create several models. These models are used to evaluate different basin management scenarios and to test out strategies. Zone 7 then creates a basin management operations plan based on the results of two types of modeling: water operations modeling and groundwater modeling. The modeling uses water supply forecasts from:

- supply and demand modeling,
- groundwater modeling,
- water supply forecasts,
- data from basin evaluation programs,
- knowledge gained by decades of studying the basin, and
- forecasts of potential water supply and demand conditions.

The basin management operations plan is a part of water supply planning and is included in the Annual Water Operations Plan.

4.7.2 Key Wells

Zone 7 has identified key index wells in each significant water-producing region of the Main Basin as general indicators of groundwater levels in the Main Basin. The data from these wells are evaluated quarterly using monthly water level data. The results from this evaluation are assembled onto easy-to-read graphs that can be displayed to the general public (see Figure 4-8).

4.7.2.1 Groundwater Storage

Zone 7 actively monitors groundwater storage in the basin to ensure that future demands are met during dry years. Zone 7 keeps groundwater storage above the main basin historical low, preserving all groundwater underneath the historical low for emergency use. Zone 7 is able to keep the storage above the historical low by importing surface water. Groundwater storage calculations help Zone 7 determine the amount of existing groundwater availability, and future availability, thus providing vital information about the hydrologic inventory of the basin.

4.7.3 Supply and Demand Simulation Modeling

Zone 7's supply and demand simulation model, Z7sim can model the entire Zone 7 system over an 80-year hydrologic period to evaluate long-term strategies or

any deficiencies in resources that would limit providing a reliable supply of water.

The Zone 7 simulation model has a groundwater basin component that calculates the recharge and extraction and change of storage for the Main Basin. Calibrations are ongoing and involve matching model projections to actual groundwater recharge, storage change and groundwater levels.

Through groundwater elevation/storage monitoring and retailer demands, Zone 7 is able to predict the supply of the groundwater basin in relation to the current and future demand.

Zone 7 compiles a detailed hydrologic inventory of annual supply and demand components for the Main Basin and computes the end-of-year storage. The hydrologic inventory represents the water balance between groundwater supply and groundwater demand.

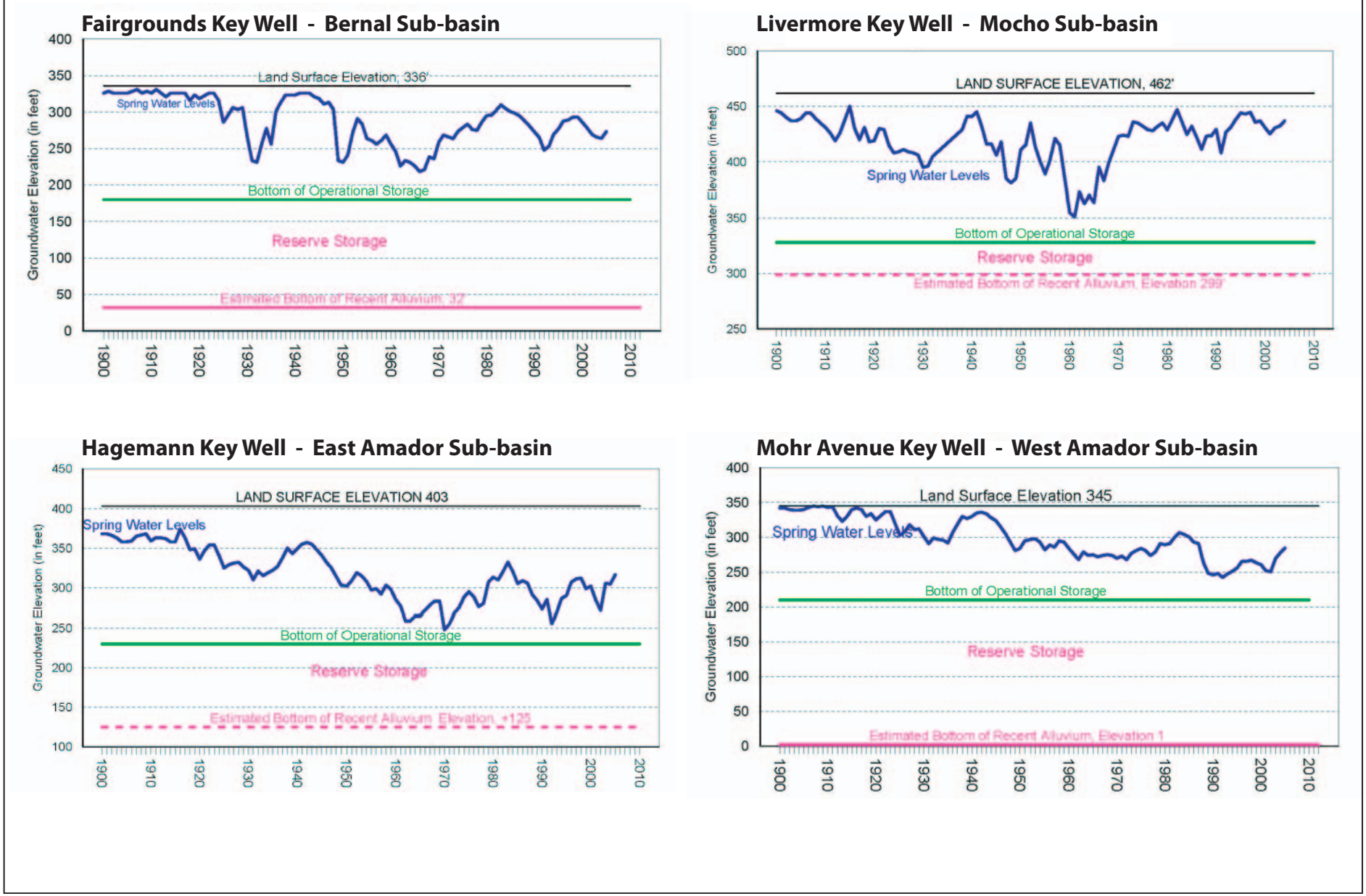
4.7.4 Groundwater Modeling

A groundwater model is a device that represents an approximation of a groundwater basin. Physical models such as laboratory sand tanks simulate groundwater flow directly. A mathematical groundwater model simulates groundwater flow indirectly by means of equations to represent the physical processes that occur in the groundwater basin. A mathematical model can be used analytically or numerically. As analytical solutions are not suitable because of complexities in the groundwater flow modeling, numerical groundwater modeling is more often used for groundwater basin modeling.

Groundwater models are useful for predicting the consequences of a proposed groundwater basin management action. Groundwater models can also be used to learn about the controlling parameters in a site-specific setting such as establishing locations and characteristics of aquifer boundaries.

The original Main Basin groundwater model was developed by Zone 7 and DWR in the 1970s and is documented in DWR Bulletin 118-2. Davies (a Stanford graduate student) developed a groundwater model of the Amador sub-basin in 1981. Danskin (another Stanford graduate student) extended this model into the Bernal sub-basin in December 1985 and calibrated the model for average fluxes for the period 1977–1981. Although these models and the associated documentation provided some useful technical information, Zone 7 did not use them for basin management studies.

In 1996, Zone 7 retained consultant CH2M Hill to assist Zone 7 Staff with the development of a groundwater flow and solute (salt) transport model for the main groundwater basin. The model was designed to be usable by Zone 7 Staff or evaluating alternative SMP strategies and future Main Basin management options. The model was originally developed using Visual MODFLOW for Windows version 2.61 by Waterloo Hydrologic, Inc. package and M+3D for



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Jones & Stokes

Figure 4-8
Key Index Wells

solute transport. In the late 1990s, the model was converted to Groundwater Vistas using MODFLOW-SURFACT for simulate groundwater flow and MT3D to simulate solute transport.

The model is currently being updated and recalibrated to include recent data sets. The original model was calibrated using data from 1974 to 1994; the updated includes data sets through 2004.

Chapter 5
Plan Implementation

5.1 Groundwater Management Program

5.1.1 Introduction

Zone 7 has been actively monitoring and managing the groundwater basin for more than 30 years. Many of the various policies guiding the groundwater program were formalized in the 1987 Statement on Zone 7 Groundwater Management, incorporated herein by reference and included in Appendix E. This plan was partially revised and updated as part of the development of Zone 7's SMP, which was formally adopted by Zone 7 and approved by the RWQCB in October 2004; the SMP is also incorporated herein by reference and a copy of the Executive Summary is included in one of the Appendices. This Groundwater Management Plan serves to document the various existing groundwater management program components and how they are being implemented.

5.1.2 Salt Management

5.1.2.1 Background/Introduction

Zone 7's Salt Management Plan (SMP) was designed to comply with the requirements of the Master Water Recycling permit, RWQCB Order No. 93-159, issued jointly to Zone 7, the City of Livermore, and Dublin San Ramon Services District.[1] In May 2004, Zone 7, in cooperation with others, published the SMP to address the increasing level of TDS in the main groundwater basin. The SMP was approved by the RWQCB in October 2004. The SMP is incorporated herein by reference and a copy of the Executive Summary is included in Appendix D.

Zone 7 has define potential salt management strategies to offset the calculated long-term average salt loading to the main groundwater basin of approximately 2,200 tons per year.[2] The available alternatives are defined as those capital facilities and/or operational strategies already included in Zone 7's capital

[1] Zone 7 2004a.
[2] Zone 7 2004a.

improvement program or under evaluation in the Facilities Master Plan, and the Well Master Plan. In addition Zone 7 operates the groundwater basin conjunctively to remove salts as well as to maintain reliability of its supply.

Zone 7 has historically managed water deliveries and artificial stream recharge in accordance with its water supply operations planning program that consists of the following three major components:

1. Five-Year Demand Projections and DWR delivery scheduling;
2. Annual Water Supply and Storage Probability Analysis (also called the water supply forecast); and
3. Annual and Monthly Water Supply Operations Plans.

The Water Supply Forecast is prepared in December of each year for the following calendar year. The Water Supply Forecast shows how Zone 7 would operate to make full deliveries under a wide range of hydrologic conditions ranging from critically dry to extremely wet.

The Water Supply Forecast provides the framework for water management decisions. The Water Supply Operations Plans provide additional guidance for monthly supply goals (i.e., balancing surface and groundwater supplies). Each year in July, Zone 7 prepares preliminary versions of the Water Supply Operations Plans for the following three years. In September of each year, these three-year Water Supply Operations Plans are updated to reflect the latest demand requests received from Zone 7's retail water supply agencies. In January of each year, the Water Supply Operations Plan for the current year is updated with more accurate DWR water supply projections for most probable conditions. In April of each year, after DWR has announced the firm rest-of-year deliveries, Zone 7 develops a Monthly Water Supply Operations Working Plan. This Monthly Plan is then updated monthly for the rest of the year with actual year-to-date data and, as such, reflects adjustments made to meet water supply operational objectives.

The primary goal of historic water supply planning efforts was to minimize operations and maintenance costs by delivering the maximum amount of surface water available and pumping groundwater only to supplement surface water supplies during peak demand and drought periods. This historic approach successfully provided sustainable water supply at a minimum cost but did not specifically address salt loading, groundwater quality or delivered water quality.

The Water Supply Operations Plans now incorporate the Salt Management Plan (SMP) goals and an adaptive management approach to selecting the combination of salt management strategies to be implemented in a given year. Zone 7 determines the optimum combination of strategies to use in a given year. Multiple variables are balanced in making decisions and variables change from year to year, hence the need for a so-called adaptive or iterative management approach.

Factors used to track salt loading include data and information collected from the various monitoring programs described in Chapter 4. The existing monitoring programs are sufficient for tracking salt loading from existing sources and for existing land use conditions. Future land use changes and any increase used of recycled water may require additional monitoring to track the resultant additional salt loading. The monitoring component of the SMP facilitates tracking any progress in salt removal. No significant change is anticipated until groundwater demineralization begins (anticipated in around 2009).

5.1.2.2 Demineralization

To maintain delivered water quality (i.e., acceptable total dissolved solids or "TDS" and hardness) during future periods of increased groundwater pumping, Zone 7 has plans for constructing groundwater demineralization facilities.[3] The primary advantages of wellhead demineralization are that significant salt loading benefits may be realized (by exporting the brine concentrate from the groundwater basin) while concurrently improving delivered water quality by lowering TDS and hardness. Depending on the capacity installed, wellhead demineralization allows one to "dial-in" desired delivered water quality (i.e., by adjusting flows between demineralization treatment unit and bypass to achieve target hardness and/or TDS levels) and to reduce seasonal and drought-related variability. The primary disadvantages of wellhead demineralization are the moderately high operations and management (O&M) costs for pumping energy and the costs for brine disposal.

Groundwater demineralization will also allow Zone 7 to pump from water-bearing zones containing higher levels of minerals (expressed as TDS and hardness). In addition, Zone 7 will be able to pump increased volumes of groundwater (taking advantage of "banked" water in the basin) without impacting delivered water quality.

Demineralization will use a reverse osmosis (RO) membrane-based treatment system producing product water with extremely low TDS. The demineralized water will then be blended with other groundwater (non-demineralized) and/or surface water prior to delivery to achieve a target delivered water TDS or hardness and to reduce aggressiveness to distribution lines. The brine concentrate from the RO process will be exported out of the watershed via the regional wastewater export pipeline operated by the LAVWMA.

5.1.3 Integrated Water Resources/ Conjunctive Use

Historically throughout California, surface water and groundwater have been managed as separate resources because water law treats groundwater and surface

[3] Zone 7 2004a.

water as two separate resources. Such management does not represent hydrologic reality. As a result, DWR recommends monitoring surface water and groundwater resources as an integrated program that includes conjunctively managing groundwater with surface water.

DWR provides examples of planning efforts that should be integrated with groundwater management. These might include surface water flow/quality monitoring, wellhead protection management, agriculture/salt management, urban water management, flood management, and toxic site management.

For many years, Zone 7 has actively embraced a conjunctive use program by integrating management of local and imported supplies. Natural and artificial recharge utilizing releases of surface water to recharging streams is a key component of this program. To track the conjunctive use effort, Zone 7 actively monitors all of the following components:

1. natural inflow, including groundwater seepage (i.e., rising groundwater);
2. releases of imported water from the SBA;
3. urban run-off;
4. groundwater discharges from aggregate mining operations;
5. flood control releases from Lake del Valle; and
6. discharges from other artificial releases, including LLNL treated groundwater, well tests, or treated water discharges.

Zone 7 monitors the quantity and quality of each of the previous components. EC, pH, and temperature are measured monthly at stream-gaging stations throughout the basin and daily at various SBA turnouts to the Zone 7 treatment plants. The EC measurements are used to estimate TDS content using the formula TDS = 0.56 x EC. Additionally, surface water samples are collected periodically and analyzed for major and total ion content.

5.1.4 Groundwater Resource Protection

Zone 7 considers groundwater resource protection to be one of the most critical components of ensuring and managing groundwater resources. This GMP identifies resource protection by preventing contaminants from entering the groundwater basin and remediation of existing contamination.

5.1.4.1 Protection of Supply

Zone 7 ensures adequate water supply by importing a large amount of surface water into the valley through the SWP. In 2004, Zone 7 had an annual maximum entitlement of 80,619 af/y. Zone 7 also has a contract with Byron-Bethany Irrigation District for an additional 2,000 acre-feet. Zone 7 has also purchased water storage rights (65 taf) in the Semitropic Water Storage District

groundwater basin located in south-central California near Bakersfield. Artificial recharge of available supply allows the main groundwater basin to remain above the historical low level with good quality water.

The natural supply of groundwater replenishment to the basin needs to be protected. Urban development can reduce the amount of water recharging the basin. If left unmitigated, the natural safe yield of the basin would decline. Zone 7 monitors the natural recharge and reviews development plans to evaluate any impacts on the recharge capacity of the basin.

Currently, the largest potential negative impacts to recharge are the operation of the Del Valle Dam and the extensive gravel mining activities. To mitigate the impacts of the construction of the Del Valle Dam, Zone 7 makes releases from below the dam to maintain the stream flow and recharge through stream beds that would have occurred had the dam not been constructed. These releases are called "Prior Rights Releases." To satisfy these prior rights requirements, Zone 7 evaluates the Pre-Del Valle Dam (Pre-Project) and Post-Del Valle Dam (Post-Project) recharge. Recharge releases are made into the Arroyo Valle to ensure that the same amount of water recharges the basin as would have recharged if the dam had not been constructed.

Regional gravel mining activities have a significant impact on stream recharge and on the loss of groundwater through evaporation and mining company discharges to the arroyos. The Mining Area Reclamation Plan calls for the creation of a Chain of Lakes (see Section 3.3) that will allow the recapture of some of the lost recharge capacity associated with the mining impacts on stream recharge. In addition the Chain of Lakes project will mitigate the impacts from the increased evaporative losses associated with the creation of large lakes within the basin.

When all mining activities are completed in 2030 Zone 7 will own the Chain of Lakes area in fee and will utilize the chain of lakes for water resources management purposes to protect the natural recharge capacity of the groundwater basin and to mitigate the loss of groundwater from evaporation and reduced stream recharge capacity. In these ways, Zone 7 protects the natural supply of groundwater which is then used primarily by the retailers to provide the water that they appropriate from the groundwater basin.

5.1.4.2 Wellhead Protection/Permit Program

DHS administers the Drinking Water Source Assessment and Protection Program that requires the identification of wellhead protection areas. A DWSAP evaluation has been conducted for all Zone 7 supply wells and will be conducted for all future Zone 7 supply wells. The DWSAP identifies areas of protection for each wellhead area. These areas are incorporated into other Groundwater Protection Programs of Zone 7, as discussed elsewhere in this chapter.

Both the County and the three local cities (Dublin, Livermore and Pleasanton) have well ordinances, all of which are administered by Zone 7 Water Agency by agreement. As a result of these Well Ordinances, any planned new well construction, soil-boring construction, or well destruction must be permitted by Zone 7 before the work is started. There is currently no fee for the Zone 7 permits. Additionally, all unused or abandoned wells must be properly destroyed, or, if there are plans to use the well in the future, a signed statement of future intent must be filed at Zone 7.

A copy of the Zone 7 drilling permit applications is available for download from the Zone 7 website. Zone 7 must receive permits at least 5 days prior to beginning any drilling. Well construction/ destruction permit requirements are determined on a case-by-case basis but generally follow DWR's California Well Standards (Bulletins 74-81 and 74-90).

5.1.4.3 Water Conservation

Because water is a limited and precious resource that must be used wisely, Zone 7 makes water conservation an integral part of its daily operations and water management approach—not just an emergency response to recurring droughts.

Zone 7 promotes the Ultra-Low-Flow Toilet Rebate Program, which began in 1994, and is a water conservation success story for Zone 7 and Tri-Valley households. The program offers rebates to households when they replace their old toilets with new water-conserving ultra-low-flow toilets. Almost 11,000 ultra-low-flow toilets have been installed in the valley, for an annual water-savings of 480 acre-feet. Each ultra-low-flow toilet will save an estimated average of 38 gallons per day.

Zone 7 also promotes the Residential Clothes Washer Rebate Program, which involves the purchase of high-efficiency, Energy Star® labeled clothes washing machines. These high-efficiency washing machines use up to 50% less energy and up to one-third less water relative to most other new washers. Zone 7 has given out approximately 4,000 rebates since this program began in 1998. This program is a regional partnership with other Bay Area water agencies, including Alameda County Water District, Contra Costa Water District, East Bay Municipal Utility District, and Santa Clara Valley Water District.

5.1.4.4 Wastewater Management

Zone 7 Board of Directors adopted an interim policy on wastewater reclamation (Resolution No. 823, 1977) and a "Wastewater Management Plan for the Unsewered, Unincorporated Area of Alameda Creek Watershed Above Niles" (WMP) (Resolution No. 1037, 1982). (See Appendix E.) The 1982 WMP encompasses the unsewered, unincorporated area above Niles situated outside the sewered urban areas in the Livermore-Amador Valley. The primary purpose of this WMP was to identify, assess, and recommend solutions to local septic tank

problems, and recommend wastewater management policies to prevent degradation of surface waters and groundwater.[4] The recommended policies of the WMP were adopted along with the WMP, itself, by the Zone 7 Board of Directors in Resolution 1037 (see Appendix E). Among the most important is B.4 in the WMP: "If more intense development proposing septic tanks is to be authorized in any area and/or when land use zoning is changed to rural residential use with septic tanks: (a) the minimum generally acceptable lot size should be five (5) acres."

A separate policy was established that prohibits the use of septic tanks for new developments zoned for commercial or industrial uses (Resolution No. 1165, Appendix E). This prohibition can be waived by the Zone 7 Board if "it can be satisfactorily demonstrated to the Board that the wastewater loading will be no more than the loading from an equivalent rural residential unit and said septic tanks will be in compliance with all other conditions and provisions."

These policies have been adopted in large part to protect the groundwater basin from contamination from untreated sewage. For many years Zone 7 has been monitoring a persistent plume of high nitrate concentrations in the Main Groundwater Basin that extends from south Livermore six miles northeast to Livermore's airport. A preliminary study was conducted in April, 1980. Nitrate concentrations within this plume typically range from 30 mg/l to 65 mg/l and have been somewhat stable for the last three decades or more. The drinking water standard or maximum contaminant level (MCL) for nitrates (as nitrate or NO_3) is 45 mg/l. CWS operates several municipal supply wells within the affected area, however, the well water that contains nitrates greater than the MCL is blended with imported water to lower the nitrate concentrations below the MCL prior to distributing it to their customers.

In 2002, Zone 7's consultant, Raines, Melton & Carella, Inc. (RMC) conducted a reconnaissance level evaluation of the nitrate sources which may be responsible for the high nitrate concentrations found in the South Livermore area. In general, in this draft report RMC concluded that the rural residential livestock manure and septic tank leachate provide over 90% of the current nitrate loadings in the study area which was comprised of 670 acres of agricultural land and rural residential area. The study area is upgradient of the affected CWS wells, and currently includes approximately 100 rural homes along Buena Vista, Almond and East Avenues and Calvary Lane that use septic tank systems for sewage disposal. The majority of the homes are on Buena Vista Avenue. In addition, there are six wineries (including one with a full-scale restaurant), commercial and private horse stables, a dog kennel and approximately 460 acres of vineyards within the study area. Historically, there was extensive chicken and row crop farming along Buena Vista Avenue that continued until the 1950s.

RMC evaluated the potential nitrogen sources in the study area. Nitrogen loadings and losses from multiple sources were estimated to determine a net mass balance for nitrogen entering the groundwater. The volume of water recharged to the groundwater basin was estimated to determine the resulting concentration of

[4] Camp Dresser and McKee 1982.

nitrate in the groundwater. The nitrogen mass balance model predicts that livestock manure is providing 50–55% of the current nitrate loadings within the study area and that septic tank leachate is providing 40–45%. On the other hand, the nitrate contributions from winery process wastes and urban and agricultural fertilizers make up less than 10% of the total.

Zone 7 continues to work with the City of Livermore, Alameda County Planning Department, the Buena Vista and Almond Avenue residents and the property and business owners along Tesla Road, to develop strategies to mitigate the regional nitrate issues.

Recycled Water Use

Overall it is anticipated that use of recycled water for irrigation purposes will increase in the future. Within the Zone 7 service area, two retail water supply agencies (DSRSD and the City of Livermore) plan to use or are currently using recycled water for the following projects:

- **Livermore Golf Course**—The Livermore Airport and Golf Course use about 400 acre-feet of recycled water annually for irrigation. The current monitoring program consists of 10 wells installed jointly by Zone 7 and the USGS in the late 1970s. The collection and analysis of groundwater data were initially done by the USGS and Zone 7, but the collection was taken over by the City of Livermore in 1985. The RWQCB established monthly monitoring and reporting requirements in Water Reclamation Permit No. 90-102 issued to the Livermore Water Reclamation Plant. The requirements in Permit No. 90-102 were superseded in January 2005 when the RWQCB issued Livermore General Order 96-011. Order 96-011 does not contain groundwater monitoring requirements. However, Livermore continues to support Zone 7 in collection and analysis of groundwater samples. In 2003, four additional shallow monitoring wells were installed and are monitored by Zone 7 to help evaluate the effect of the recycled water use on groundwater. Three of the wells are located at the Livermore Golf Course, one upgradient of the irrigation area (to establish background water quality conditions) and the others downgradient. Zone 7 reviews the groundwater quality data submitted by the City of Livermore to the RWQCB and makes additional water level and groundwater quality measurements. Zone 7 maintains records on monthly recycled water use, recycled water quality, and the application areas and rates.
- **Public Parks**—It is recommended that two shallow wells be constructed at a large park, such as the Pleasanton Sports Park, Dublin Sports Grounds, or Emerald Glen Park, that is irrigated with recycled water. One upgradient well would monitor background conditions and the other downgradient well would monitor the effects of irrigation with recycled water. The wells would be monitored quarterly for approximately 1 year and then annually once baseline conditions were established.
- **Veterans Administration Hospital**—The Veterans Administration (VA) Hospital wastewater treatment system and percolation ponds are located at

the southern edge of the Main Basin. This system is also regulated by RWQCB Waste Discharge Requirements that include groundwater monitoring and reporting requirements. For consistency and completeness, it is recommended that the existing requirements be reviewed to evaluate the usefulness of the information being collected. As appropriate, recommendations could then be made for monitoring changes to best document the current and future impacts of percolation on groundwater quality.

5.1.4.5 Toxic Site Management

Background

Zone 7 documents and tracks sites across the groundwater basin that pose a potential threat to drinking water. Information on these sites is gathered from state, county, and local agencies, as well as from Zone 7's well permitting program. This tracking program is designated the "Toxic Site Surveillance Program" and a report is generated biannually to update the progress of investigations and clean-ups. Each site has been assigned a Zone 7 number, which corresponds to the file number containing reports or other information about the site. In addition, all sites are reviewed and given a ranking based on criteria used by the RWQCB and Alameda County Environmental Health (ACEH) that have been modified to meet Zone 7 standards.

Program Description

A GIS database and map was developed to show the locations of these sites and to provide basic information including; priority, status, owner/contact, contaminants of concern, concentrations of contaminants in groundwater, proximity to supply wells, lead agency and date last reviewed. This database is maintained by Zone 7 staff to help assess the potential threat to our drinking water posed by a given site.

Each site is assigned a priority designation of high, moderate or low. The priority can change as conditions change at the site. A site is designated as a high priority site if the following conditions occur:

1. contamination at the site is in groundwater at concentrations greater than the MCL, and
2. a water supply well is within 2,000 feet downgradient of the site, or
3. it is shown that drinking water will likely be impacted by the contamination at the site.

A secondary ranking is used to represent the remedial status of the site. These codes differ slightly from those used by ACEH and RWQCB to better meet the needs of Zone 7. For example, a closed case is listed as a Status "CL" in the Toxic Site program database, instead of the RWQCB's code of "9".

In general, the Toxic Site Surveillance Program has found two types of contamination threatening groundwater in the Livermore-Amador Valley Groundwater Basin: fuels and industrial chemicals

The petroleum-based fuel products include total petroleum hydrocarbon as gasoline (TPHg), TPH as diesel (TPHd), benzene, toluene, ethylbenzene, xylene (collectively known as BTEX), and oxygenates added to fuel including methyl tertiary-butyl ether (MtBE) and tertiary-butyl alcohol (TBA). California has assigned clean-up standards for the BTEX compounds and fuel oxygenates. However, a cleanup standard for total petroleum (TPHg or TPHd) has not officially been established.

The industrial chemical contaminants of concern are tetrachlorethylene (PCE), trichloroethylene (TCE), and their by-products and degradation products. This latter group of contaminants consists of chlorinated solvents. PCE is common in the dry cleaning business, and TCE is commonly used as a degreaser for electronics. Both PCE and TCE have an established MCL of 5 micrograms per liter (µg/l).

Zone 7 is currently tracking 76 active sites where contamination has been detected in groundwater across the groundwater basin. Ten of these sites are designated as high priority, five in Livermore, four in Pleasanton, and one in Sunol.

When there are sites that are of particular concern and/or are a potential threat to the drinking water supply staff will work closely with the lead agency (RWQCB or ACEH) to ensure that Zone 7's concerns are addressed.

Reporting

A report is generated biennially to update the status of the sites in the program. This report is submitted to the Zone 7 Board. The report includes a detailed summary of the background information of each high priority site along with any special notes and the current actions taking place at the site. In addition, a summary table of all the active sites is included in the biennial report. This table includes a brief summary of the current status of each active site. A map is generated for each main area within the groundwater basin, Livermore, Pleasanton, and Dublin, to show the site locations, their priority and their proximity to municipal supply wells (Figures A, B, and C in Appendix B).

5.2 Future Review of This Groundwater Management Plan

This GMP is the framework for regionally coordinated groundwater management efforts within the Livermore-Amador Valley. Many of the components described in this GMP will likely further evolve with future management efforts in the

basin. Any such future changes will involve a collaborative effort involving Zone 7 and its four agencies (Dublin-San Ramon Services District, City of Pleasanton, City of Livermore and California Water Service Company), as well as the Tri-Valley Retailers Group, in which all four retailers participate. Key resources for evaluation are the annual monitoring and measurement reports described above. As a result, the GMP is intended to be a living document, where the components will be evaluated over time to determine whether they are meeting the overall goal of the plan, and revisions will be proposed and adopted, as appropriate.

5.3 Public Hearings and Plan Adoption

- Interim GMP presented at public meeting to Zone 7 Board in 1987.
- Original Groundwater Management Program adopted in 1987 following hearings, contributions from stakeholder-based groundwater advisory committee, etc. ("Statement on Zone 7 Groundwater Management," 8/19/87.)
- Groundwater Management Advisory Committee (GMAC) formed primarily in relation to the demonstration RO/groundwater injection project; however also assisted in evaluating the 1987 Statement on Zone 7 Groundwater Management and helping develop and review the salt management elements of a new plan reflected in the eventual adoption of the Salt Management Plan. (10 Citizen effort 1995–2002.)
- Salt Management Plan Outlining Conjunctive Use to Enhance Groundwater Quality (adopted by Zone 7 with stakeholder input via public interest group, the GMAC, as well as a Technical Advisory Group, discussions at public meetings and subsequent approval by RWQCB in October 2004).
- January 2004 Zone 7 Board notice of plan to review Groundwater Management Plan in a series of three public presentations.
- February, April, and August 2004 public presentations on groundwater basin supply, quality, and management.
- July 2005 distribution of Administrative Draft Groundwater Management Plan to Retail Water Agencies to solicit preliminary comments and input.
- August 3, 2005 meeting with retail water agencies (DSRSD, CWS, Livermore and Pleasanton) to review Administrative Draft Groundwater Management Plan.
- August 17, 2005 public hearing followed by adoption of Resolution of Intent to Adopt Groundwater Management Plan, completion of Draft Groundwater Management Plan and opening of public review and comment period (draft plan was made available to the public in area libraries and on the Zone 7 website), with all associated publications of notice.
- Receipt of comments followed by revisions to Draft Groundwater Management Plan to reflect input received.

5.4 Actions

The Zone 7 Board of Directors will be asked to adopt the Groundwater Management Plan following a public hearing at the September 21, 2005 Regular Board Meeting, following all required publications of notice.

Appendix A

Zone 7 Water Agency Water Resources Engineering Wells in 2005 Monitoring Program

Appendix A

Wells in 2005 Monitoring Program

Wells in 2005 Monitoring Program

		Objectives (see last page for definitions)							
					Water Rights				
Site	Well Name (SMP Name)	Key WL	Mon WL	SA WL	WL	WQ	Qual WQ	Muni WQ	EBDA WQ
2S/1E 31M 2	Mariposa (31M2)			SA			A		
2S/1E 32E 1	32E1 (T-HAC-1)			SA			A		
2S/1E 32N 1	2S/1E 32N 1 (T-HAC-2)			SA			A		
2S/1E 32Q 1	32Q1 (32Q1)			SA			A		
2S/1E 33L 1	33L1 (33L1)			SA	A				
2S/1E 33P 2	33P2 (33P2)			SA	A				
2S/1E 33R 1	(T-DUB-1)		M	SA	A				
2S/1W 15F 1	BOLLINGER			SA	A				
2S/1W 26C 2	PINE VALLEY			SA	A				
2S/1W 36E 3	KOLB PARK (36E3)			SA	A				
2S/1W 36F 1	dublin high shallow			SA	A				
2S/1W 36F 2	dublin high mid			SA	A				
2S/1W 36F 3	dublin high deep			SA	A				
2S/2E 27C 2	2S/2E 27C 2			SA					
2S/2E 27P 2	hartford ave east			SA	A				
2S/2E 28D 2	may school (T-MAY-1)			SA	A				
2S/2E 28J 2	new f.c.c.			SA					
2S/2E 28Q 1	hartford ave (T-MAY-2)			SA	A				
2S/2E 32K 2	jenson's N liv. Ave			SA	A				
2S/2E 34E 1	mud city (T-MAY-3)			SA	A				
2S/2E 34Q 2	(T-SPR-2)			SA	A				
3S/1E 1F 2	1F2 (T-AIR-1)			SA	A				
3S/1E 1H 3	collier canyon g1 (1H3)			SA	A				
3S/1E 1J 3	Triad Vineyard			SA					
3S/1E 1L 1	SMP LOC-1 (T-AIR-2)			SA	A				
3S/1E 1N 1	liv inj monitor			SA	A				
3S/1E 1P 2	airport gas g5 (T-AIR-3)			SA	A				
3S/1E 1P 3	new airport well			SA					
3S/1E 1R 2	3S/1E 1R 2			SA	A				
3S/1E 2J 2			M	SA	A				
3S/1E 2J 3			M	SA	A				
3S/1E 2K 2	doolan rd (2K2)			SA	A				

		Objectives (see last page for definitions)							
		Key	Mon	SA	Water Rights		Qual	Muni	EBDA
Site	Well Name (SMP Name)	WL	WL	WL	WL	WQ	WQ	WQ	WQ
3S/1E 2M 3	SMP MW-2 (T-FRI-1)			SA	A				
3S/1E 2N 2	molt barn @friesman (T-FRI-2)			SA	A				
3S/1E 2N 6	SMP MW-1 (T-FRI-3)			SA			A		
3S/1E 2P 3	friesman			SA			A		
3S/1E 2P 7	Tri-Valley Driving Range			SA			A		
3S/1E 2Q 1			M	SA			A		
3S/1E 2R 1	red barron			SA			A		
3S/1E 3G 2	fallon rd			SA			A		
3S/1E 3Q 1	county farm			SA			A		
3S/1E 4A 1	SMP-DUB-2 (T-DUB-2)		M	SA			A		
3S/1E 4G 1	northside dr shallow		M	SA			A		
3S/1E 4J 4	northside dr deep (4J4)		M	SA			A		
3S/1E 4J 5	Pimlico shallow (T-DUB-3)		M	SA			A		
3S/1E 4J 6	Pimlico Deep (T-DUB-4)		M	SA			A		
3S/1E 4Q 2	gulfstream		M	SA			A		
3S/1E 5K 6	rosewood shallow			SA			A		
3S/1E 5K 7	rosewood deep			SA			A		
3S/1E 5L 3	(T-HAC-3)			SA			A		
3S/1E 5P 6	SMP LOC-3 (T-HAC-4)			SA			A		
3S/1E 6F 3	dublin ct			SA			A		
3S/1E 6G 5	nissan repair			SA			A		
3S/1E 6N 2	dsrsd mw-3			SA			A		
3S/1E 7B 2	hopyard rd			SA			A		
3S/1E 7B12	Hacienda Arch (T-CHA-1)			SA			A		
3S/1E 7G 7	Chabot Well (T-CHA-2)			SA			A		
3S/1E 7J 5	7J5 (T-CHA-3)			SA			A		
3S/1E 7M 2	DSRSD Sub (7M2)			SA			A		
3S/1E 7R 8	7R8 (T-CHA-4)		M	SA			A		
3S/1E 8B 1	tassajara creek (T-HAC-5)			SA			A		
3S/1E 8G 4	(T-HAC-6)			SA			A		
3S/1E 8H 2	Army Well #1			SA			A		SA
3S/1E 8H 9	Mocho 4 mw1		M	SA			A		SA
3S/1E 8H10	Mocho 4 mw2		M	SA			A		
3S/1E 8H11	Mocho 4 mw3		M	SA			A		
3S/1E 8H13	Mocho 3 mon		M	SA			A		
3S/1E 8H18	Mocho 4		M	SA			A	M	SA
3S/1E 8K 1	sutter gate			SA			A		SA
3S/1E 8N 1	sports park			SA			A		
3S/1E 9B 1	Stoneridge		M	SA			A	M	SA
3S/1E 9G 1	3775 trenery - Kamp			SA			A		
3S/1E 9M 2	Mocho 1		M	SA			A	M	SA
3S/1E 9M 3	Mocho 2		M	SA			A	M	SA
3S/1E 9M 4	Mocho 3		M	SA			A	M	SA
3S/1E 9P 5	Mohr Key	M	M	SA			A		

		Objectives (see last page for definitions)							
		Key	Mon	SA	Water Rights		Qual	Muni	EBDA
Site	Well Name (SMP Name)	WL	WL	WL	WL	WQ	WQ	WQ	WQ
3S/1E 10A 1	rancho el charro			SA			A		
3S/1E 10A 2	el charro rd			SA			A		
3S/1E 10B 8	Kaiser Rd.		M	SA			A		
3S/1E 10B 9	Kaiser Rd.		M	SA			A		
3S/1E 10B10	Kaiser Rd.		M	SA			A		
3S/1E 10B11	Kaiser Rd.		M	SA			A		
3S/1E 10D 2	3S/1E 10D 2		M	SA			A		
3S/1E 10D 3	3S/1E 10D 3		M	SA			A		
3S/1E 10D 4	3S/1E 10D 4		M	SA			A		
3S/1E 10D 5	3S/1E 10D 5		M	SA			A		
3S/1E 11B 1	liv golf g3			SA			A		
3S/1E 11C 3	3S/1E 11C 3		M	SA			A		
3S/1E 11G 1	mw-4		M	SA			A		
3S/1E 11G 2	mw-3		M	SA			A		
3S/1E 11G 3	mw-2		M	SA			A		
3S/1E 11G 4	mw-1		M	SA			A		
3S/1E 11P 6	New Jamieson Residence			SA			A		
3S/1E 12A 2	liv stp g7 (12A2)			SA			A		
3S/1E 12F 1	hagemann #6			SA					
3S/1E 12G 1	3S/1E 12G 1			SA			A		
3S/1E 12H 4	LWRP monitor 1		M	SA			A		
3S/1E 12H 5	LWRP monitor 2		M	SA			A		
3S/1E 12H 6	LWRP monitor 3		M	SA			A		
3S/1E 12H 7	LWRP monitor 4		M	SA			A		
3S/1E 12P 5	Hagemann Key	R	R	R			A		
3S/1E 13E 1	hagmn S/W access rd			SA			A		
3S/1E 13G 1	cal rock recorder			SA			A		
3S/1E 13P 1	cal rock			SA			A		
3S/1E 14A 2	randj domestic			SA			A		
3S/1E 14B 1	Industrial Asphalt			SA			A		
3S/1E 14K 2	lone star ind			SA			A		
3S/1E 15F 3	kaiser #8			SA			A		
3S/1E 15J 3	shadow cliff			SA			A		
3S/1E 15M 3	Bush/Valley South		M	SA			A		
3S/1E 16A 2	Pleas 8		M	SA			A	M	
3S/1E 16A 4	Bush/Valley Mid		M	SA			A		
3S/1E 16B 1	Bush/Valley North		M	SA			A		
3S/1E 16E 4	black ave - cultural			SA			A		
3S/1E 16L 2	Pleas 3			SA			A		
3S/1E 16L 5	Pleas 5		M	SA			A	M	
3S/1E 16L 7	Pleas 6		M	SA			A	M	
3S/1E 16P 5	Vervais Monitor	R	R	R	SA		A		
3S/1E 16R 1	Stanley Berry Farm			SA					
3S/1E 17B 4	Casterson			SA			A		

		Objectives (see last page for definitions)							
		Key	Mon	SA	Water Rights		Qual	Muni	EBDA
Site	Well Name (SMP Name)	WL	WL	WL	WL	WQ	WQ	WQ	WQ
3S/1E 17D 3	HOP7_Mon1		M	SA			A		
3S/1E 17D 4	HOP7_Mon2		M	SA			A		SA
3S/1E 17D 5	HOP7_Mon3		M	SA			A		
3S/1E 17D 6	HOP7_Mon4		M	SA			A		
3S/1E 17D 7	HOP7_Mon5		M	SA			A		
3S/1E 17D10	Hopyard 7			SA			A		
3S/1E 17D11	Hop 9 mon			SA			A		
3S/1E 17D12	Hopyard 9		M	SA			A	M	SA
3S/1E 17Q 4	Fairground Key	M	M	SA	M	SA	A		
3S/1E 18A 5	Pleas 7		M	SA			A	M	
3S/1E 18A 6	Hopyard 6		M	SA			A	M	SA
3S/1E 18E 4	Valley Trails II			SA			A		
3S/1E 18J 2	camino segura			SA			A		
3S/1E 18N 1	merritt			SA			A		
3S/1E 19A 3	SFWD O6						A		SA
3S/1E 19A 5	SFWD O1			SA			A	M	
3S/1E 19A11	SFWD new well			SA			A	M	
3S/1E 19C 4	del valle and laguna			SA			A		
3S/1E 19K 1	680/bernal			SA			A		
3S/1E 20B 2	fairgrounds potable			SA			A		
3S/1E 20C 3	GWP_3S1E20C3			SA			A		
3S/1E 20C 7	New FG well		R	R			A		SA
3S/1E 20J 4	civic center			SA			A		
3S/1E 20Q 2	(T-PLE-3)			SA			A		
3S/1E 22D 2	vineyard trailer (T-BER-3)			SA			A		
3S/1E 23J 1	1627 vineyard trailer			SA			A		
3S/1E 24Q 1	Ruby Hills			SA			A		
3S/1E 25C 2	stoney ridge (T-RH-2)			SA			A		
3S/1E 25H 1	Ruby Hills			SA			A		
3S/1E 29E 4	castlewood north			SA			A		
3S/1E 29M 4	f.c. channel		M	SA	M		A		SA
3S/1E 29P 2	castlewood dr			SA			A		
3S/1W 1B 5	maple dr. #2			SA			A		
3S/1W 1B 9	dsrsd garden shallow		M	SA			A		
3S/1W 1B10	dsrsd garden mid		M	SA			A		
3S/1W 1B11	dsrsd garden deep (1B11)		M	SA			A		
3S/1W 2A 2	McNamara's (2A2)			SA			A		
3S/1W 12B 2	MW-1			SA			A		
3S/1W 12J 1	DSRSD South			SA			A		
3S/1W 13J 1	muirwood dr			SA			A		
3S/2E 1F 2	down barn			SA			A		
3S/2E 2B 2	south front rd			SA			A		
3S/2E 3A 1	Bluebell (T-SPR-1)			SA			A		
3S/2E 3K 3	first and S. front rd (3K3)			SA			A		

		Objectives (see last page for definitions)							
		Key	Mon	SA	Water Rights		Qual	Muni	EBDA
Site	Well Name (SMP Name)	WL	WL	WL	WL	WQ	WQ	WQ	WQ
3S/2E 5J 1	N. liv and las positas			SA			A		
3S/2E 5N 1	1037 portola -trailer			SA			A		
3S/2E 6P 1	portola ave			SA			A		
3S/2E 7C 2	york way - jaws -G4			SA			A		
3S/2E 7H 2	dakota			SA			A		
3S/2E 7N 1	kittyhawk south			SA			A		
3S/2E 7P 3	CWS STA 24		M	SA			A	M	
3S/2E 7R 3	CWS STA 31		M	SA			A	M	
3S/2E 8F 1	CWS STA 10		M	SA			A	M	
3S/2E 8G 1	CWS STA 19		M	SA			A	M	
3S/2E 8H 1	CWS STA 4		M	SA			A	M	
3S/2E 8H 2	North k			SA			A		
3S/2E 8K 2	Livermore Key Well	R	R	R			A		
3S/2E 8N 2	CWS STA 14		M	SA			A	M	
3S/2E 8N 5	olivina and rincon			SA			A		
3S/2E 8P 1	CWS STA 8		M	SA			A	M	
3S/2E 9L 1	CWS STA 17		M	SA			A	M	
3S/2E 9P 1	CWS STA 12		M	SA			A	M	
3S/2E 9Q 1	CWS STA 9		M	SA			A	M	
3S/2E 9Q 4	school st			SA			A		
3S/2E 10C 4	250 mines rd			SA			A		
3S/2E 10F 1				SA			A		
3S/2E 10F 3	hexcel			SA			A		
3S/2E 10Q 1	almond			SA			A		
3S/2E 10Q 2	llnl p-703			SA			A		
3S/2E 11C 1	joan way (11C1)			SA			A		
3S/2E 11J 2	vasco rd pat pass			SA			A		
3S/2E 14A 3	S. vasco @east ave			SA			A		
3S/2E 14B 1	5763 east ave			SA			A		
3S/2E 14C 3	14C3 (14C3)			SA			A		
3S/2E 14D 1	Big Tree Well - New Wente			SA			A		
3S/2E 14H 1	2480 S. vasco			SA			A		
3S/2E 15B 4	4565 East avenue			SA			A		
3S/2E 15E 2	1356 S. Livermore			SA			A		
3S/2E 15J 2	1912 buena vista			SA			A		
3S/2E 15Q 6	Concannon			SA			A		
3S/2E 15R 6	2383 buena vista			SA			A		
3S/2E 16A 3	Memory Gardens			SA			A		
3S/2E 16B 1	CWS STA 5		M	SA			A	M	
3S/2E 16C 1	CWS STA 15		M	SA			A	M	
3S/2E 16E 4	pepper tree			SA			A		
3S/2E 17E 2	3S/2E 17E 2			SA			A		
3S/2E 18A19	MURRIETA		M	SA			A		
3S/2E 18B 1	CWS STA 20			SA			A	M	

		Objectives (see last page for definitions)							
					Water Rights				
Site	Well Name (SMP Name)	Key WL	Mon WL	SA WL	WL	WQ	Qual WQ	Muni WQ	EBDA WQ
3S/2E 18E 1	E. stanley			SA			A		
3S/2E 19D 7	ISABEL 1		M	SA			A		
3S/2E 19D 8	ISABEL 2		M	SA			A		
3S/2E 19D 9	ISABEL 3		M	SA			A		
3S/2E 19D10	ISABEL 4		M	SA			A		
3S/2E 20M 1	Alden Lane			SA					A
3S/2E 21E 3	Concannon			SA					A
3S/2E 21L13	3S/2E 21L13			SA					A
3S/2E 22B 1	grapes		M	SA					A
3S/2E 24A 1	S. greenville (24A1)			SA					A
3S/2E 26J 2	mines rd			SA					A
3S/2E 29F 4	usgs wetmore		M	SA	M		SA	A	
3S/2E 29H 6	Los Vinos			SA				A	
3S/2E 30D 2	vineyard (T-VIN-3)		R	R	R		SA	A	
3S/2E 30G 1	genesis farms			SA					
3S/2E 30H 1	750 vineyard			SA					
3S/2E 33G 1	crohare		M	SA	M		SA	A	
3S/3E 7D 2	7D 2			SA				A	
3S/3E 7M 2	lupin way			SA				A	

February 14, 2005

Frequency Codes: R = Recorder; D = Daily; W = Weekly; M = Monthly; Q = Quarterly; SA = SemiAnnual; A = Annual.

Objectives:
Key = Zone 7's Index Wells Mon = Zone 7's Monthly Objective SA = Zone 7's Semiannual Objective Water Rights = Required for Zone 7 Water Rights Qual = Zone 7's Water Quality Objective Muni = Municipal Pumping Wells -includes water quality sampling (frequency as listed) and monthly water level measurements EBDA = Required by the East Bay Discharges Authority
WL = Water level measurements WQ = Water quality sampling

Salt Management Plan Designations (SMP 2004):
T-AIR = Airport Transect T-BER = Bernal Transect T-CHA = Chabot Transect T-DUB = East Dublin Transect T-FRI = Friesman Transect T-HAC = Hacienda Transect T-HV = Happy Valley Transect T-LIV = South Livermore Transect T-MAY = May Transect T-PLE = Pleasanton Transect T-RH = Ruby Hill Transect T-SPR = Springtown Transect T-VIN = Vineyard Transect T-WEN = Wente Transect

Appendix B

Toxic Site Surveillance Program Areas for Livermore, Pleasanton, and Dublin Areas

Figure A, Toxic Site Surveillance, Livermore Area Sites

Figure B, Toxic Site Surveillance, Pleasanton Area Sites

Figure C, Toxic Site Surveillance, Dublin Area (North of Main Basin)

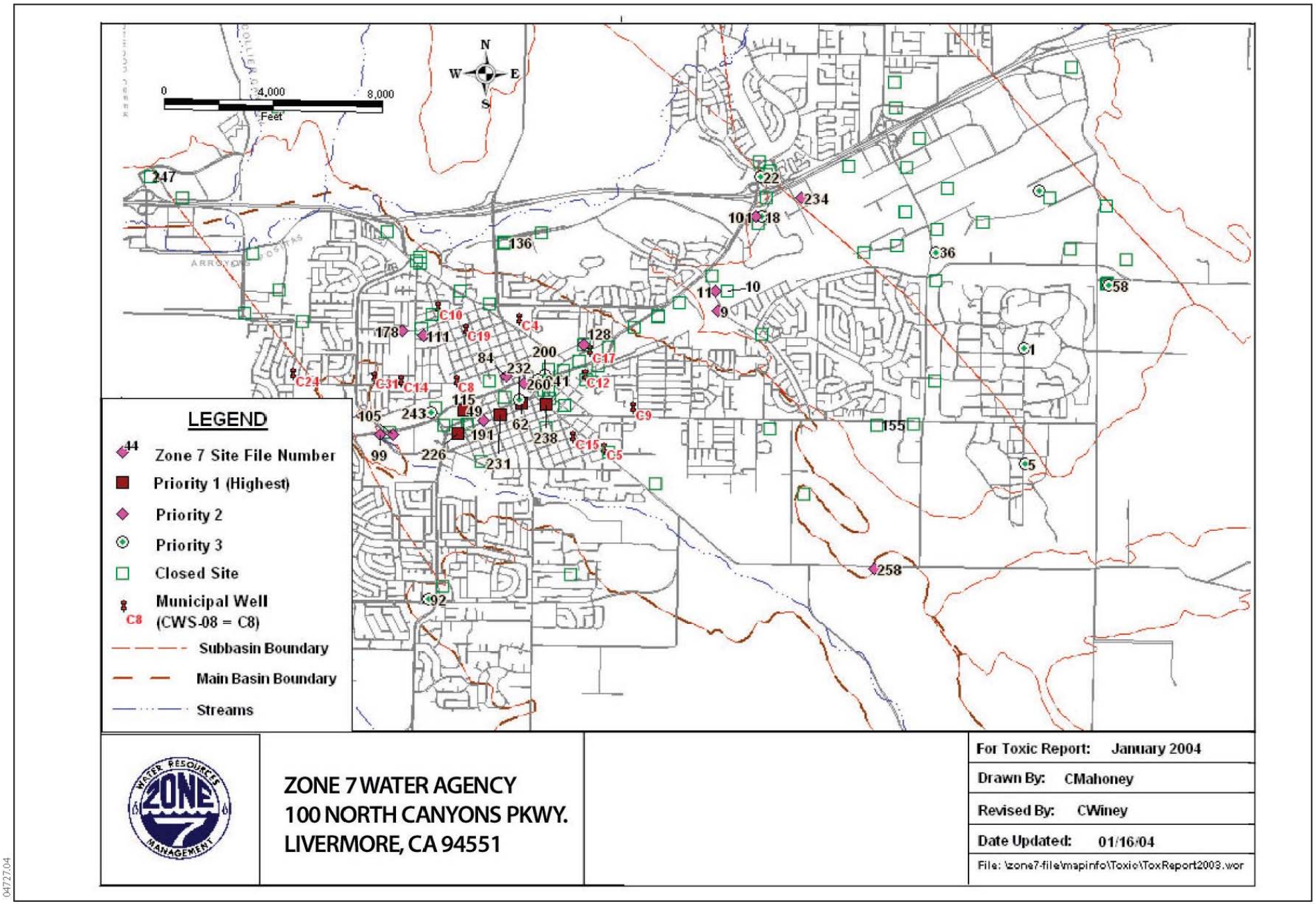

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Figure A
Toxic Site Surveillance, Livermore Area Sites

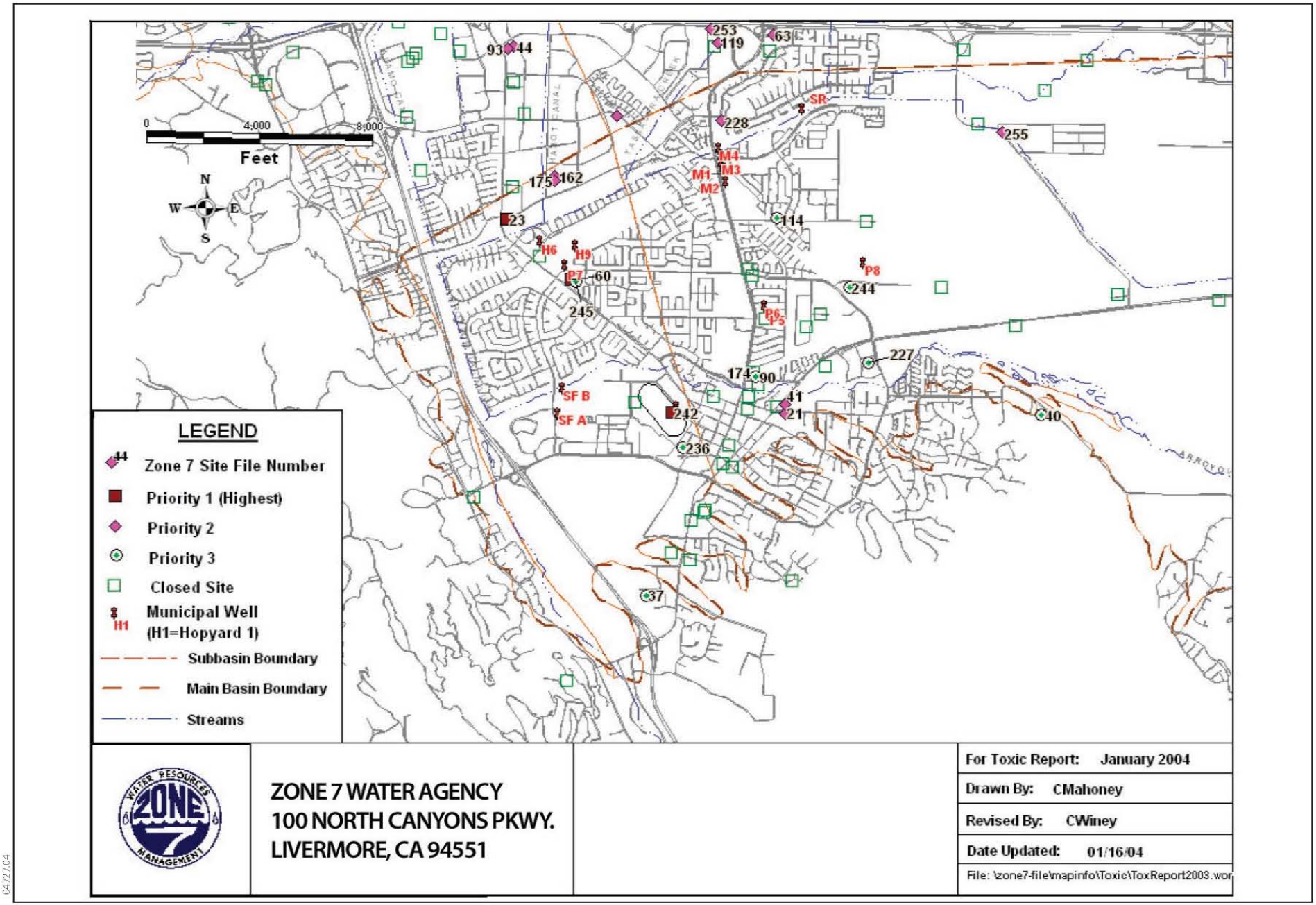

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Figure B
Toxic Site Surveillance, Pleasanton Area Sites

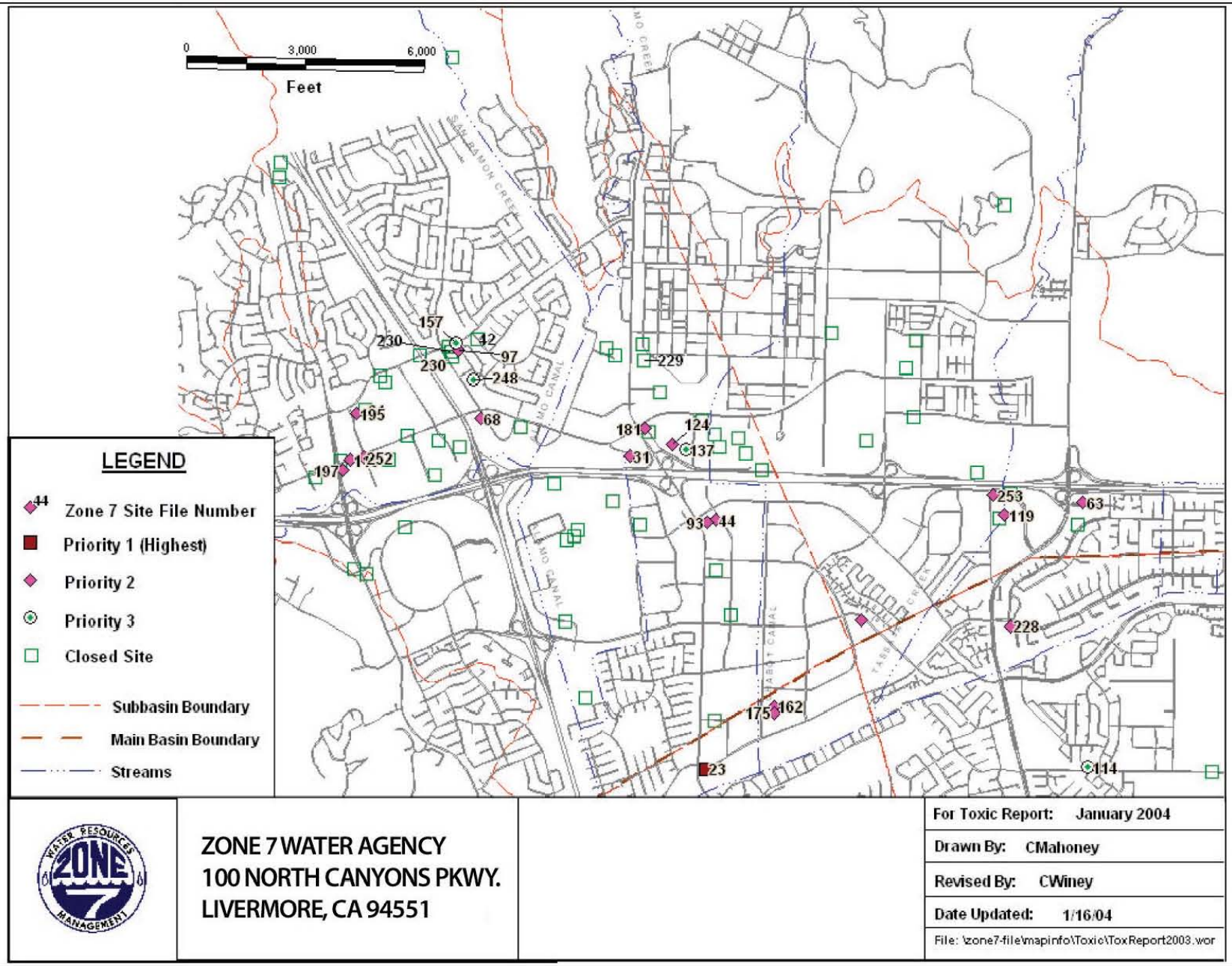

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Figure C
Toxic Site Surveillance, Dublin Area (North of Main Basin)

Appendix C

Standard Operating Procedures

Appendix C

Standard Operating Procedures

C.1 General Procedures

Standard Operating Procedures (SOPs) are essential in running a successful monitoring program to ensure that all data collection procedures for each specific type of monitoring remain homogenous. Zone 7 adheres to such standard procedures in all types of monitoring and data collection.

Appropriate equipment will be brought into the field including appropriate sample containers, sampling equipment, container labels, chain of custody sheets, and field sheets. Sample containers are provided by the laboratory with the appropriate preservative, if any is required. Containers are labeled with the site, date, time, and sampler. Sample timing will be coordinated with the laboratory so that samples can be analyzed within the specified holding time for that analysis. Zone 7's laboratory supplies clean sample collection containers appropriate for each of the analyses.

Upon arrival to the site, all on-site equipment is monitored for damage and maintained, if necessary. If maintenance cannot be completed at that time, the equipment is either brought back to the office for maintenance or field personnel will return with the appropriate equipment/personnel as soon as possible to repair the equipment.

A Chain of custody form is completed for each set of samples and is submitted to the laboratory along with the samples. Samples will be delivered to the laboratory within the recommended holding times for the appropriate analysis.

C.2 Climatological Monitoring

Each of the daily rain gage stations (excluding the California Irrigation Management Information System or CIMIS Station) is equipped with a 10-inch Forester rain gage. Once a day, an observer measures and records the depth of rain (to the nearest 0.01 inch) that has fallen in the preceding 24 hours. If the station is operated by a private observer, the observer then mails their monthly data to Zone 7 at the end of the month. The Livermore station, 15E, also reports to the National Oceanic and Atmospheric Administration (NOAA) and is

currently Livermore's official NOAA station. The NOAA Livermore record is the longest record in our valley, extending back to January 1871. Station 44, part of the Lick Observatory on Mt. Hamilton, has records going back to 1881.

The recorder stations consist of a 10-inch Forester rain gage and a computerized tipping bucket recorder. These tipping buckets continuously record the amount of rain that has fallen at that station.

The California Irrigation Management Information System (CIMIS) Station was installed in 2004 by the California Department of Water Resources (DWR). This station collects 15 minute data sets for precipitation, air temperature, soil temperature, wind speed, wind direction, solar radiation and evapotranspiration. The data is stored and corrected as necessary by DWR and is made available to Zone 7 via DWR's website:

<http://wwwcimis.water.ca.gov/cimis/welcome.jsp>.

The two evaporation stations located at the Livermore Water Reclamation Plant (LWRP) and Lake Del Valle Dam are logged daily and record evaporation to the nearest 0.01 inches.

New average precipitation and average pan evaporation are computed at the end of each water year for use in the following water year. The new average monthly and annual precipitation values are computed using the entire historic database including the current year. For statistical accuracy, an adjusted average is computed by adjusting the monthly totals until the numeric sum of the monthly totals, rounded to the nearest 0.01 inch, equals the average of the water year totals. Typically, only a few of the monthly mean values are changed, and only by one or two hundredths. These adjusted means are listed at the bottom of the monthly table of precipitation.

C.3 Groundwater Elevation

For groundwater level data, Zone 7 measures depth-to-water from a surveyed reference point in each well. Reference point elevations are typically surveyed to an accuracy of 0.01 feet. Mean sea level is used as a common datum for all monitoring wells. Several different devices are used to measure the depth to water. Each device is calibrated routinely to ensure the accuracy of these measurements. Measurements are made to within 0.1 feet and recorded on field data sheets. The elevation of the water surface in the well is computed by subtracting the depth to water from the reference point elevation. The field data is then entered into a database and made available to staff for further analysis.

The California Water Service Company (CWS) and the City of Pleasanton provide monthly water level data from their production wells.

Groundwater levels for all monthly wells are graphed and reviewed monthly. Wells with levels that do not correspond to past or other nearby observations are re-measured to check the elevation. Water levels measured by others are

received a month or more after the actual measurement, so a check measurement is usually not possible. Unusual water levels are noted as suspect in the database and are deleted from the graphs. Pumping water levels are sometimes obtained and are so noted in the database.

Semiannual groundwater level data are initially compared to previous elevations in the field at the time of measurement. These levels are then graphed and contoured to check the general accuracy of the data.

Municipal wells are turned off prior to water level measurements and turned on prior to sampling.

C.4 Groundwater Quality

Groundwater samples are collected at least annually from all wells in the program provided a suitable sample can be obtained. Zone 7 municipal wells, which are turned on prior to sampling, are sampled quarterly by lab personnel. Zone 7 personnel sample other municipal wells annually or analytical results are obtained from the respective agency. Water rights wells are sampled semi-annually.

Groundwater quality samples are monitored for electrical conductivity (EC) and temperature during pumping to determine stability. Samples are collected after the conductivity and temperature have stabilized. Typically, several casing volumes are pumped before stability has been confirmed, when feasible.

Depth to water, sample temperature, EC, and pH are measured in the field. Samples are filtered in the field through a 0.45-micron filter and are generally transported to the laboratory at the Del Valle Water Treatment Plant on the same day. Municipal wells sampled by the lab personnel are not filtered. Samples not analyzed within a few days are preserved by refrigeration. Analysis of samples is limited to major minerals and miscellaneous metals (e.g., arsenic, boron).

Samples sent to the DWR lab are preserved using industry standards for each analytical method. Split samples are obtained for all of the DWR samples and are tested in Zone 7's lab.

C.5 Surface Water Flow

Data loggers have been installed at all surface water recorder sites. These data loggers allow Zone 7 to retrieve 15-minute gage-height data. Most stations are equipped with some type of telemetry capability enabling Zone 7 to download the data remotely. For sites where there is no telemetry capability, data is downloaded directly onto laptop computers monthly.

In general, the procedures used to operate the Zone 7 recording stations and compute streamflow data are in conformance with USGS standards. Each Zone 7 station is visited twice each month: at the beginning of the month for a service visit, and during the middle of the month for an equipment check (the three USGS stations are also visited at this time). The service visit usually consists of a streamflow measurement to verify the station discharge rating, the equipment is checked and serviced, and the used A35 recorder paper chart is removed. The middle of the month visit consists of checking of the station equipment for proper operation, obtaining an outside gage height, and measuring the EC and temperature of the stream. Streamflow measurements are plotted on the rating curve to either confirm the validity of the curve or to make adjustments to the curve. Daily streamflow data are calculated from the A35 recorder chart, or the digital data, which serves as record of flow, and the data obtained from the servicing visits. The streamflow records are computed and reviewed monthly and are given a final review before the compilation of this annual report.

Gage-height records and calculated flow data at the recorder stations are generally of good to fair quality, usually within about eight percent of actual flow. There may be periods when records are missing or incomplete. Flow records from other stations are used to estimate flows during those periods of missing records.

Metered sites in the surface water program are read monthly by Zone 7 personnel or by personnel from other agencies or companies. Daily flow volumes are estimated from the monthly values and meter activity logs. Staff gage sites in the program are visited weekly, when gage-heights are recorded. Flow data is estimated or measured from the gage readings from historical stage-discharge curves. Flow values are then prorated for the previous week. General stage-discharge relationships are developed for staff gage sites, but generally do not contain the rigorous review given to recorder sites. For ‘Other’ sites, surface water flow is estimated by visual inspection.

C.6 Surface Water Quality

Surface water quality sample locations are selected in areas of well-mixed flow, away from influent flow sources. Samples are collected in an intermediate container by wading into the stream or at a suitable bank location. If conditions are unsafe, a sample container is attached to the end of a grab pole or by affixing a Teflon bailer to a rope for submersion into the creek and then immediately emptied into the intermediate container. Water temperature, specific conductance, and pH are measured in the field, by inserting probes into the intermediate container.

While in the field, samples are filtered from the intermediate container into designated sample containers through a 0.45-micron filter. Samples are then transported to the laboratory at the Del Valle Water Treatment Plant on the same day. Samples not analyzed within a few days are preserved by refrigeration.

Analysis of samples is limited to major minerals plus miscellaneous metals (e.g., arsenic and boron).

C.7 Land Surface Elevation

C.7.1 Surveying of Benchmark

C.7.1.1 Overview

Zone 7 performs seasonal elevation monitoring to evaluate changes in land surface elevations across the Livermore-Amador Valley Main Basin. This monitoring is performed by a surveyor licensed by the State of California. In 2002 Zone 7 contracted Kier and Wright Civil Engineers and Surveyors of Pleasanton, California to set up the circuits and has performed all of the surveying events since that time.

C.7.1.2 Main Circuit (A1)

The surveyor performs a cross-valley run, as an "open" loop using "multiple collection" electronic differential levels. The circuit:

- Starts at USC and GS bench mark "G 972 1964" (A1-1.0) located along Foothill Boulevard (State Highway 21),
- Runs east along the Arroyo Mocho to "M1257-1974 reset 1988" (A1-7.0) to include bench marks near Zone 7's Mocho 1 to Mocho 4 pumping stations,
- Runs north along Santa Rita Rd and Old Santa Rita Rd to "L1257-1974" (A1-9.0),
- Returns south to A1-7.0,
- Runs southeasterly along the former South Pacific Railroad Right of Way to Stanley Boulevard to include Alameda County bench mark "TBM-2, ALA Co., 1971" (A1-13.0) and pumping wells 3S/1E 16B1 and 16A 4,
- Runs east along Stanley Boulevard to USC and GS bench mark "D 8" (A1-15.0),
- Return westerly along Stanley Boulevard to Kottinger Drive to include "V1" (A1-16.0), and
- Runs southeast along Kottinger Drive to Adam Way to close at City of Pleasanton bench mark "K2" (A1-17.0).

C.7.1.3 Supplemental Circuits

Circuit B1 (Mocho wells loop):

The surveyor uses the established elevation on bench mark "M1257-1974 reset 1988" to run "multiple collection" closed loop electronic differential levels through monitoring discs located on the Santa Rita Road and Stoneridge Drive bridges over the Arroyo Mocho. Points in this circuit include:

Well #	Mark/Location
3S/1E 9M 2	Mocho 1: Fnd. Cut sq. on conc. @pump house door.
3S/1E 9M 4	Mocho 3: Fnd "PK" nail and KW tag south side door.
3S/1E 8H18	Mocho 4: Fnd "PK" nail and KW tag south side door.
3S/1E 8H13	Fnd. Cut mark north side 12" dia. casing.
3S/1E 8H 2	Fnd. Cut X on conc. @pump house door.
3S/1E 8H 4	Fnd. Cut X. on conc. @pump house door.
3S/1E 8H 3	Fnd. Cut X. on conc. @pump house door.
3S/1E 9M 3	Mocho 3: Set. Cut mark on conc @pump house door.

Circuit B2 (Mocho wells loop):

The surveyor uses the established elevation on bench mark "TP50" (3" diameter brass disc "ACFCandWCD", "ZONE 7) to run "multiple collection" electronic differential levels through monitoring discs along Tassajara Creek. The circuit:

- Starts at Arroyo Mocho,
- Runs north along the west bank of Tassajara Creek,
- Continues east over the Tassajara Creek at West Las Positas Blvd.,
- Proceeds south along the east bank of Tassajara Creek, and
- Closes back on "TP50".

Circuit B3 (Hopyard wells loop):

The surveyor uses the established elevation on bench mark "C972 reset 1967" to run "multiple collection" closed loop electronic differential levels to tie in Zone 7's Hopyard 6 and 9 pumping wells. The circuit:

- Runs southeasterly along Hopyard Road through previously established monitoring disc "Mocho/Park 2002" located within the Zone 7's old Parkside Drive office complex,

- Runs southeasterly along Hopyard Road through Alameda County bench mark "1H" located on the westerly concrete bridge abutment over the Pleasanton Canal,
- Runs along the north side of the Pleasanton Canal to Zone 7's municipal well "Hopyard 9" within the Pleasanton Sports Park, and
- Returns through each point to end back on bench mark "C972 reset 1967".

Circuit B4 (Stoneridge wells loop):

The surveyor uses the established elevation on bench mark "M1257-1974 reset 1988" to run "multiple collection" closed loop electronic differential levels along the Arroyo Mocho to the east of Santa Rita Rd. The circuit:

- Runs along the south side of the Arroyo Mocho through two existing district brass disc located on the South and North side of the gaging station weir,
- Continues easterly along the south side of the Arroyo Mocho to Zone 7's Stoneridge Well (3S/1E 9B 1),
- Continues along the south side of the Arroyo Mocho to include two additional points east of the Stoneridge Well (from 2004 to present), and
- Returns through each point to end back on bench mark "M1257-1974 reset 1988".

If water levels in the Arroyo Mocho prevent safe crossing, the surveyor will only run though the south side disc located within the arroyo at the gauging station. If water levels present a danger to the field crew, they will omit running through either of the brass discs located within the arroyo at the gaging station.

Circuit B5 (Tassajara-Rosewood loop):

This loop, which extends north from the Mocho Municipal Well Field to "L1257-1974" (A1-9.0), has been incorporated into Circuit A1 (see Section C.7.1.2, above).

Circuit B6 (Verona loop) (Discontinued in 2004)

The surveyor uses the established elevations on monitoring points at the Tassajara Bridge as part of Circuit B2 to run a loop into the Verona subdivision. The survey includes elevations on monuments located:

- On Belleza Drive opposite Verde Court,
- At the end of Flora Court,
- At 5606 Belleza Drive, and
- On a point previously established on Circuit A1.

Circuit B7 (Sutter Gate loop) (Discontinued in 2004)

The surveyor uses the established elevations on monitoring points as part of Circuit B1 to extend into the Sutter Gate subdivision area. The circuit:

- Runs west from the Mocho Municipal Well field to include elevations on the monuments located on Larame Gate Drive and Larame Gate Court,
- Run along Larame Gate Drive southwesterly to Sutter Gate Avenue,
- Runs northwesterly along Sutter Gate Avenue to the monument at Sutter Gate Avenue and Lin Gate Street,
- Continues along Sutter Gate Avenue to the monument at Sutter Gate Avenue and Jones Gate Court, and
- Closes on a Circuit A1 point.

C.7.1.4 Level Loop Misclosure Check

If the Circuit A1 run fails to close back on to the previously established elevation for "K2" by more than +/-0.02 feet, the surveyor will run a closing "multiple collection" electronic differential level loop back to "G 972 1964". This assures that the differences are not in the surveyor's work, but may be related to vertical movement of either "G 972 1964" or "K2" or both.

C.7.2 Zone 7 Surveying of Wells

For groundwater elevation reference points, Zone 7 also surveys small circuits to some of the Zone 7 wells. These small circuits branch off of the Kier and Wright surveyed circuits. Due to security and access issues, Zone 7 staff surveys these points. These survey points are listed on Table 1 and include reference point elevations for measuring groundwater levels in the following wells:

- Army Well 1 – 3S/1E 8H 2
- Army Well 2 – 3S/1E 8H3
- Army Well 3 – 3S/1E 8H
- Hopyard 6 – 3S/1E 18A 6
- Hopyard 9 – 3S/1E 17D12
- Mocho 1 – 3S/1E 9M 2
- Mocho 3 – 3S/1E 9M 4
- Mocho 4 – 3S/1E 8H18
- Stoneridge – 3S/1E 9B 1

Zone 7 uses a theodolite transit (Leitz DT5A or equivalent) for surveying the points. The Zone 7 procedures for using the transit include the following:

1. Measurements are read to the nearest one half of a hundredth of a foot.
2. Readings are double-checked to ensure that they have been recorded correctly.
3. After the reading has been recorded, both vials on the transit are double-checked to ensure that the bubbles are exactly centered between the marks. If they are not, the transit is recentered and the reading procedure is repeated.
4. Field notes are kept in the "Zone 7 Wellhead Survey Field Notes" book.
5. 'Back-sights and 'Fore-sights' are taken on each 'Turning Point' at each survey location. The Back-sights (+) and the Fore-sights (-) should be summed and the loop closed to less than 0.015 feet. If the error is greater than 0.015 feet. The entire survey loop is performed again until it can be closed to within the tolerances specified.

C.8 Land Use/Mining Area

The land use and mining area data are derived from field observations, aerial photography and interviews. An aerial image of the Livermore-Amador Valley provides the basis for the mapping.

The aerial image, obtained as a color photographic print, is scanned and utilized in MapInfo, a geographic information systems (GIS) mapping software. The resulting land use and mining area boundaries are a combination of aerial imagery, field observations and, in the case of land use agricultural areas, field interviews. Mining area land use data are compiled from mining area observations. Recycled water use areas are amended using maps and information provided by Dublin San Ramon Services District and the City of Livermore.

Mapping accuracy and efficiency has improved due to the Regional GIS data sharing between local agencies. In the future, developments may be further defined to include categories such as detention basins in order to quantify their impacts on the groundwater basin.

The total acreage of unclassified land is computed by subtracting the classified land use types from the total nodal area. It should be noted that beginning in 2003 the Land Use study includes Node 36 as part of the Main Basin. Node 36, containing approximately three miles of the Arroyo Valle stream channel below the dam, was historically deemed insignificant due to limited groundwater storage potential and minor impacts on the Main Basin. The impacts of this node on the Main Basin have increased in recent years due to significant urban, agricultural and gravel mining developments. It should also be noted that, beginning in 2003, the inclusion of Node 36 in our data tables has changed certain totals and historical averages.

The land use and mining area maps are generated and stored on the computer. All tabulated areas are calculated from maps using MapInfo software.

C.9 Data Management

The Water Resources section of Zone 7 maintains a number of relational databases that track most of the information of importance to Zone 7's groundwater management, including production and distribution parameters, climatological data, benchmark elevations, and water quality data. The data set amassed includes more than 100 years of hydrology in the Livermore-Amador Valley. These databases were developed as a direct result of co-operative programs with both USGS and DWR.

Zone 7 breaks up data into different classes:

- Site Data—typically data about specific monitoring or operational sites (e.g., location, capacity, age, and owner).
- Event Data—is a recording of a specific event and might include a site, a date, and a measure of an event. The water level database is an example of an event database.
- Daily/Monthly/Annual Data—is normally an aggregate total and is fixed based on the duration of interest. An example of daily data is the daily water production database.
- Continuous Recorded Data—can come from a variety of sources such as data-loggers with set interviews, or program recorders that record value changes.

Zone 7 has collected data dating back to the early 1900s and earlier. The collected data sets are converted to other data sets so they can be easily reviewed, compared, and presented. The available data sets are dependent on the type of measurement device at the site:

- Recorder—15 minute data sets for gage height, water levels, and or EC are recorded and downloaded at least weekly for sites with telemetric capabilities or monthly for those without. Recorder data is stored and compiled using proprietary software by 'Western Hydrologic Systems' specifically designed for storing and manipulating field recorder data. Gage height values are converted (using discharge rating tables for each stream) to daily and monthly data values for flow.
- Wells—Monthly water levels are collected from about 80 wells in the program. Semi-annual water levels are collected from about 225 wells in the program.
- Benchmark—Land surface elevation benchmarks are measured semi-annually and correspond to times when water levels are expected to be the highest and lowest during the water year.

- Staff—Weekly data sets for gage height are collected. In most cases, these are compiled and stored as daily and monthly values for flow. However, in some cases only the gage height is stored.
- Meter—Monthly data sets for flow are collected. These are compiled and stored as daily and monthly values for flow.
- Calculated—Monthly data sets are calculated from other data. These are compiled and stored as daily and monthly values for flow.
- Other/None—For sites in the program, weekly data sets are collected by visual inspection since there are no devices. These are compiled and stored as daily and monthly values for flow.
- Mining area lake levels—water levels are monitored monthly from various lakes in the mining area.

All flow data is stored in various relational database files. All water level data is stored in a relational database file and in "GIS\Key", a proprietary database and GIS program specifically designed for storing and presenting environmental data.

All water quality samples submitted to Zone 7's laboratory for testing, are analyzed for EC, Temperature, pH, minerals, and metals. Water quality data generated by Zone 7's laboratory is stored in various database files and in GIS\Key.

Appendix D

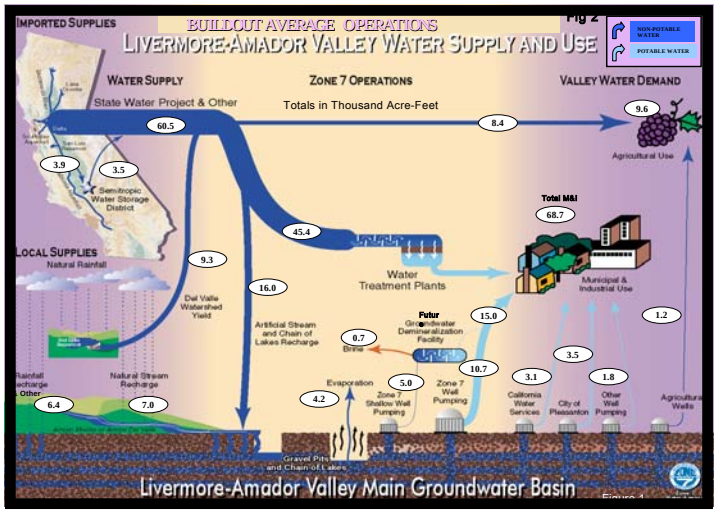
Executive Summary of Salt Management Plan

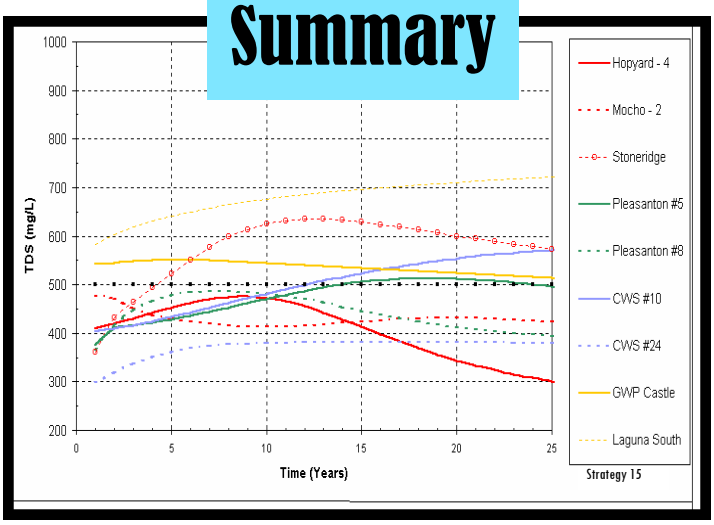
ALAMEDA COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

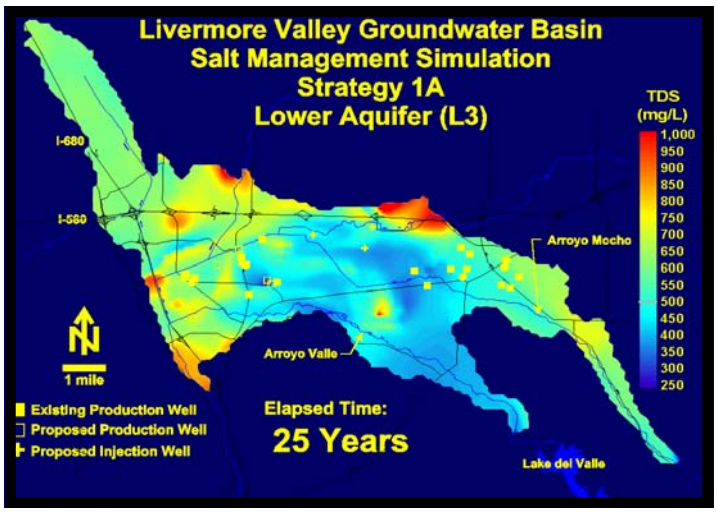
Livermore-Amador Valley Main Groundwater Basin

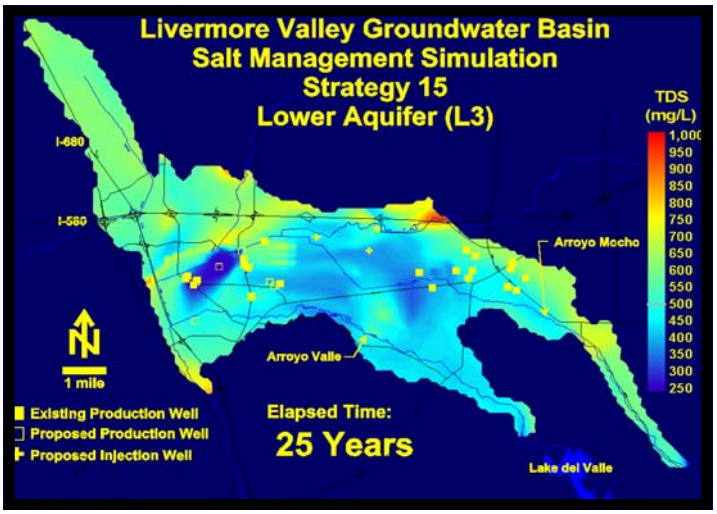
Salt Management Plan

Executive Summary









May 2004

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588-5127 • PHONE (925) 484-2600 FAX (925) 462-3914

June 3, 2004

Mr. Bruce Wolfe
Executive Officer
Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Subject: Zone 7 Salt Management Plan Submittal and DSRSD/Livermore Water Recycling Permitting Coordination

Dear Mr. Wolfe:

The San Francisco Bay Regional Water Quality Control Board (RWQCB) issued Order No. 93-159, the "Master Water Recycling Permit," to the Zone 7 Water Agency, the City of Livermore and Dublin San Ramon Services District in December of 1993. The Master Permit specified requirements for implementation of recycled water projects in the Livermore-Amador Valley, including Provision D.1.c.ii. for development and implementation of a Salt Management Plan (SMP). One component of the SMP was to ensure that the overall impact of permitted water recycling projects would not unacceptably degrade groundwater resources.

Zone 7 developed a comprehensive SMP over the last several years with input from the Technical Advisory Group (TAG), including Livermore, DSRSD, and others. The SMP addresses all Master Permit requirements (Permit Attachment 3 Section B) and additional issues. It was designed to document all of Zone 7's current and proposed surface and groundwater resource management and monitoring practices within the Livermore-Amador Valley, not just water recycling impacts. (Currently less than ten percent of the net salt loading to the main groundwater basin is due to recycled water irrigation.) Salt management is being accomplished by Zone 7 in cooperation with its water retailers, through an adaptive management process designed to maintain, and where feasible, to improve both groundwater quality and delivered (potable) water quality.

In August 1999, the Zone 7 Board of Directors approved Resolution 99-2068 adopting an Interim Salt Management Implementation Plan and associated goals. Since then, Zone 7 has been implementing this Interim SMP that focuses on salt impacts from use of imported water supplies and existing recycled water supplies. Zone 7 has now finalized the documentation for the Final SMP and resolved a number of institutional and regulatory issues necessary before being able to fully implement regional water recycling and salt management programs.

Groundwater demineralization and export of salts from one or more reverse osmosis (RO) treatment systems combined with artificial stream recharge with low TDS surface water are the key elements of the SMP. The LAVWMA/EBDA effluent pipeline is the only viable option to export RO concentrate (export salt) from wellhead demineralization. Zone 7 has budgeted over $20 million to construct groundwater RO facilities over the next several years. Zone 7 has been working with DSRSD and Livermore to document the benign impacts of disposal of groundwater RO concentrate water on the

quality of wastewater discharged to San Francisco Bay via LAVWMA and EBDA facilities. Zone 7 entered into a "Basis of Agreement" with DSRSD in March 2004 to support Zone 7's implementation of the groundwater demineralization program portion of the SMP and to support DSRSD's wastewater disposal needs and implementation of local recycled water irrigation projects.

Livermore's NPDES permit, Order No. 00-089, Finding 7, recognized disposal of groundwater RO concentrate via the LAVWMA/EBDA export pipeline as the preferred disposal option, as cited below:

7. "*Livermore, DSRSD, Zone 7 and/or other entities in the Livermore-Amador Valley are likely to implement one or more groundwater demineralization projects in the future to help control salt loading and resultant groundwater degradation, and to help maintain and improve potable water quality. The currently preferred option for disposal of this concentrate is directly to the LAVWMA/EBDA export pipeline. Concentrate typically does not require discharge to the sewer collection system and treatment plant since it is essentially brackish water with low levels of naturally occurring trace elements from the local groundwater. Any sewer discharge would also reduce Joint Powers Agreement limited influent capacity. Board staff find that discharge of concentrate to the Livermore Interceptor would be consistent with the terms and conditions of this Order as long as the combined stream is in compliance with all applicable effluent limitations as measured at the joint EBDA monitoring location. The discharger shall notify the Board prior to allowing any such concentrate discharge and the Executive Officer will amend the Self-Monitoring Program to include appropriate monitoring requirements.*"

DSRSD Water Recycling Permitting

In January 2004, DSRSD submitted a report to the RWQCB and Department of Health Services titled "*Update to Engineer's Report and Notice of Intent for Inclusion Under RWQCB Order 96-011.*" Over 10 years have passed since adoption of the Master Permit (Order No. 93-159) and many aspects of that permit are outdated and/or are no longer applicable. Order No. 96-011 is the General Water Recycling Order applicable throughout the region. The stated intent of the General Order "is to streamline the permitting process and to delegate the responsibility of administrating water reuse programs to local agencies to the fullest extent possible."

The General Order addresses salt management issues in General Provision D.5, as cited below:

> "*When directed by the Regional Board, in groundwater basins that are a significant source of drinking water where there is a likely potential for groundwater degradation from salt buildup from extensive water recycling irrigation, a Producer shall prepare and submit a Salt Management Program, acceptable to the Executive Officer, to insure that the overall impact of permitted water recycling projects does not degrade groundwater resources.*"

The General Order wording is similar to that in Master Permit Provision D.1.c.ii, as cited below:

> *"The permittees shall prepare and submit a Salt Management Program (SMP), acceptable to the Executive Officer, to insure that the overall impact of permitted water recycling projects does not degrade groundwater resources. The program will contain monitoring, management and mitigation elements necessary to achieve salt management goals defined in Zone 7 policies and in the Basin Plan. At the permittees option, the SMP may be incorporated into the Engineering Report or other regulatory documentation."*

To facilitate regulatory and administrative efficiency and to reduce customer costs, DSRSD has requested that its recycled water landscape irrigation projects be transferred from Order No. 93-159 to General Order No. 96-011. DSRSD has committed to complying with the SMP, and to providing TDS and related monitoring data as specified in the SMP, whether the SMP is submitted pursuant to the Master Permit or the General Order.

Livermore Water Recycling Permitting

Recycled water irrigation at the Livermore Golf Course is currently regulated under the city's existing Water Reclamation Permit Order No. 90-102. This order is outdated in many ways and does not reflect the current basin-wide salt management approach of the Master Permit and SMP. The RWQCB stated its intent to rescind Order No. 90-102 and to regulate all of Livermore's water recycling projects under the Master Permit, following submittal and Executive Officer approval of the Salt Management Program in Provision D.4 of the Master Permit, stated below:

> *"Following Executive Office approval of the Salt Management Program (SMP) required to be developed in Provision D.1.c.ii of this Order, the requirements prescribed by the Order will supersede the requirements prescribed by Order No. 90-102 (Livermore and Caltrans Water Reclamation Requirements) and the applicable requirements of Order No. 91-042 (Region 2 Water Reuse Requirements)."*

In April 1998, Livermore submitted to the RWQCB its "*Water Reuse Program Manual.*" This document contains detailed information on how Livermore manages, administers, and permits its recycled water program. As recommended by RWQCB staff, the manual was developed to provide the same basic information as that required to be submitted in the Notice of Intent for coverage under the General Order No. 96-011. DHS and RWQCB staff reviewed and approved the manual in December 1998. Therefore, Livermore would also appear to have an acceptable program in place to allow for coverage for irrigation projects under the General Order.

Requested RWQCB Actions

Zone 7, DSRSD, and Livermore hereby submit the enclosed Salt Management Plan Report and Executive Summary in fulfillment of Master Water Recycling Permit Order No. 93-159 Provision D.1.c.ii requirements and General Water Recycling Permit Order No. 96-011 Provision D.4 requirements. Zone 7 will be the lead agency responsible for implementation of the SMP. DSRSD and Livermore commit to participate with Zone 7 in the SMP to offset salt loading associated with their

implementation of water recycling projects as required by General Order No. 96-011 General Provision D.5.

To provide a comprehensive and effective approach for administering, regulating and encouraging water recycling in the Livermore-Amador Valley, the agencies collectively request RWQCB staff to:

- Review the SMP and provide your approval as soon as possible that the SMP provides a satisfactory program to ensure that salt loading from water recycling projects will be offset;
- Notify Livermore when the SMP is approved that the requirements of Order No. 90-102 are no longer applicable and are superceded by those of Order No. 96-011 and the SMP;
- Approve all DSRSD landscape irrigation programs under Order No. 96-011 following DSRSD submittal of an updated NOI; and
- Cooperate with Livermore and DSRSD in the approval of the addition of groundwater RO concentrate to their wastewater discharge from the Valley to San Francisco Bay.

We would like the opportunity to present to you the results of our significant collective efforts that resulted in this SMP and to answer any questions that you may have about how the SMP is being implemented. We would like to schedule a meeting with you to accomplish this the week of June 7. Dr. Tom Hall of EOA will be contacting you to find out about your availability to meet the morning of Wednesday June 9 and to answer any initial questions that you may have. We look forward to meeting with you.

If there are any questions, please call David Lunn at extension 327.

Very truly yours,

Edward Cummings	Dave Requa	Darren Greenwood
Zone 7	DSRSD	City of Livermore
Assistant General Manager	Assistant General Manager	Water Resources Manager

JC:arr

Enc.

cc: Rich Condit, Regional Water Quality Control Board
Steve Cusenza, City of Pleasanton (w/enc.)
Henry Wind, CWS (w/enc.)
David Lunn
Jarnail Chahal

California Regional Water Quality Control Board
San Francisco Bay Region

Terry Tamminen
Secretary for
Environmental
Protection

1515 Clay Street, Suite 1400, Oakland, California 94612
(510) 622-2300 • Fax (510) 622-2460
http://www.swrcb.ca.gov/rwqcb2

Arnold Schwarzenegger
Governor

SEP 24 2004

File: 2199.9295 (RJC)

Dale Myers, General Manager
Alameda County Flood Control and Water
Conservation District (Zone 7 Water Agency)
5997 Parkside Dr.
Pleasanton, CA 94588-5127

RECEIVED
SEP 27 2004

Dear Mr. Myers:

Subject: Zone 7 Water Agency - *Salt Management Plan*

We have received and reviewed your letter of June 3, 2004 transmitting the Executive Summary and supporting technical document for your Salt Management Plan (SMP), dated May 2004. This letter is approving the SMP with comments on future salt management monitoring plans. Separate approval from the NPDES Permit Division is required for seasonal groundwater export and wellhead demineralization, two salt management strategies that will result in discharges to surface waters.

The SMP is required under Provision D.1.c.ii of the San Francisco Bay California Regional Water Quality Control Board's (Board) "Master Water Recycling Permit," Order No. 93-159 (Master Permit) if the permittee(s) seeks to undertake a Group C project. The permit was issued to the Alameda County Flood Control and Water Conservation District (Zone 7), the City of Livermore (Livermore) and Dublin San Ramon Services District (DSRSD) in December of 1993. The Master Permit authorizes Livermore, DSRSD, and Zone 7 to produce, distribute, and manage recycled water projects throughout the Livermore-Amador Valley (Valley). The Master Permit requires that prior to implementation of valley-wide recycling projects, the permittees submit a SMP for approval by the Executive Officer. The permit also authorizes groundwater projects using surface spreading and well injection.

Recycled Water Projects in the Valley

In the early 1990's Zone 7, Livermore, and DSRSD conducted a valley-wide water recycling study and found that properly treated recycled water can provide a safe and cost-effective source of additional water supply. The study also found that use of demineralized recycled water could help improve the salt balance and groundwater quality. But relatively little recycled water has been used directly in the Valley due to concerns about potential impacts from elevated total dissolved solids (TDS) levels in recycled water.

The 1993 Master Permit and the SMP

Before extensive recycling projects could be implemented by Livermore and DSRSD under the Master Permit, a SMP required that would assess and manage the impacts of salt loading from those projects on the water quality of the Valley's underlying groundwater basin. Zone 7 would be the lead agency responsible for the development and implementation of the SMP. The SMP was developed during 1994-

1999 through a cooperative effort involving Zone 7 staff, technical consultants and local citizens. Over the years the scope broadened beyond that outlined in the Master Permit, to one more resembling a comprehensive watershed water resources management plan. It identifies and documents Zone 7's long-term plan and strategy for managing salts and mineral water quality within the Valley's groundwater basin. Most of the proposed projects in the Master Permit were never implemented, awaiting the implementation of a SMP to fully offset both current salt loading from natural sources and operations, and any future salt loading associated with new recycled water use. The success of the SMP in controlling salt loading on water quality in the Valley is essential if wastewater reuse is to reach its maximal potential in the Valley.

Salt Management Monitoring Plan (SMMP)

As part of the SMP, Zone 7 conducts an extensive groundwater monitoring program to identify changes in groundwater quality throughout the watershed, to refine salt loading estimates, and provide input to the groundwater models. It is proposed that Zone 7 would submit annual reports to the Board summarizing results obtained as part of the SMMP. In addition to data collected by Zone 7 for the SMMP, there are additional salt loading assessments that may be useful for the SMP. These may include salt loading data from Alameda County Water District, mining companies, septic tank discharges, increased agricultural irrigation outside the Main Basin, sanitary sewer overflows from Livermore's and DSRSD's sewage collection systems, Alameda County's stormwater control program that implements stormwater infiltration as best management practices, private recycled water projects, (i.e., vineyards) etc. Staff encourages Zone 7 to continue to incorporate such information into applicable Zone 7 databases so that Zone 7 can continue to serve as a centralized repository/clearinghouse for surface and groundwater quality and quantity information in the Valley.

Future Water Recycling Programs (General Permit)

Both DSRSD and Livermore have applied for the Board's **General Water Reuse Order** (General Order) to administer their current and future landscape and/or agricultural irrigation type recycled water projects within their individual jurisdictions. Both have completed Notices of Intent (NOI) as required by the General Order. As with the Master Permit, an approved SMP is also required under the General Order. Approval of the SMP by the Executive Officer will also satisfy the General Order's SMP requirement. All future surface recycled water projects by DSRSD and Livermore will be administered by the General Order, once their respective NOIs have been approved by the Executive Officer. Livermore and DSRSD have requested that the Master Permit be kept active to only address potential future groundwater recharge projects. Once the State Water Resources Control Board and the State Department of Health Services finalize new regulations on groundwater recharge reuse, the Board staff will work with Zone 7, Livermore and DSRSD in updating the Master Permit for those uses.

Approval of the Zone 7 Salt Management Plan

Our review of the SMP finds that program provides Zone 7 a very valuable, comprehensive and flexible tool for management of the Valley groundwater basin. It uses an adaptive management process to identify and evaluate many input sources of information that are used to modify salt management strategies for protecting/improving the basin's groundwater quality for domestic and municipal beneficial uses while maximizing recycled water use. This adaptive management process allows annual changes to Zone 7's salt management approaches and operational plans and helps ensure that they result in an optimized combination of strategies for any given year.

In addition to being an essential management tool for protecting and maintaining basin water quality, the SMP will provide the Board valuable insight on the impacts of salt loading on surface and groundwater quality from various sources in the valley. To that end, the Board would like to be appraised of Zone 7 policy directives, available water resources and demands in the basin, updates to groundwater modeling, salt loading tracking, and changes in salt management strategies in an annual summary report to this Board. The contents, format, and timing of the summary report submittal can be determined through consultation between our staffs.

I find that the **Salt Management Plan**, submitted by Zone 7 of the Alameda County Flood Control and Water Conservation District, pursuant to Master Permit Provision D.1.c.ii, satisfactorily meets the intent of the Master Permit. It is understood Zone 7 will be the lead agency responsible for SMP implementation, and that DSRSD and Livermore have committed to actively participate with Zone 7 in SMP implementation. We agree with the SMP approach that it will be implemented via an adaptive management process within the context of the annual Zone 7 water operations plan and in accordance with Zone 7 approved SMP policies and objectives.

If there are questions regarding this matter, please contact either Richard Condit at (510) 622-2338 or Shin-Roei Lee at (510) 622-2376.

Sincerely,

Bruce H. Wolfe
Executive Officer

cc: Mr. David Requa
Assistant General Manager
Dublin San Ramon Services District
7051 Dublin Blvd
Dublin, CA 94568

Mr. Darren Greenwood
Water Resources Division Manager
City of Livermore
101 W. Jack London Blvd.
Livermore, CA 94550

bcc: Lila Teng

Acknowledgements

Salt Management Plan Report

ZONE 7 OF ALAMEDA COUNTY FLOOD CONTROL AND
WATER CONSERVATION DISTRICT – ZONE 7 WATER AGENCY

Dale Myers, General Manager
Edward Cumming, Assistant General Manager
Vince Wong, Assistant General Manager

Prepared by Zone 7 Water Resources Staff in Conjunction with EOA, Inc.

David Lunn, Water Resources - Project Manager
Jarnail Chahal, Water Resources – Project Engineer
Gerald Gates, Water Resources – Staff Technician

Tom Hall, EOA – Project Manager
Jeff Soller, EOA – Senior Scientist

Modeling Assistance was Provided by CH2MHILL and WRMI

Dan Wendell, CH2MHILL – Groundwater Modeling
Harold Meyer, Water Resources Management, Inc. – System Operations Modeling

Guidance and Direction were Provided by the Technical Advisory Group

Bill Adams, Steve Gittings, Randy Werner – City of Livermore
Steve Cuzenza, Garry Lee – City of Pleasanton
Dave Requa, Bob Gresens – DSRSD
Bert Michalczyk, Bruce Webb - DERWA
Sam Palermo – California Water Service
Helen Ling – Morrison and Associates
Vince Wong, David W. Lunn – Zone 7

Public Input was Provided by the Groundwater Management Advisory Committee

Mary Jean Aufderheide, Dorothy Bishop, Michael Gatzman, Bryant Hudson,
Zev Kahn, Eric Nichols, Peggy Purnell, Jay Zucca

Other Zone 7 staff, managers and consultants who participated in this multi-year effort are recognized for their contributions to the success of this project.

Executive Summary

Zone 7 Salt Management Plan

Introduction

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The Salt Management Plan (SMP) is a cooperative effort developed to address the increasing level of total dissolved solids in the main groundwater basin. It was developed in partnership by Zone 7 staff and consultants, a technical advisory group (TAG) composed of local water retailers, and a Zone 7 citizens committee—the Groundwater Management Advisory Committee (GMAC). In-house data compilation work began in 1994, with technical analyses and presentations continuing through 1999. This SMP report provides the technical information and analyses that support the August 1999 Zone 7 Board approved salt management strategy of using increased conjunctive use combined with shallow groundwater demineralization in the western portion of the service area to fully offset current and future sources of salt loading to the main groundwater basin (Main Basin). This strategy was designed to also maintain or improve delivered water quality and to facilitate increased use of recycled water using planned Zone 7 facilities to offset salt loading. Annual Salt Management decisions are to be made via an adaptive management process integrated into Zone 7's annual water operations plan.

Chapter 1 provides a brief history of the SMP process and the regulatory framework that initiated and guided its development. It includes a summary of water recycling investigations and proposed projects in the Livermore-Amador Valley and how such projects could be implemented under the Master Water Recycling Permit and the SMP.

Chapter 2 provides an overview of both current and future Zone 7 facilities, water demands, and operations. It describes the key role of the annual operations plan in maintaining a sustainable water supply. The water system operations computer model used to project delivered water quality under alternative operating strategies is also described.

Chapter 3 provides a condensed summary of historic information and ongoing data collection on the hydrogeology of the fringe and main groundwater basins. Connectivity and mixing, fringe to Main Basin and upper to lower aquifer are addressed. Supporting information is presented from the enhanced Visual Modflow computer groundwater flow and MT3D solute transport model developed for the SMP.

Chapter 4 summarizes the extensive database of surface and groundwater quantity and quality information collected and maintained by Zone 7 as part of its management of water resources in the Livermore-Amador Valley. Issues of seasonal and spatial variability are addressed in addition to the major influence that imported South Bay Aqueduct water quality has on delivered water quality.

Chapter 5 describes the methodology and extensive data required by Zone 7 to calculate the annual and steady state-based water and salt balances for the main groundwater basin. Historic and projected year 2010 salt loadings are discussed. Variations of these salt balance calculations are used in the SMP to evaluate the impacts of alternative salt management strategies.

Chapter 6 presents Zone 7's existing monitoring programs, as well as additional surface and groundwater monitoring implemented to track current and future sources of salt loading in the watershed and to address areas of hydrogeological uncertainties. The surface and groundwater monitoring networks for each drainage basin are described.

Chapter 7 presents the key salt management plan policy issues and options developed through consultation with the TAG and GMAC. Key recommendations include: (1) fully offset current and future net salt loading and (2) maintaining and, where feasible, improving delivered water mineral quality. Background information is presented on consumer acceptability of varying TDS concentrations of delivered water.

Chapter 8 describes the range of individual and composite salt management strategies that are evaluated in more detail in the remaining chapters of the SMP. The focus is on strategies that use previously planned and budgeted Zone 7 facilities such as wells and groundwater demineralization facilities. Preliminary unit operations and maintenance (O&M) costs are also presented.

Chapter 9 presents the results of the salt loading calculations for 20 salt management strategies under projected year 2010 conditions. The strategies are based on the policies and options described in Chapter 7. Estimated costs and impacts on groundwater and delivered water quality TDS are included. A screening process is presented to identify the most feasible strategies for further analysis.

Chapter 10 presents the computer modeling results for four of the most promising strategies identified in the screening analysis discussed in Chapter 9. Included are computer model generated maps and graphics depicting impacts on groundwater, individual wells, and retailer turnouts under status quo operations versus SMP strategies.

Projected impacts of potential strategies using demineralized recycled water injection also are included.

Chapter 11 presents alternatives and recommended approaches for allocating the costs of salt management as a function of the salt source: existing municipal and industrial (M&I), future M&I, untreated water, or recycled water. TAG recommendations to fund capital costs through connection fees and O&M costs through water rates, similar to other Zone 7 facilities, are summarized.

Chapter 12 presents the SMP near-term implementation plan, including the most feasible salt management strategies identified in Chapter 10 scaled down to offset the current 2,200 tons/year salt loading versus the 5,400 tons/year loading projected for year 2010. These strategies include increased conjunctive use, shallow groundwater demineralization, and potential future demonstration scale stream recharge with demineralized recycled water. Chapter 12 describes the specific near-term (2000-2002) SMP implementation plan that was approved by the Zone 7 Board in August 1999 and two implementation options for 2004-08. The SMP concludes with recommended next steps to address future salt loading sources and to further investigate potential lower cost salt management strategies such as seasonal groundwater export.

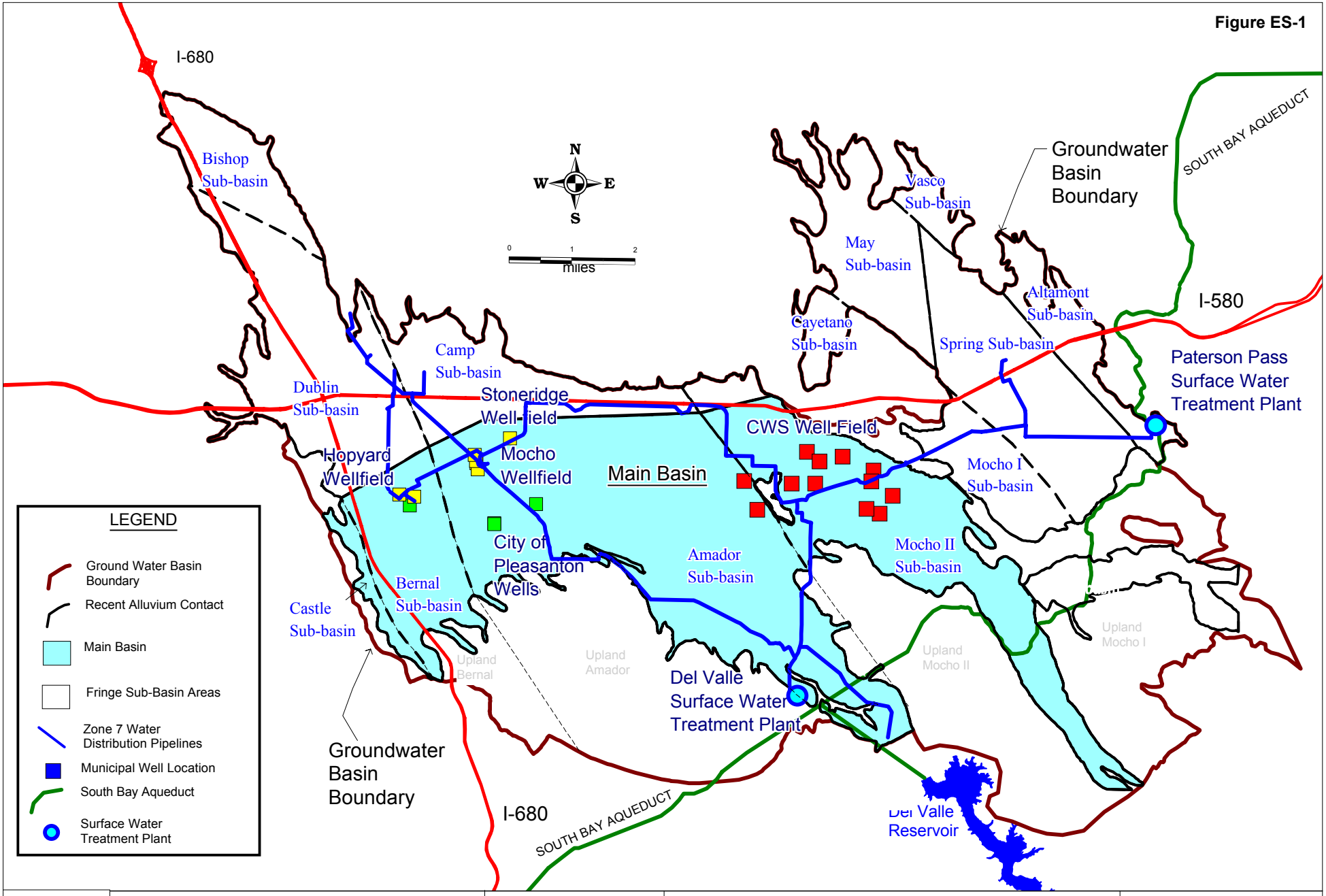
Background

Zone 7 of Alameda County Flood Control and Water Conservation District, locally known as Zone 7 Water Agency, serves as the overall water quality management agency for the Alameda Creek Watershed above Niles. Zone 7 has the primary responsibility of managing the Livermore-Amador Valley surface and groundwater resources. It has historically managed the 250,000 acre-foot capacity main groundwater basin (Figure ES-1) by maximizing lower TDS surface water deliveries, artificially recharging the Main Basin with low total dissolved solids (TDS) imported surface water, restricting groundwater pumping, and restricting wastewater disposal and water recycling within the watershed.

Studies relating to the groundwater supply of the Livermore Amador Valley were first conducted in the early 1900's. Since that time, a number of studies have been completed by entities, including the California Department of Water Resources, the U.S. Geological Survey, as well as Zone 7. To signify the area of the groundwater basin that had long been recognized as containing the majority of usable groundwater storage, the concept of a central or "main" basin was developed in the 1980's.

The Livermore-Amador groundwater basin is located in the heart of the Livermore-Amador Valley and extends into the hills south of Pleasanton and Livermore. The basin includes the areas occupied by both the Livermore Valley and Livermore uplands. The principal water-bearing units are the unconsolidated recent alluvium sands and gravels, and the tilted, semi-consolidated beds of sandstones and conglomerates of the Livermore Formation. Groundwater occurs in the aquifers under unconfined, semi-confined and

Figure ES-1



ZONE 7 WATER AGENCY	
5997 PARKSIDE DRIVE PLEASANTON CA 94588	
DRAWN	GERALD GATES STEWART SMITH
DESIGNED	GERALD GATES STEWART SMITH
CHECKED	DAVID LUNN
APPROVED	DAVID LUNN

SALT MANAGEMENT PLAN

GROUNDWATER BASIN AND WATER FACILITIES MAP

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confined conditions, depending on depth and location in the basin. Several geologic faults or linear groundwater anomalies cut across the groundwater basin. Based in large part on these fairly linear fault-related groundwater impediments, the basin has been divided into 13 sub-basins: Altamont, Amador, Bernal, Bishop, Camp, Castle, Cayetano, Dublin, May, Mocho I, Mocho II, Spring, and Vasco. Together, portions of the Castle, Bernal, Amador, and Mocho II sub-basins overlain by recent alluvium are considered the "main" basin because of their large capacity to store and transmit groundwater and their significance to the local groundwater supply. The other sub-basins are collectively called the "fringe" basins.

Groundwater in the Livermore Valley exists in a multi-layered aquifer system with the upper aquifer being unconfined and the subsequent deeper aquifers being semi-confined or leaky. Flow generally follows a westerly pattern, like the surface water streams, along the structural central axis of the valley. The majority of subsurface inflow, however, occurs across the northern boundaries of the Main Basin, in particular from the Dublin and western Camp sub-basins, and flows in a southerly direction. These sources of groundwater co-mingle in the Bernal and Amador sub-basins and generally flow towards groundwater pumping facilities in Pleasanton.

It is a common misconception that the groundwater basin is a "totally closed" basin suggesting that minerals or contaminants that enter the groundwater basin have no way of leaving the basin. In the late 1800s, pre-development groundwater levels in the basin created a gradient causing groundwater to flow from east to west and naturally exit the basin as surface flow (rising groundwater) in the Arroyo de la Laguna. In the early to mid-1900s, groundwater began to be extracted in appreciable amounts causing groundwater levels to drop throughout the basin, below the level where it would naturally rise into the Arroyo de la Laguna and exit the basin through stream flow. This was the closest the Main Basin came to being, by definition, a "closed" basin. At present, the basin cannot be considered "totally closed" since water is recharged into and exported from the basin through various means. On average, approximately 8% of the total groundwater storage exits the basin each year.

Treated water production facilities in the valley include two surface water treatment plants owned and operated by Zone 7, as well as groundwater production wells owned and operated by Zone 7, the City of Pleasanton, and California Water Service Company (CWS). Total surface water treatment design capacity is 55 mgd. Actual capacity can vary with South Bay Aqueduct flow (water elevation). Zone 7 has seven existing active production wells with a total peak production capacity of 32 million gallons per day (mgd). Pleasanton has three existing active wells with a production capacity of 11 mgd and CWS has 12 existing active wells with a production capacity of 10 mgd. Total combined groundwater capacity for Zone 7 and its retailers is approximately 53 mgd.

Zone 7's treated water distribution system conveys treated water to retailer turnouts. The system includes booster pump stations and distribution pipelines, and 13.5 million gallons of total storage capacity in three storage reservoirs that help meet hourly demand fluctuations. Water retailers own and operate their own water distribution system to serve

their customers. Pleasanton and CWS both pump directly into their distribution systems to meet hourly and daily peak demands. Annual total groundwater pumping by Pleasanton and CWS is limited to their groundwater pumping quotas.

Water Quality and Variability

The historic management approach implemented by Zone 7 (i.e., maximizing surface water deliveries, artificially recharging the Main Basin with low total dissolved solids (TDS) imported surface water, restricting groundwater pumping, and restricting wastewater disposal and water recycling within the watershed) has been successful in maintaining a sustainable and reliable water supply. The valley-wide annual average delivered water blend during an average year is about 85% surface water and 15% groundwater. TDS is used as an indicator of overall mineral (salt) content in this SMP. However, Zone 7 monitors for a large suite of mineral constituents in surface and groundwater in addition to TDS. These more detailed data and TDS data are used to track sources of water and analyze water quality trends, as well as to calculate salt loading of the Main Basin.

The quality of Zone 7 potable deliveries varies seasonally as a function of both source water quality and the blend ratio of surface water to groundwater. The TDS concentrations of source water from the South Bay Aqueduct (SBA) can vary from 100 to 700 mg/l on an annual average basis depending on the wetness of the water year (climatic conditions) and seasonally, month to month depending on reservoir releases into the Delta and Delta pumping patterns. Groundwater quality changes slowly and is generally more consistent, ranging from 400 to 550 mg/L TDS. Hence, actual delivered water TDS varies from month to month and year to year. The ratio of groundwater to surface water can vary by season, by day, and by turnout depending on demand. Table ES-1 shows typical winter and summer source water quality, delivered water blend, and resultant delivered water TDS of Zone 7 deliveries under three climatic conditions: dry, average and wet years.

Table ES-1
Typical Delivered Water TDS
Under Historic Basin Management Strategy

	Source water Quality (TDS)		
Climatic	SBA TDS (mg/L)		GW
Conditions	Winter	Summer	TDS
Dry	500	500	450
Average	270	220	450
Wet	170	150	450

	Delivered Water Blend	
Climatic	%Surface Water Delivered	
Conditions	Winter	Summer
Dry	30%	30%
Average	100%	90%
Wet	100%	90%

Climatic	**Delivered Water Quality, TDS (mg/L)**	
Conditions	**Winter**	**Summer**
Dry	**470**	**470**
Average	**270**	**240**
Wet	**170**	**180**

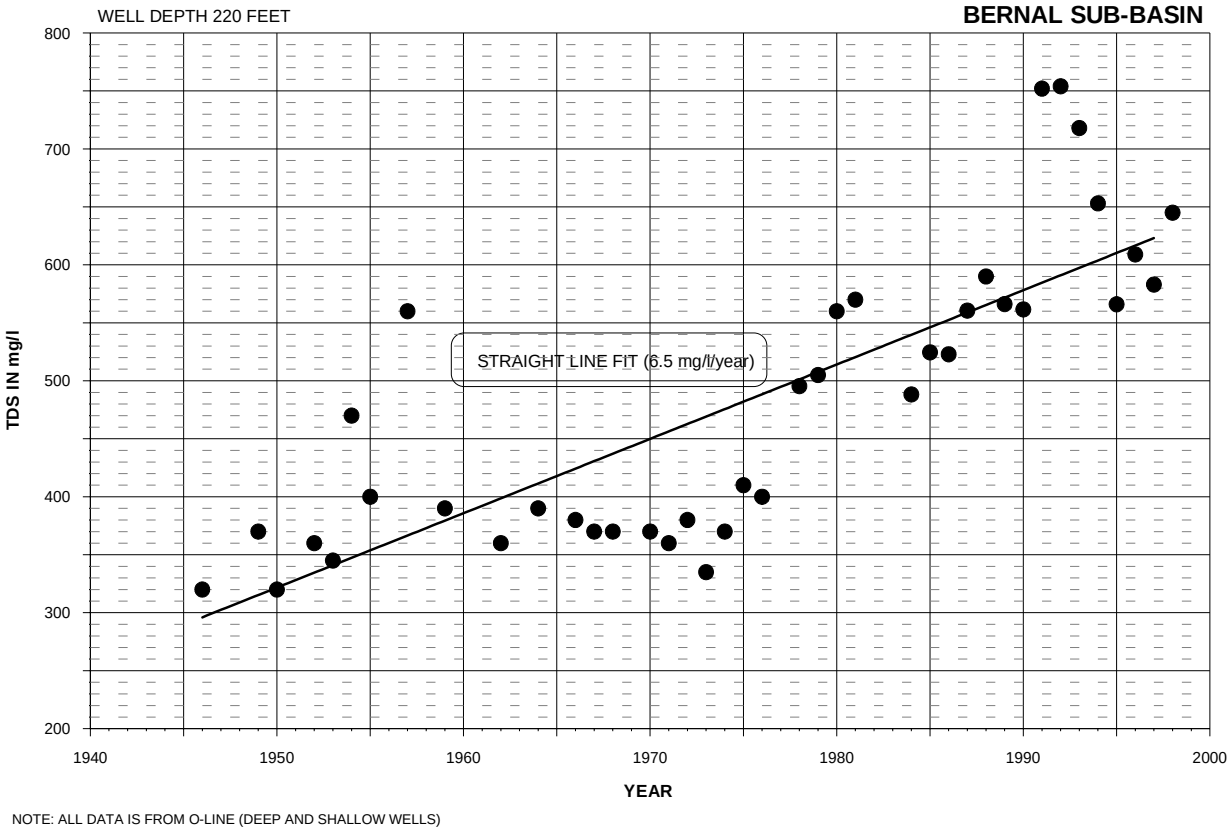
Delivered water TDS also varies from east to west in the valley. The blend of surface to groundwater varies between turnouts because of the locations of the wells relative to the turnouts and because of their intermittent use. The Livermore and CWS service areas, which are closer to surface water treatment plants, typically receive a higher percentage of treated surface water, while Pleasanton and DSRSD service areas, which are closer to Zone 7 wells, receive higher percentages of groundwater (see Figure ES-1). CWS and Pleasanton also operate their own wells and blend groundwater with their Zone 7 deliveries, adding to the variability of water quality delivered to their customers.

Salt Loading, Sources, and Sinks

As in other arid areas that rely on imported water for a significant portion (75-85%) of the local supply, the historic groundwater management approach has allowed a gradual but continual degradation in groundwater mineral (salts) quality. Annual net loadings varied from about 11,800 to a negative 4,800 tons, with a 25-year average of about 2,550 tons/year. The cumulative salt loading to the Main Basin during that time period was approximately 63,500 tons and there were only six years in which there was a negative salt accumulation in the Main Basin, three of them being 1996-1998. The net steady state salt loading to the Main Basin under 1998 conditions was 2,200 tons. The 2,200 tons per

year is equivalent to a TDS increase of about 10 mg/L per year in the groundwater. Figure ES-2 presents the groundwater TDS changes with time in the Bernal Sub-basin.

Figure ES-2



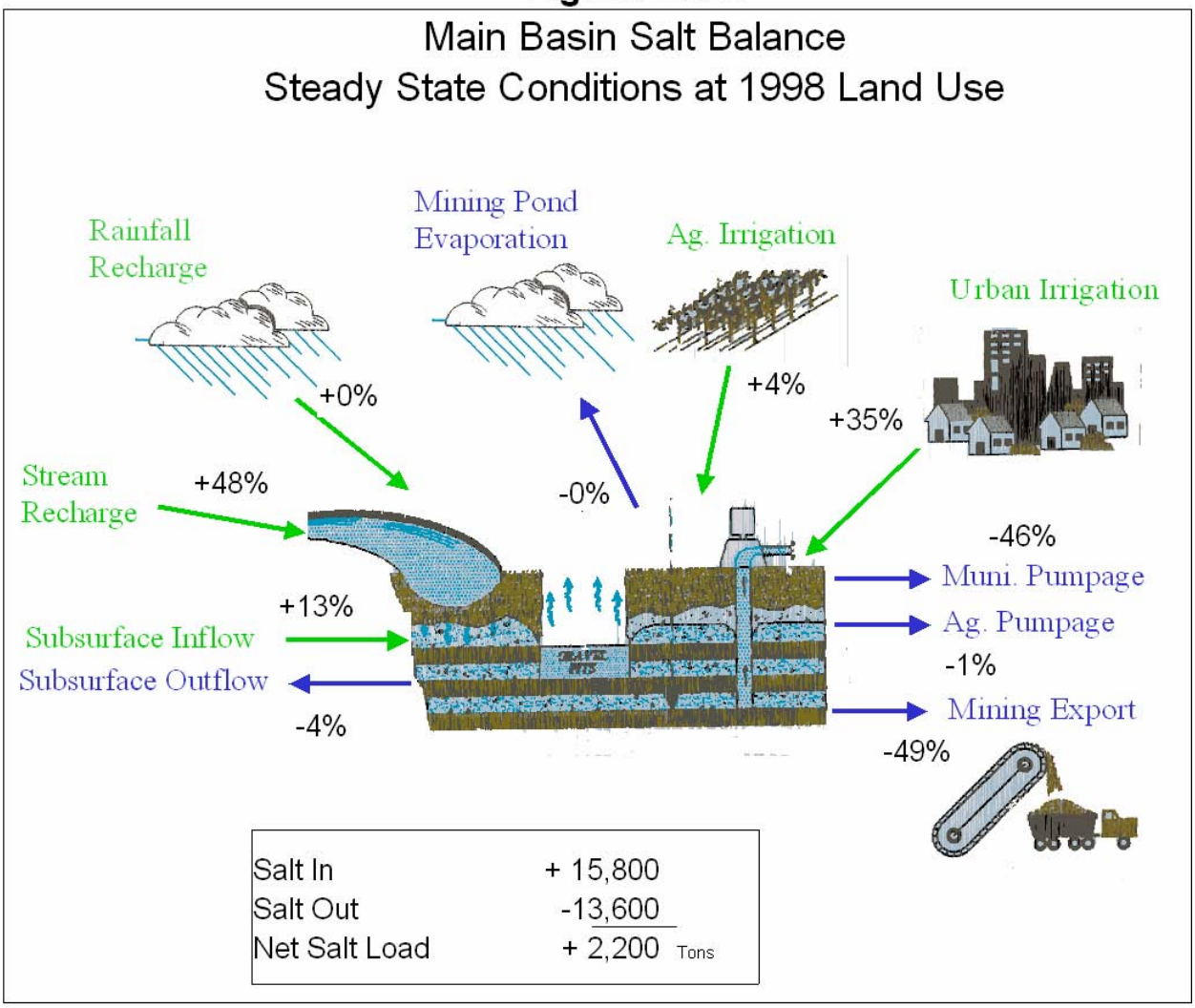
NOTE: ALL DATA IS FROM O-LINE (DEEP AND SHALLOW WELLS)

The main sources and removal mechanisms of salts from the groundwater basin under 1998 land use are shown schematically in Figure ES-3. The main salt sources are conveyed through natural and artificial surface water flow when the water is percolated or recharged into the Main Basin aquifers (48%). Deep percolation of urban irrigation water contributes 35% of total salt loading. Subsurface inflow of high salinity (1,000 mg/L TDS) fringe basin groundwater contributes about 13% of salt loading. Rainfall does not contribute any salt but it dilutes and transports the salts added through urban and agricultural irrigation down to the water table. Salts are removed from the Main Basin primarily as water is pumped from wells (46%) or from gravel mining pits (49%). Zone 7 manages the basin levels so that there is little or no loss of water (and salts) via subsurface outflow. However, the basin is not truly "closed" since, through recharge and pumpage, annually approximately 8% of the total basin storage and more than half of the pumped water and associated salts leave the basin.

Some of the extracted municipal pumpage and associated salts (25-30%) are returned to the basin in areas where irrigation over the Main Basin takes place. The remainder of the pumpage and salts is either used inside the home and then exported as wastewater through the LAVWMA pipeline or used for irrigation in fringe basin areas where the applied salts do not impact the Main Basin. Some of the mining pumpage is returned to the Main Basin through stream recharge but most of this water, along with the salts, leaves the basin and valley via stream outflow.

The annual salt loading under 2003 land use conditions is 5,000 tons per year, an increase of 2,800 tons over the 1998 salt loading. The major cause for the increase in annual salt loading is the cessation of the majority of the gravel mining pumpage and associated salt export from the valley. Salt loading is projected to increase to 5,400 tons per year by year 2010.

Figure ES-3



Salt Management Monitoring Plan

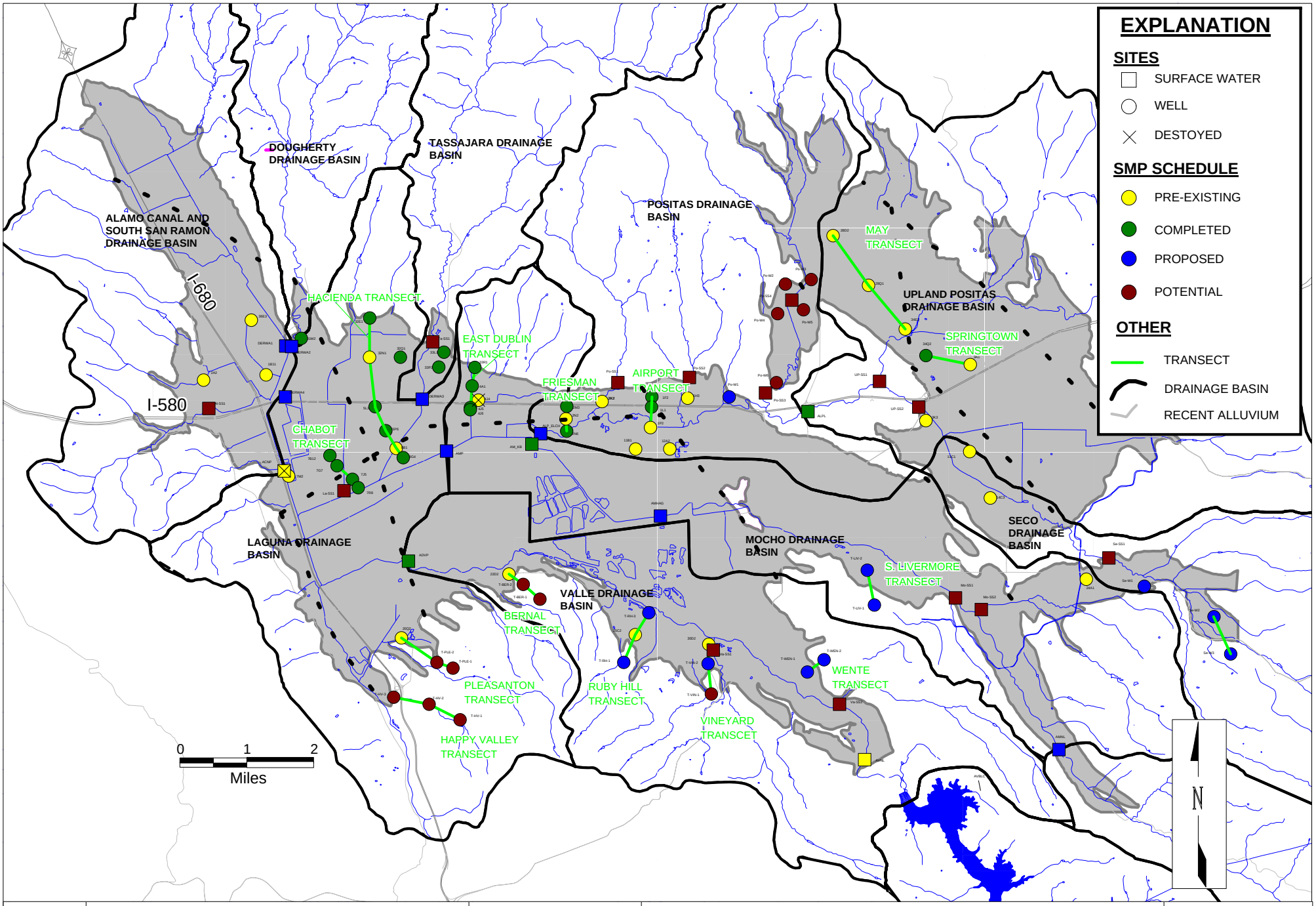
The SMP includes a Salt Management Monitoring Plan (SMMP) designed to help refine the baseline salt loading estimates, particularly from new urban and agricultural irrigation in the fringe basins. Seventeen additional monitoring wells and upgraded continuous recording surface water monitoring facilities have been identified to supplement information provided by existing monitoring program sites. Figure ES-4 shows the locations of the existing and new Salt Management Monitoring Plan monitoring sites.

Salt Loading Calculations

Since 1974, Zone 7 has computed both an annual and a long-term steady state salt balance using a fundamental salt balance equation: inflow of salts dissolved in water minus outflow of salts dissolved in water equals the change in dissolved salts in the groundwater basin. The actual balance in any one year is not indicative of long-term trends since there can be significant storage changes due to change in recharge (e.g., rainfall) and extraction components in a given year. The steady state salt balance equations are used in this SMP to track long-term expected TDS impacts on the Main Basin. They are also adjusted for future land use and operational conditions to evaluate the impacts of alternative salt management strategies under year 2010 conditions.

Supply and demand components each have associated TDS concentrations based on the given year's monitoring data, some historic data, and a few assumed (immeasurable) values. The salt balance calculations include several fundamental and intentionally simplifying assumptions as part of the screening level "spreadsheet" model of the Main Basin. Perhaps the most important simplifying assumption is that all salts applied through irrigation eventually make their way to the underlying groundwater (while in actuality vadose zone processes can delay salt transport for decades). Salts removed by plant uptake and by the application of fertilizers are considered negligible. Percolate quality is assumed to be primarily a function of the differing percentage of applied water that recharges throughout the area due to site specific variations in soil characteristics.

The calculations of main basin water quality assume that the main groundwater basin is well mixed. Monitoring and modeling information developed for and presented in this SMP support the conclusion that there is significant long-term movement from the upper to the lower aquifers in the Main Basin. High TDS (700-2,000 mg/L) irrigation percolate that accumulates in the upper (0-150 foot) aquifer and then "leaks" and mixes into the lower aquifer is a key source of the Main Basin TDS increases. This upper/lower connectivity explains in part why extraction and demineralization (or export) of this high TDS shallow groundwater can provide significant long-term salt management benefits. The same benefits would also result from extraction of high TDS shallow groundwater (e.g., Dublin Sub-basin) that would otherwise enter the Main Basin as subsurface inflow.



ZONE 7 WATER AGENCY 5997 PARKSIDE DRIVE PLEASANTON CA 94588	DRAWN GERALD GATES DESIGNED/CHECKED GG/TR FILE NAME: H:\SMP\Fig6a-TRUpdate.wor	*SALT MANAGEMENT PROGRAM* *SURFACE WATER AND GROUNDWATER MONITORING SITES*	SCALE 1" = 2 miles DATE APRIL 8, 2004 FIGURE: **Fig ES-4**

Recycled Water

Numerous studies of potential recycled water use have been conducted but relatively little recycled water has been used directly to date in the valley. This is due in part to concerns about potential impacts from the elevated TDS levels in recycled water (versus potable water) on groundwater TDS concentrations. Zone 7, Livermore, and Dublin San Ramon Services District (DSRSD) conducted a valley-wide water recycling study (*Livermore-Amador Valley Water Recycling Study—May 1992*) and found that properly treated recycled water can provide a safe and cost effective new source of additional water supply and wastewater disposal capacity for the valley. The study also found that use of demineralized recycled water could help improve the salt balance and groundwater quality. Zone 7 subsequently adopted Resolution No. 1548, which affirmed the conclusions of the May 1992 Water Recycling Study and stated Zone 7's intent to work cooperatively with Livermore, DSRSD, and other entities to encourage the proper and orderly development of water recycling projects in a manner that would avoid degradation of groundwater quality.

In December 1993, the Regional Water Quality Control Board (RWQCB) issued a Master Water Recycling Permit (Order No. 93-159) to Zone 7, DSRSD, and Livermore. A key permit requirement was the development and implementation of a Salt Management Plan to fully offset both current salt loading from natural sources and operations, and any future salt loading associated with new recycled water use. The permit, through the SMP, provided the framework within which local decisions could thereafter be made determining the quality, quantity and location of permitted recycled water use.

Furthermore, the RWQCB 1995 Basin Plan Implementation Plan acknowledged the balancing of uses that needs to occur in managing the Livermore-Amador Valley groundwater basin:

"*... The Regional Board supports efforts to concurrently improve the salt balance in the Main Basin, to improve the local water supply, and to reduce the need for wastewater export through recycled water irrigation, groundwater recharge, and other basin management practices.*"

The Basin Plan supported the use of a "*mass-balance approach in assessing cumulative impacts*" for the SMP. This mass-balance approach has more commonly been called the "salt bubble" approach and was fundamental to the SMP and its salt management strategies. The salt balance calculation is the mass balance calculation that determines the long-term impacts.

Salt Management Plan Goals

The SMP was developed during 1994-1999 through a cooperative effort involving Zone 7 staff, Zone 7 consultants, the Technical Advisory Group (TAG) comprised of local water retailers, and the Zone 7 Groundwater Management Advisory Committee (GMAC)

comprised of local citizens. In consultation with the above advisory groups, a series of policy goals were developed for the SMP to help guide the development and refinement of various salt management strategies. The policy goals were also recommended for Zone 7 adoption and inclusion in the annual operations plan to help guide the use of available surface and groundwater supplies and treatment facilities (e.g., demineralization).

The SMP 1999 policy goals are as follows:

- Offset the current (1999) 2,200 tons per year of salt loading plus the approximately 50 tons per year of projected annual increase.
- Maintain or improve groundwater mineral quality.
- Maintain or improve delivered water quality.
- Provide comparable delivered water quality to all water retailers.
- Provide a mechanism for full mitigation of all salt loading associated with recycled water use.
- Minimize total operations and maintenance costs through an adaptive management process.

Over several years during which the SMP was being developed, the scope broadened beyond that outlined in the Master Permit. The resultant effort and product in many ways more closely resemble an overall watershed water resource management plan than simply a Main Basin salt management plan. In particular, at the request of the retailers, a considerable effort was devoted to evaluating the impacts of the salt management strategies on delivered water quality. The Visual Modflow computer groundwater model was further refined to compute future water quality at each production well. The water system operations model (WRMI) was developed and calibrated to provide better estimates of impacts on individual wells and delivered water quality at each Zone 7 turnout under alternative operational and salt management strategies. The WRMI model calculated monthly water quality at each turnout over an extensive 75-year hydrologic period.

Year 2010 Salt Management Strategies

Reducing net salt loading requires reducing the import of salts and/or increasing the export of salts. The SMP evaluates over twenty alternative individual and composite salt management strategies based on their compliance with the SMP policy goals. These include their ability to fully offset the projected year 2010 salt loading of 5,400 tons/year, operational costs, and impacts on delivered water quality.

The SMP focuses primarily on strategies that would only require use, or increased use of, existing and already planned Zone 7 facilities. Among the key individual conceptual salt management strategies are:

- **Conjunctive use via stream recharge—**Contrary to historic basin management, this strategy would maximize the amount of groundwater delivered to customers

and, to the extent practicable, allocate more local and imported surface water for stream recharge, thereby "flushing" the basin with lower TDS water.

- **Conjunctive use with ASR wells**—Aquifer storage and recovery (ASR) wells are capable of pumping groundwater from and injecting surface water into the groundwater basin. Under this strategy, low TDS treated surface water would be injected for about six months (winter) and subsequently extracted for six months (summer). This strategy would maintain and, in average to wet years, improve delivered water quality by creating bubbles of low TDS water around Zone 7's wells. This strategy, however, does not directly impact the salt balance. Zone 7 testing has identified potential clogging problems that may limit the feasibility of ASR operation.
- **Seasonal groundwater export**—This strategy consists of pumping high TDS shallow groundwater to the creeks during wet season periods if it did not adversely impact in-stream and downstream beneficial uses. To implement this strategy, various agency approvals and close coordination with Alameda County Water District operations would be required. Additional water would need to be procured to replace the water "lost" due to export.
- **Wellhead demineralization** — This strategy consists of groundwater demineralization at the point of extraction. For the SMP, demineralization is assumed to include a reverse osmosis membrane-based treatment system producing water in the 100 mg/L TDS range. The product water would be blended with non-demineralized groundwater and/or surface water prior to delivery to achieve a target delivered water TDS or hardness and to reduce aggressiveness to distribution pipelines. Demineralizing shallow high TDS water that could otherwise migrate vertically over time and degrade the lower aquifer would maximize salt removal benefits and minimize costs.
- **Demineralized recycled water injection**—This strategy is based on the City of Livermore's and DSRSD's potential projects as originally designed to inject demineralized recyled water into the groundwater basin. Both projects were designed to produce product water that meets all drinking water requirements and have less than 100 mg/L TDS prior to injection.
- **Conjunctive use with Chain of Lakes (2005)**—Similar to conjunctive use via stream recharge, this strategy consists of allocating local and imported surface water for recharge in the Chain of Lakes.
- **Delta fix (future)**—This strategy refers to the State and Federally sponsored CalFed Bay-Delta Program's proposed projects to solve multiple Bay-Delta water quality, quantity, resource, and environmental problems. Of interest for the SMP are options which, if implemented, would result in higher quality (lower TDS) Delta water being conveyed to the State Water Project and thus to Zone 7 and other municipalities throughout California.

A composite strategy that includes more than one strategy offers a more flexible and potentially cost-effective approach. For example, a composite strategy could be comprised of a blend of seasonal groundwater export, conjunctive use and demineralized recycled water recharge. Initially, all SMP strategies included the use of 6 TAF of Reverse Osmosis (RO) recycled water injection. Following public concerns in 1998 about the acceptability

of RO recycled water injection, an additional subset of strategies was developed without RO recycled component. The current recommended strategy does not include RO recycled water injection.

Table ES-2 presents the salt management strategies evaluated for projected year 2010 land and water use conditions. Baseline conditions are established by Strategy 1A. If implemented, Strategy 1A would continue Zone 7's historical operational practice of maximizing surface water deliveries and pumping groundwater only for peaking and drought conditions. Under this "status quo" strategy and year 2010 conditions, an average salt loading of 5,400 tons/year and delivered water TDS of 275 mg/L would result.

A screening for technical feasibility, timeline, economics, delivered water quality, including public and institutional acceptance, showed that only Strategy 15 could successfully pass all feasibility screening criteria (Section 9.6). Strategy 15 consists of a combination of conjunctive use and 5,000 AF of high TDS shallow groundwater wellhead demineralization (WHD). Detailed modeling analyses (Chapter 10) confirmed that Strategy 15 would provide the projected benefits to municipal groundwater and delivered water quality, and would eliminate the positive net salt loading in the Main Basin. Delivered water quality would be maintained at the baseline level of 275 mg/L.

Table ES-3 shows the difference in municipal groundwater quality (TDS) from using Strategy 15 versus Strategy 1A. It is clear that after 25 and 50 years of operation under Strategy 15, groundwater TDS would be improved at all listed locations except at well CWS#10, which is located in the Mocho II Sub-basin. This happens because recharge and pumping conditions in the Mocho II Sub-basin remain the same under both strategies. The modeled groundwater TDS for the lower aquifer after 25 years of operating under strategies 1A and 15 are mapped in figures ES-7 and ES-8, respectively. When comparing the figures, it is clear that the area of the basin with groundwater TDS below 500 mg/L would be significantly larger under Strategy 15. The Bernal Sub-basin lower aquifer and western portion of the Amador aquifer would benefit most under Strategy 15. Most of the Main Basin lower aquifer would stabilize near or below 500 mg/L.

Table ES-2

SUMMARY OF SALT BALANCE STUDIES AT 2010 CONDITIONS

Study No.	Name	LONG TERM AVERAGE: Vadose Zone Attenuation Credit	Demineralized Municipal Pumpage TAF	Salt Mgt. Conj. Use GW Pumpage TAF	Total Zone 7 GW Pumpage TAF	Net Salt Loading Tons/Yr	Net Increase In TDS mg/l/year	Projected GW TDS After 10 Years	TDS of Zone 7 Deliveries mg/l	Incremental Operational Cost: Per year	Incremental Operational Cost: Per Acre-foot of TW Delivery
1	Status Quo 6 TAF RO RW INJECTION (1)	NONE	NONE	NONE	12	**3100**	**10**	CURRENT 450 **550**	**300**	**$0**	**$0**
1A	Status Quo NO RO RW INJECTION	NONE	NONE	NONE	7.5	**5400**	**18**	**630**	**275**	**$0**	**$0**
1B	Status Quo 3640 AF RO RW INJECTED PLUS 20% MORE GW PUMPED FOR AG	NONE	NONE	NONE	10.4	**5000**	**17**	**620**	**270**	**$0**	**$0**
2	DELTA FIX 100mg/l SBA water quality	NONE	NONE	NONE	12	**0**	**0**	**450**	**180**	**$0**	**$0**
3	15% ATTENUATION	15%	NONE	NONE	12	**2000**	**7**	**520**	**300**	**$0**	**$0**
4	30% ATTENUATION	30%	NONE	NONE	12	**1000**	**3**	**480**	**300**	**$0**	**$0**
5	INCREASED GW PUMPING FOR CONJUNCTIVE USE	NONE	NONE	16	28	**800**	**3**	**480**	**360**	**$760,000**	**$10**
6		NONE	NONE	22	34	**0**	**0**	**450**	**390**	**$1,100,000**	**$20**
7	DEMINERALIZE ZONE 7 GW PUMPAGE	NONE	13	NONE	12	**1700**	**6**	**510**	**210**	**$5,473,000**	**$100**
8	DEMINERALIZE ZONE 7, CWS & PLEASANTON GW PUMPAGE	NONE	20	NONE	12	**900**	**3**	**480**	**210**	**$8,420,000**	**$160**
9	COMPOSITE OF CONJUNCTIVE USE & DEMINERALIZATION OF GW PUMPAGE	NONE	19	7	19	**100**	**0**	**450**	**212**	**$8,333,000**	**$160**
10		NONE	10	16	28	**-100**	**0**	**450**	**250**	**$4,968,000**	**$90**

Table ES-2

SUMMARY OF SALT BALANCE STUDIES AT 2010 CONDITIONS

Study No.	Name	LONG TERM AVERAGE: Vadose Zone Attenuation Credit	Demineralized Municipal Pumpage TAF	Salt Mgt. Conj. Use GW Pumpage TAF	Total Zone 7 GW Pumpage TAF	Net Salt Loading Tons/Yr	Net Increase In TDS mg/l/year	Projected GW TDS After 10 Years	TDS of Zone 7 Deliveries mg/l	Incremental Operational Cost: Per year	Incremental Operational Cost: Per Acre-foot of TW Delivery
11	COMPOSITE OF CONJUNCTIVE USE & DEMINERALIZATION OF SHALLOW GW PUMPAGE	NONE	5 (Demin 1000 mg/l GW pumpage to 100 mg/l)	5	17	**-2200**	**-7**	**380**	**270**	**$2,351,000**	**$40**
11A		NONE	1.5 (Demin 1000 mg/l GW pumpage to 100 mg/l)	10	22	**0**	**0**	**450**	**320**	**$1,091,500**	**$20**
11B		NONE	3 (Demin 1000 mg/l GW pumpage to 100 mg/l)	3	15	**0**	**0**	**450**	**277**	**$1,383,000**	**$30**
12	COMPOSITE OF ATTENUATION, CONJUNCTIVE USE & GW DEMINERALIZATION	15%	1.5 (Demin 1000 mg/l GW pumpage to 100 mg/l)	10	22	**-1200**	**-4**	**410**	**320**	**$1,077,500**	**$20**
13	ZONE 7 GW (1000TDS) PUMPAGE TO ARROYO MOCHO (EXPORT) WHEN GW STORAGE IS ABOVE 200 TAF	NONE	NONE	Average 3.6 TAF Seasonal GW Export	15.6	**0**	**0**	**450**	**300**	**$404,000**	**$8**
13A	ZONE 7 GW (1000TDS) PUMPAGE TO ARROYO MOCHO (EXPORT) WHEN GW STORAGE IS ABOVE 200 TAF	NONE	NONE	Average 1.5 TAF Seasonal GW Export	13.5	**1730**	**6**	**510**	**300**	**$169,000**	**$0**
14	COMPOSITE OF RO RW, ASR CONJUNCTIVE USE & DEMINERALIZATION OF GW PUMPAGE **ASR RO RW PUMPAGE FOR AG USE**	NONE	4.6 (Demin 1000 mg/l GW pumpage to 100 mg/l)	4	14.3	**0**	**0**	**450**	**250**	**$2,096,600**	**$40**
14A	COMPOSITE OF RO RW ASR CONJUNCTIVE USE & DEMINERALIZATION OF GW PUMPAGE **ASR RO RW PUMPAGE FOR URBAN IRRI.**	NONE	3.8 (Demin 1000 mg/l GW pumpage to 100 mg/l)	4	14.3	**0**	**0**	**450**	**255**	**$1,759,800**	**$30**
15	COMPOSITE OF CONJUNCTIVE USE & DEMINERALIZATION OF GW PUMPAGE **NO RECYCLED WATER INJECTION**	NONE	5 (Demin 1000 mg/l GW pumpage to 100 mg/l)	8.5	16	**0**	**0**	**450**	**270**	**$2,607,000**	**$50**

Assumptions:

1. *All studies include 6 TAF/YEAR of RO recycled water (RW) injection except Study 1a & 15 have no RO RW water injection and studies 14 & 14a have 3640 af of demineralized RW injection.*
2. *All studies do not include salt loading due to future development outside the main basin or new recycled water irrigation water use.*
3. *Incremental operational cost is based upon total treated water deliveries (45,100 AF Zone 7 plus 7,214 AF GPQ pumpage) .*

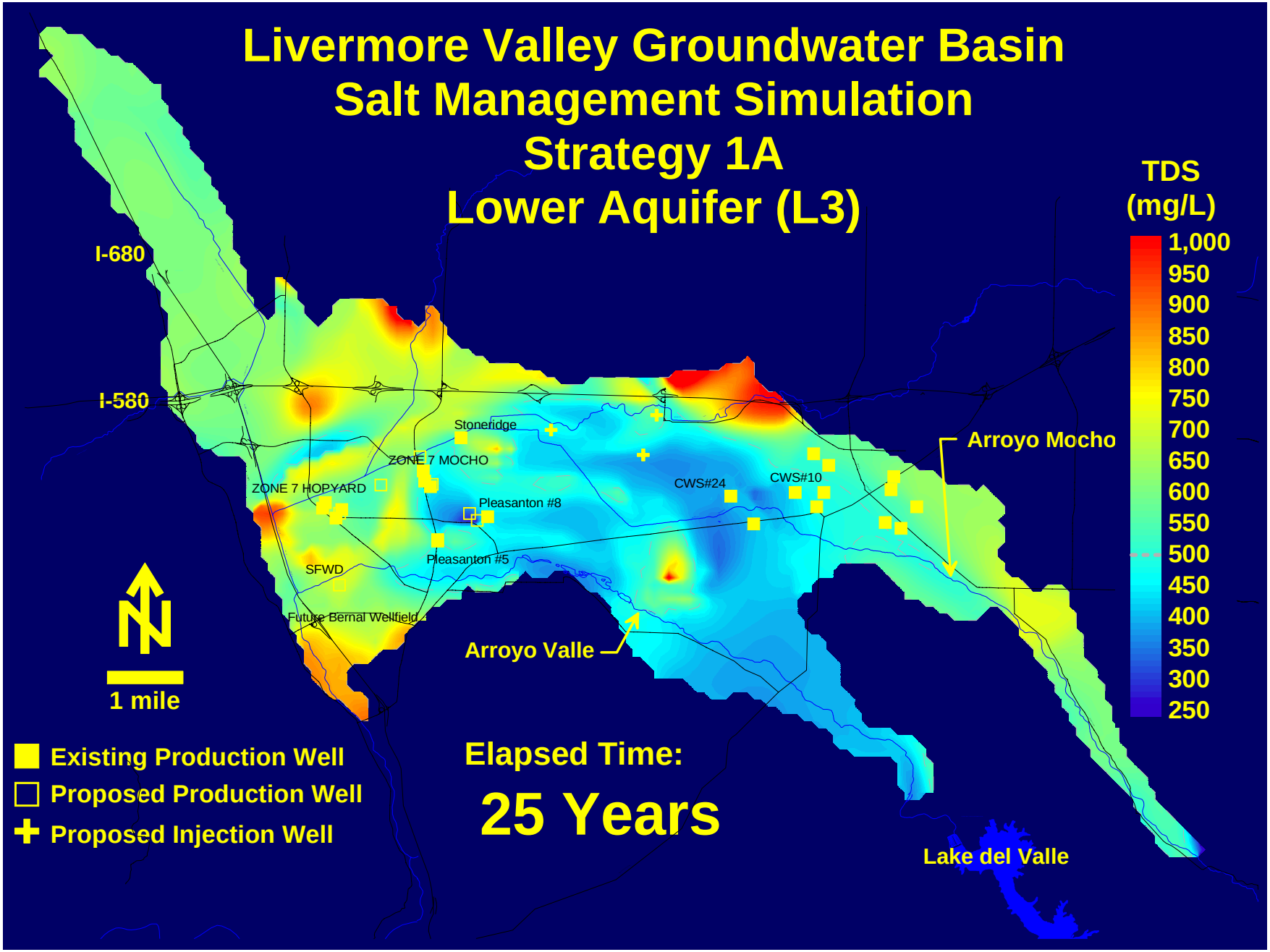

Livermore Valley Groundwater Basin
Salt Management Simulation
Strategy 1A
Lower Aquifer (L3)
TDS
(mg/L)
1,000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
I-680
I-580
Stoneridge
ZONE 7 MOCHO
ZONE 7 HOPYARD
Pleasanton #8
Pleasanton #5
SFWD
Future Bernal Wellfield
CWS#24
CWS#10
Arroyo Mocho
Arroyo Valle
Lake del Valle
1 mile
Existing Production Well
Proposed Production Well
Proposed Injection Well
Elapsed Time:
25 Years

Figure ES-7

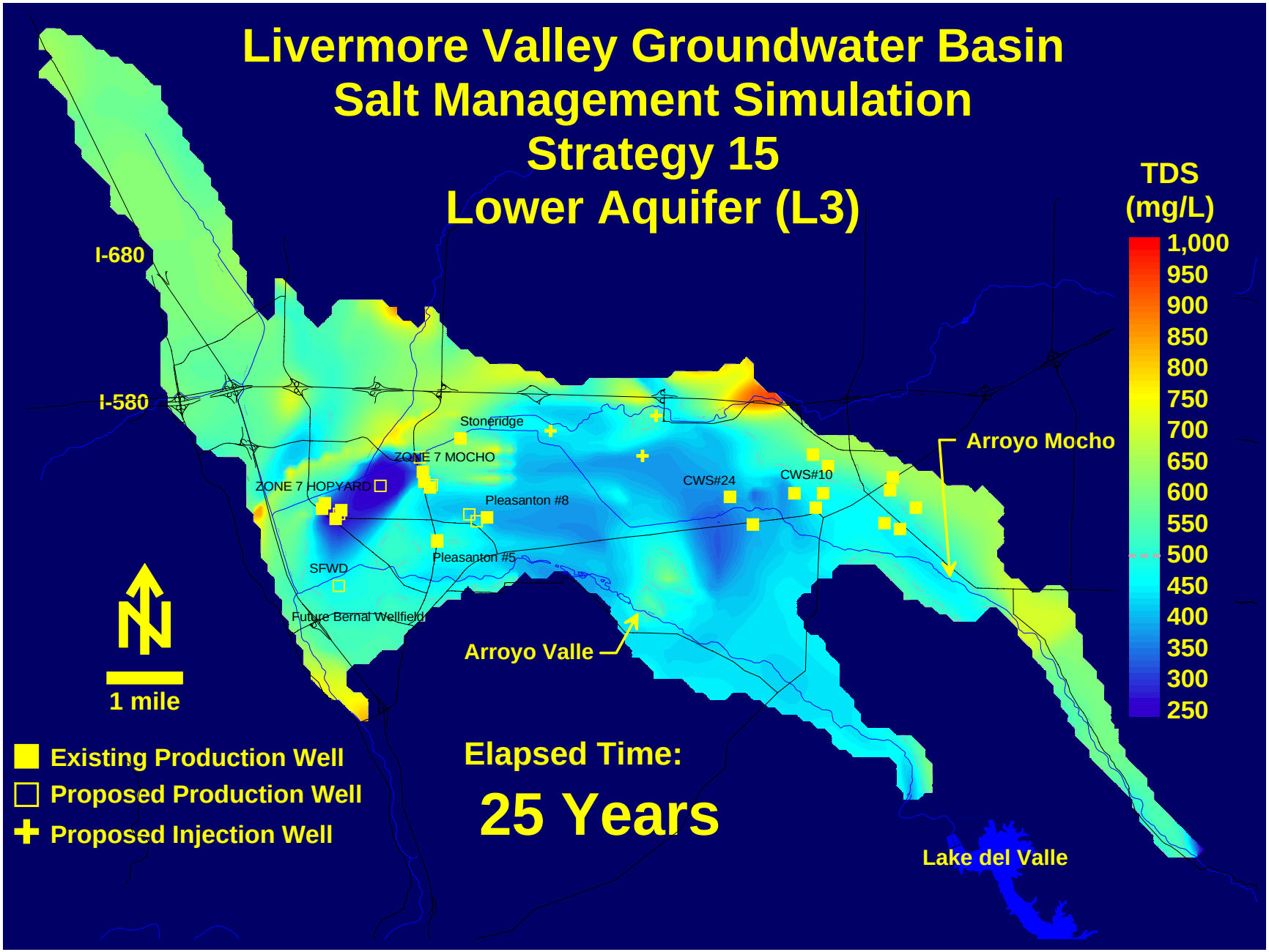

Livermore Valley Groundwater Basin
Salt Management Simulation
Strategy 15
Lower Aquifer (L3)
TDS
(mg/L)
1,000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
I-680
I-580
Stoneridge
ZONE 7 MOCHO
ZONE 7 HOPYARD
Pleasanton #8
Pleasanton #5
SFWD
Future Bernal Wellfield
CWS#24
CWS#10
Arroyo Mocho
Arroyo Valle
Lake del Valle
1 mile
Existing Production Well
Proposed Production Well
Proposed Injection Well
Elapsed Time:
25 Years

Figure ES-8

Table ES-3: Strategy 15 Versus Strategy 1A Groundwater Model Simulation Results Municipal Wellfield Groundwater Quality (TDS) at Select Locations

	Groundwater TDS and Change from Strategy 1A, mg/L			
Wellfield or Well Name	After 25 Years	Change	After 50 Years	Change
Zone 7 Hopyard Welfield (Hop-9)	300	-250	260	-410
Zone 7 Mocho Wellfield (Mocho 2)	420	-60	400	-80
Zone 7 Stoneridge Wellfield	570	-10	550	-50
Pleasanton # 5	490	-10	430	-50
Pleasanton # 8	390	-50	390	-60
CWS # 10	570	50	550	10
CWS # 24	380	-20	390	-20
SFWD Wellfield	510	-130	490	-320
Future Bernal Wellfield (Laguna South - Shallow Aquifer)	720	-160	760	-220

Cost Allocation

By late 1998, the TAG and GMAC agreed to support the cost allocation approach of having Zone 7 fund annual salt management O&M costs via the treated water rates to offset the existing 2,200 tons/year salt loading (Section 11.3). The majority recommended that it made the most sense economically and administratively to not attempt to differentiate between sources of salts and let Zone 7 manage future salt loading by expanding the approach adopted to manage current salt loading. A methodology for calculating individual project salt loading was developed in the SMP. This provides the framework under which future salt loading could be determined on a project-by-project basis and/or where salt management projects can be conducted by agencies other than Zone 7 and generate salt "credits".

Near-Term Salt Management Strategies

Zone 7 staff, in consultation with the TAG and GMAC, decided in early 1999 to develop a revised set of salt management strategies that could be implemented in the near term (i.e., in 2000-2002) rather than in year 2010. These near-term strategies were the strategies previously identified and screened for year 2010 conditions (Section 9.6), but scaled down for the current 2,200-tons/year loading conditions. Letter suffixes (e.g., 15A) are variations of the same basic year 2010 strategy. The near-term salt management strategies and implementation plan are detailed in Chapter 12.

From among the 2010 strategies, seven near-term salt management strategies believed to be feasible were identified. These are listed in Table ES-4. The values in the table were

calculated as if the strategies were to be implemented under year 2000 loadings, treated water deliveries, and costs. The unit O&M costs and salt removal capability assumptions used to develop these near-term strategies were the same as described in detail in Section 8.14. As previously indicated, the TAG and GMAC agreed to support the cost allocation approach of having Zone 7 fund annual salt management O&M costs via the treated water rates to offset the existing 2,200 tons/year salt loading (Section 11.3). Therefore, incremental operational costs in Table ES-4 are also expressed as a percentage increase in treated water rates, based on an assumed annual water usage of 1/2 acre-foot per household.

Table ES-4
NEAR TERM SALT MANAGEMENT STRATEGIES

		Long - Term Average							
			NET	NET	Projected	TDS OF	ZONE 7 INCREMENTAL OPERATIONAL COSTS		
STRATEGY NO.	NAME	POLICY OPTION	SALT LOADING TONS/YR	INCREASE IN GW TDS mg/l/year	GW TDS after 10 yrs mg/l	ZONE 7 DELIVERIES mg/l	PER YEAR	PER ACRE-FOOT OF TW DELIVERY	% Rate Increase
Status Quo 1A	Year 2000 Status Quo (no demineralized RW injection)	I	2200	7	520	300	$0	$0	0.0%
Conj. Use 5A	Minimum Conjunctive Use 3000 AF (Stoneridge well - no GW demin)	II	1600	5	500	310	$120,000	$4	0.8%
6A	Major Conjunctive Use 11,000 AF.(zero out salt balance)	III	0	0	450	350	$680,000	$20	3.8%
Wellhead Demin 15A	2200 AF Demin GW Pumpage (1000 mg/L to 100 mg/L)	III	0	0	450	280	$976,800	$29	5.5%
COMPOSITE OF 5A AND 15A	Minimum Conjunctive Use (3000 AF/Y) and 1500 AF/Y Demin GW PUMPAGE	III	0	0	450	300	$786,000	$23	4.4%
COMPOSITE OF 5A, 15 A AND 17A (17A Ref. Table 12.2)	Minimum Conjunctive Use (3000 AF/Y) and 1300 AF/Y Demin GW PUMPAGE 840 AF (Livermore) RW RO Stream Recharge	II	0	0	450	300	$714,000	$21	4.0%
6A PLUS 15A	Major Conjunctive Use (11000 AF/Y) and 2200 AF/Y Demin GW PUMPAGE	IV	-2100	-7	380	330	$1,656,800	$49	9.3%

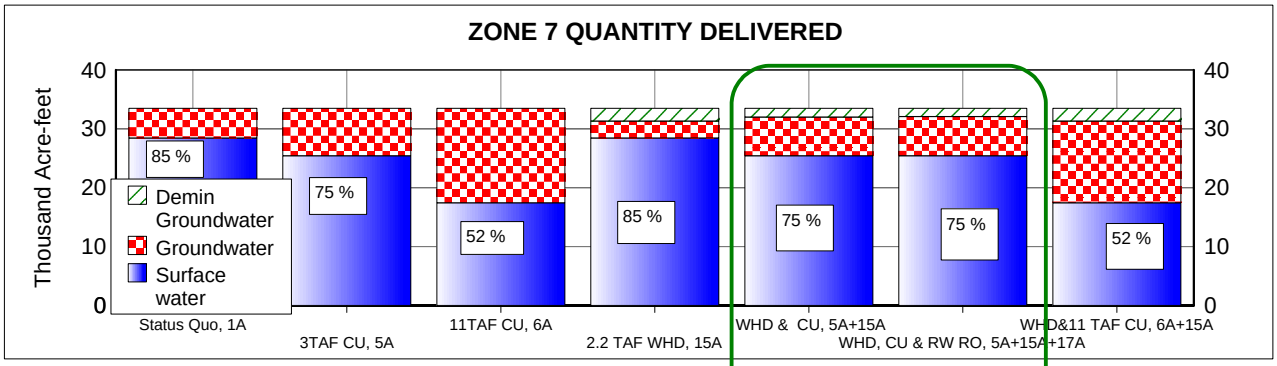
Assumptions:

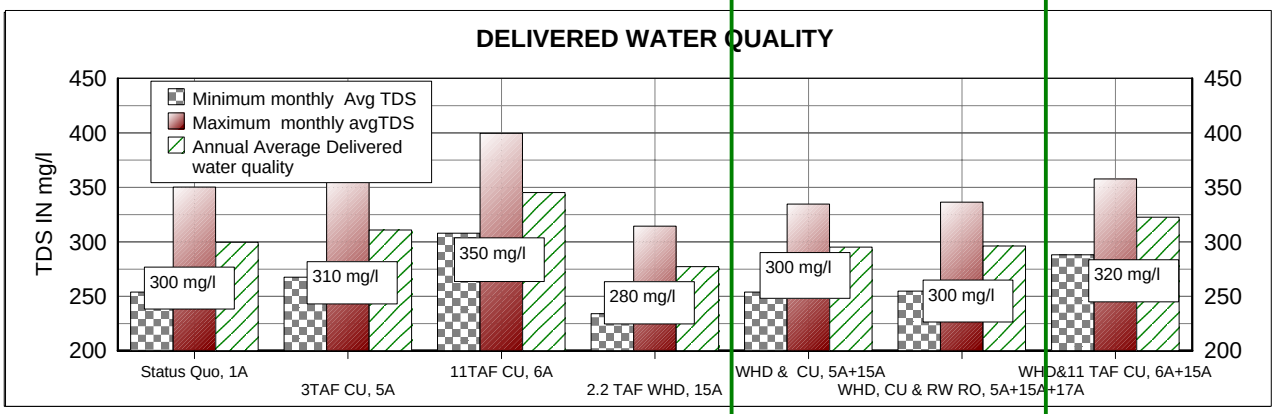
1) *Zone 7 TW delivery of 33,500 AF and UTW of 7300 AF (Year 2000)*
2) *Base TW rate of $528 / AF for year 1999.*
3) *Incremental cost spread only to Zone 7 Treated water deliveries.*
4) *GW TDS of 450 mg/l and SW TDS 270 mg/l (Historic average at PPWTP)*
5) *GW Demin capacity at 2200 AF/Y (180 af/ month for 12 months)*

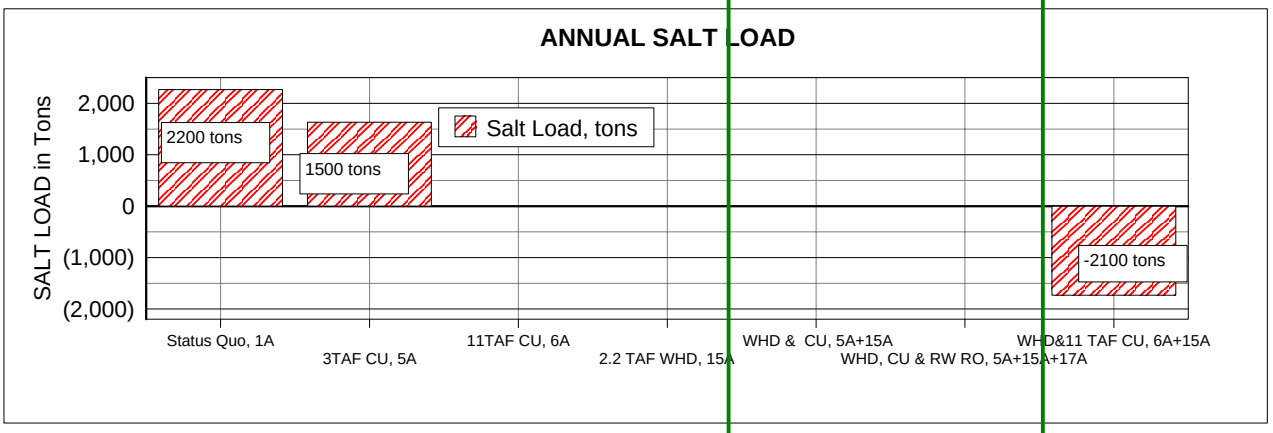
The above (seven) individual and composite year 2000 strategies are compared in figures ES-9 and ES-10. Figure ES-9 presents four parallel bar charts. The first (uppermost) bar chart series presents the ratio of surface water to total groundwater delivered by Zone 7 under each of the seven strategies. The second graph presents every strategy's resultant minimum and maximum monthly average TDS (12 month average), and the overall annual average TDS of Zone 7 deliveries (i.e., three bars per strategy). The third graph presents the annual average salt loading (in tons) remaining after implementation of each strategy. The fourth (bottom) graph presents the incremental O&M cost per acre-foot of

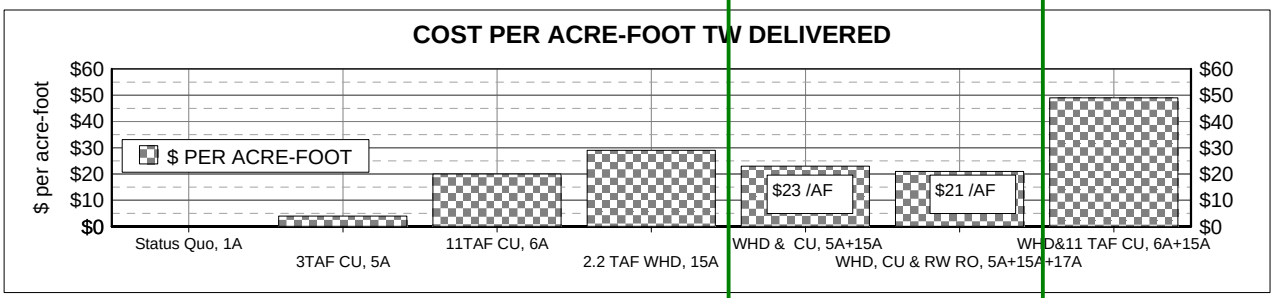
Figure ES-9

COMPARISON OF STRATEGIES FOR 2000-2002 IMPLEMENTATION









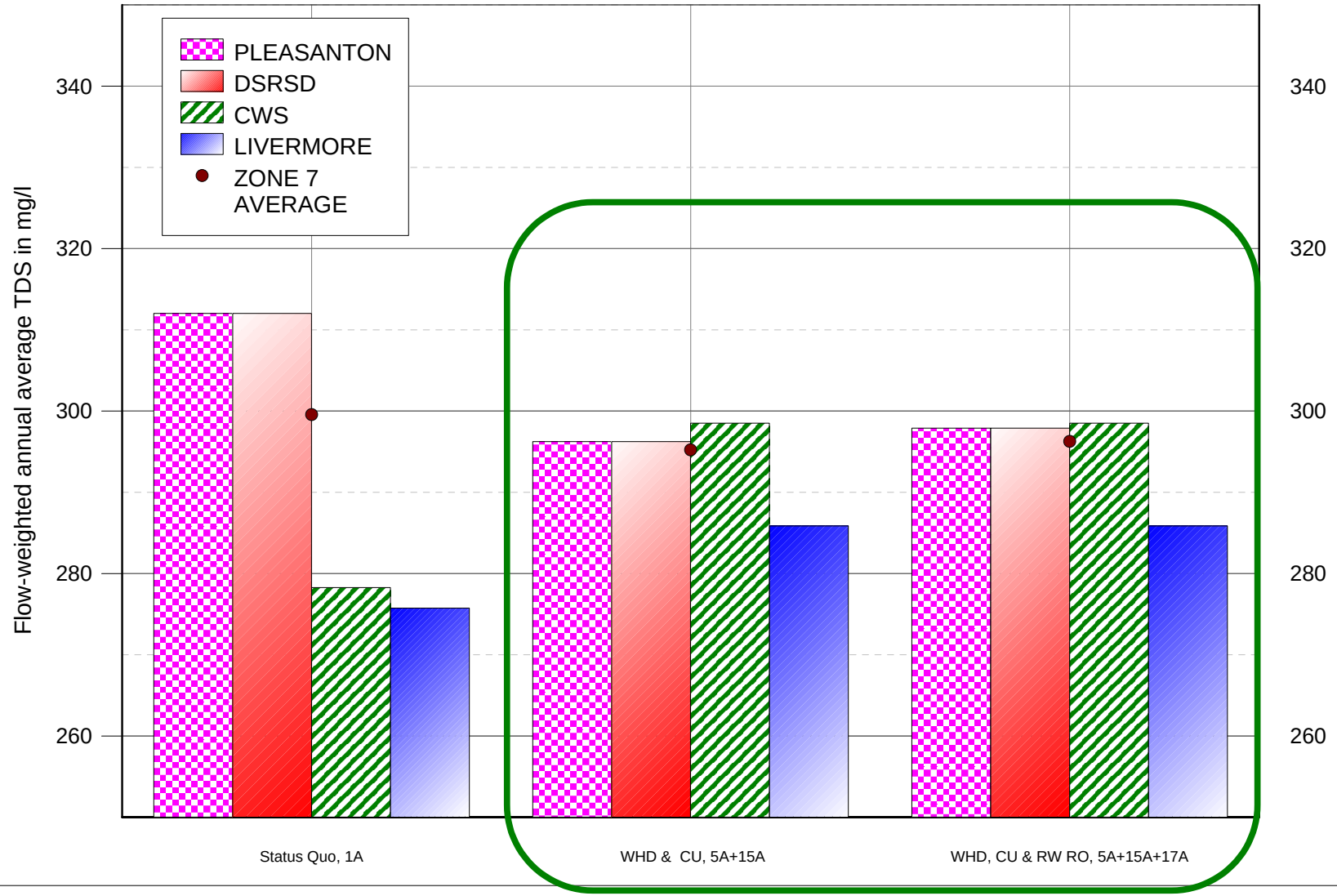
CU = CONJUNCTIVE USE, WHD= WELL HEAD DEMINERALIZATION
RW RO= RECYCLED WASTE WATER RO, PENDING PUBLIC ACCEPTANCE
AF= ACRE-FEET, TAF=THOUSAND ACRE-FEET

Most economical that meet salt loading and delivered water TDS goals.

RECOMMENDED STRATEGIES

Figure ES-10

Annual Average TDS Delivered to Retailers
Under Historic and Proposed 2000-2002 Operating Conditions



NOTE:

1) Assuming that 75% of the time the Stoneridge pumpage will be diverted to East (to CWS & Livermore) by closing rate control valve in X-valley pipeline.

2) Assuming that all the other GW pumpage (GW, WHD & ASR) is delivered to Pleasanton and DSRSD (prorated by delivery amount) .

3) Assumes Stoneridge pumpage at 400 mg/l and all other Zone 7 pumpage at 450 mg/l, Well Head Demineralization to 100 mg/l.

Figure ES-10

Zone 7 deliveries (i.e., increase in treated water rates attributable to salt management). Figure ES-10 compares the annual average TDS of Zone 7 deliveries to individual retailers between status quo operation (i.e., Strategy 1A) and two composite strategies.

Comparison of the strategies indicates the following:

- Strategy 1A (Status Quo)—This strategy minimizes operational costs but fails to achieve any other SMP goals. Under this strategy, treated water rates would not increase.
- Strategy 5A (Minimum Conjunctive Use)—This reduces salt loading by about 600 tons/year (28%), but it increases the annual average TDS of Zone 7 delivered water by about 3%. Under this strategy, treated water rates would increase by 0.8%.
- Strategy 6A (Major Conjunctive Use)—This is minimum cost strategy and is salt neutral. However, it would significantly increase the TDS of Zone 7 deliveries, particularly to the west side of the valley, which contradict SMP goals. Under this strategy, treated water rates would increase by 3.8%.
- Strategy 15A (Wellhead Demineralization)—This salt neutral strategy would decrease the TDS of blended Zone 7 deliveries, particularly to the west side of the valley. However, it is the highest cost near-term salt neutral strategy. Under this strategy, treated water rates would increase by 5.5%.
- Composite of 5A and 15A (Minimum Conjunctive Use and Wellhead Demineralization)—This is the most economical near-term strategy that satisfies all salt management criteria. Under this strategy, treated water rates would increase by 4.4%.
- Composite 5A, 15A and 17A (Minimum Conjunctive Use, Wellhead Demineralization, and RO Recycled Water Stream Recharge)—This strategy could satisfy all salt management criteria and would be slightly less expensive than the composite 5A/15A strategy. Under this strategy, treated water rates would increase by 4%. If the RO recycled water stream recharge component did not occur or were postponed, wellhead demineralization would need to be increased, and it would effectively make this strategy the same as the composite 5A/15A strategy.
- Composite 6A and 15A (Major Conjunctive Use and Wellhead Demineralization)—Groundwater quality would improve most rapidly under this strategy but delivered water quality would degrade. This is the highest cost near-term strategy. Under this strategy, treated water rates would increase by 9.3%.

Several of the 2010 strategies passed the feasibility screens (technical, timeline and water quality), except for public and institutional acceptability. If regulatory and/or perception barriers are overcome, at least some of these strategies could also potentially be implemented before 2010. A select group of what appeared to be the more promising of these other strategies were scaled down to current 2,200 tons/year loading and were named potential near-term strategies. Eleven potential near-term salt management strategies were identified based on a Delta fix, RO recycled water injection, seasonal

groundwater export, Lake G recycled water storage and irrigation, and RO recycled water stream recharge. These strategies are discussed in Section 12.3.

Zone 7 staff, in consultation with the TAG and GMAC, developed a recommended near-term implementation plan (Section 12.4) out of the near-term strategies evaluated. The plan included recommended policy goals and a three-year phased implementation of increased conjunctive use, wellhead demineralization with brine export, and potential demonstration scale RO recycled water stream recharge. The plan also identified how annual salt management decisions would be made via an adaptive management process and integrated into Zone 7's annual operations plans.

Adaptive Management

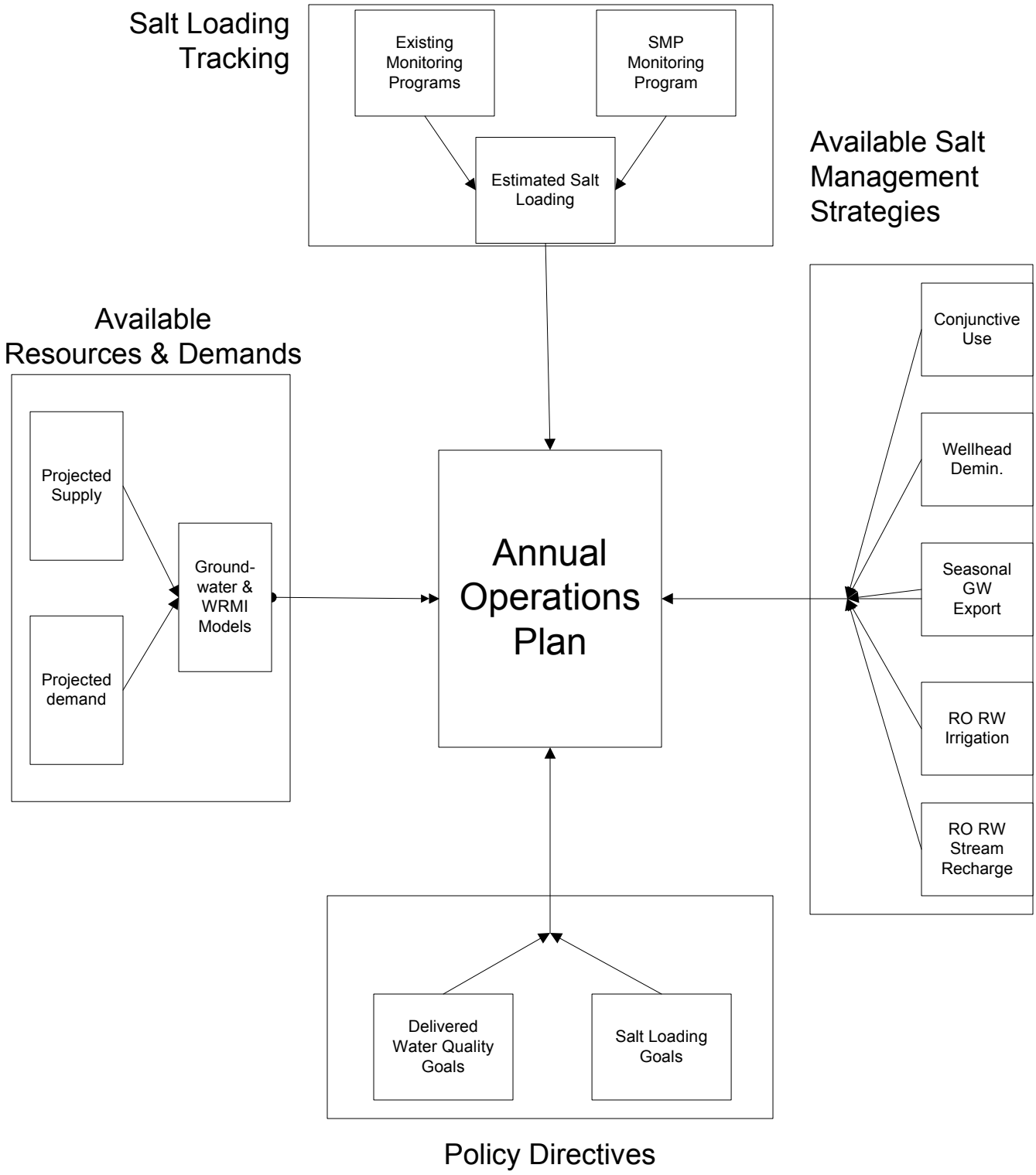
Zone 7's annual operations plan has been expanded to incorporate the SMP goals and an adaptive management process. This means that when all the facilities are in place to fully implement the SMP, each year staff will review the projected water supply forecast, retailer water demands and adopted salt management goals to select the most cost-effective combination of available salt management tools to be used during the upcoming year. Annual operational costs will be estimated and allocated as appropriate during the annual water rate setting process. Over time, it is expected that additional strategies may become available (e.g., seasonal groundwater export) and Zone 7 will re-evaluate the optimum combination of strategies for any given year. Figure ES-11 illustrates Zone 7's proposed adaptive management process through which multiple changing variables will be balanced annually to arrive at an optimal operational decision.

The adaptive management approach requires input in four major areas: policy directives, available resources and demands, salt loading tracking, and available salt management strategies.

- Policy directives include items such as Zone 7 Board decisions/guidance that there be no long-term average net salt loading to the groundwater basin and that delivered water mineral quality be maintained or improved.
- Available water resources and demands involve assessing the new water supply, demand and groundwater storage conditions at the beginning of each year. This basically represents the information tracked and processed by the historic operations plan.
- Salt loading tracking involve collection of data and information from the various monitoring programs. The existing monitoring program is sufficient for tracking salt loading from existing sources and for existing land use conditions. Future land use changes and any increased use of recycled water will require additional monitoring to track the resultant salt loading. The Salt Management Monitoring Program will provide this new salt loading source information, facilitate tracking of salt removal, and provide the information needed to calculate the annual salt removal targets for inclusion in the annual operations plan.

Figure ES-11

Schematic of Salt Management Annual Operations Plan



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6/26/2002

- Available salt management strategies include all the available salt removal strategies and their relative removal capacities. The number and type of strategies are expected to increase over time with the facilities owned and operated by Zone 7 and others (see tables 12.2 and 12.3).

With adaptive management, factors such as current and projected salt loading, relative salt removal costs ($/ton removed), impacts on delivered water quality, and water supply conditions, will be evaluated together and the best possible solution that balances the competing salt management goals will be incorporated into the annual operations plan. In some years, the decision-making may require groundwater modeling or other sophisticated prediction methods.

An example of a possible outcome of the adaptive management process is a decision to not implement any salt removal measures in a given year and to accrue a salt deficit recognizing that it would need to be offset in future years. This may be the case in the early years of implementing the SMP when there will be few salt management strategies to choose from (e.g., conjunctive use). This outcome could also result during a drought when demineralization facilities may not be operated to conserve the water that would otherwise be lost as salt concentrate. A similar decision to limit or not operate demineralization facilities may be made during periods of limited power supply and/or high power cost. Conversely, under very favorable water supply and water quality conditions, Zone 7 could choose to implement extra salt removal measures and thereby accrue salt credits.

Zone 7 Board's Near-Term Implementation Plan Approval

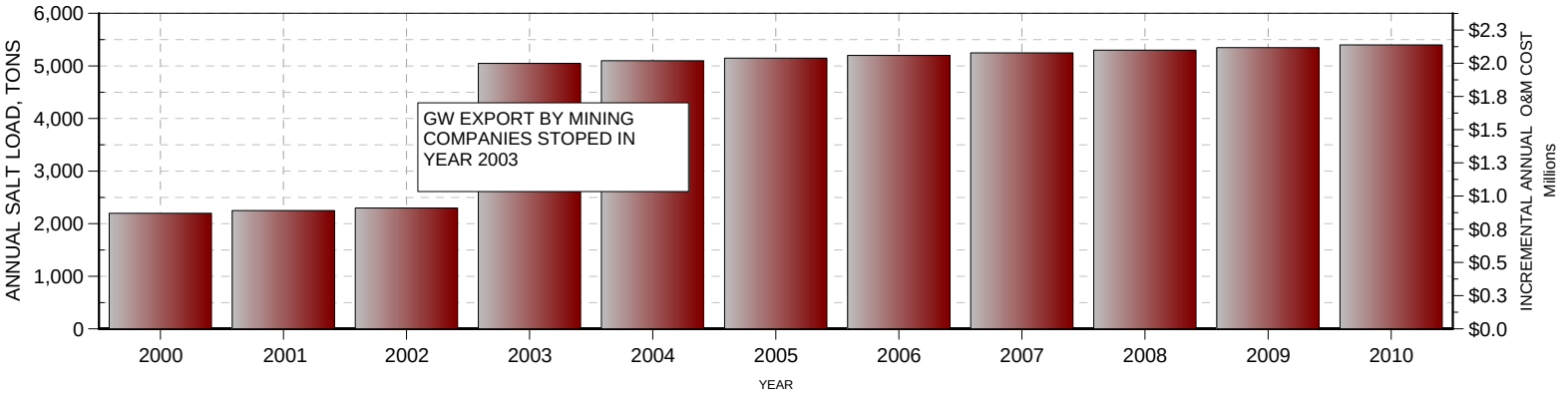
The above phased near-term implementation plan was presented to and approved by the Zone 7 Board of Directors on August 18, 1999 by Resolution No. 99-2068. The tables and figures illustrating the plan contained in Chapter 12 (ES 9-12) are essentially the same as those presented to the Board. The Resolution stated the Board's support for the proposed Salt Management Program Implementation Plan and for inclusion of the six policy goals in the Zone 7 annual operations plan. The Resolution also authorized the Zone 7 General Manager to proceed with the recommended year 2000-2002 Salt Management Implementation Plan.

Future Salt Loading

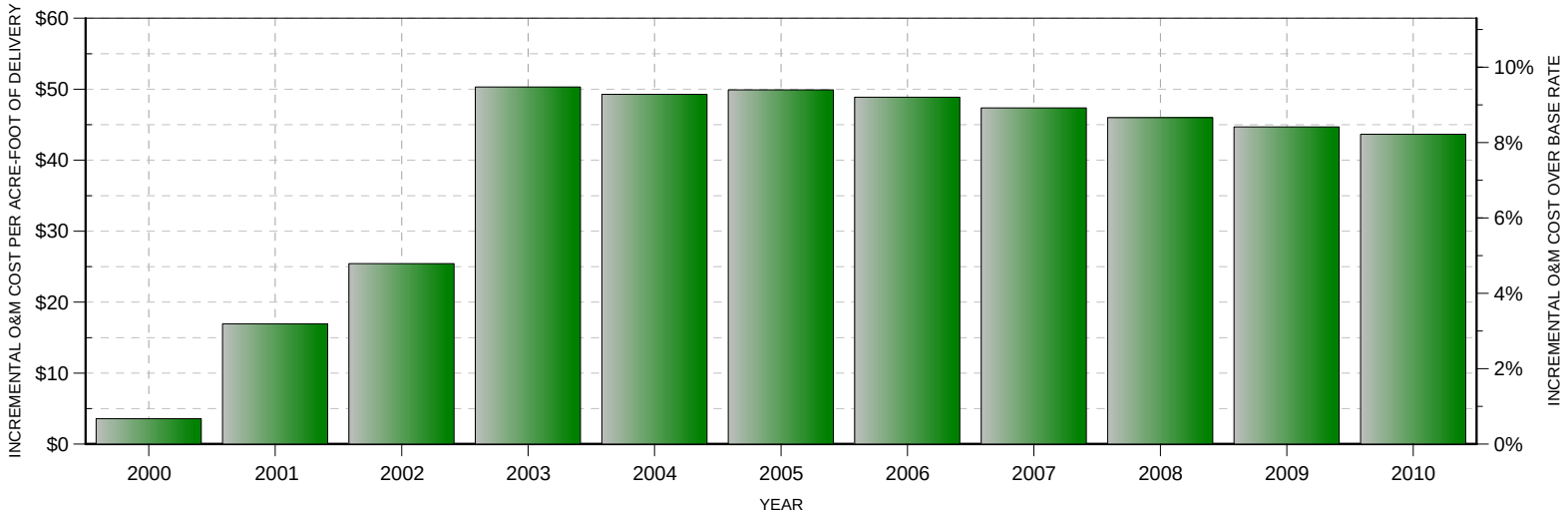
Main Basin salt loading has been projected to increase from the current (1999) 2,200 tons/year to 5,400 tons/year by year 2010 (Section 8.9). The upper graph in Figure ES-12 presents projected future annual salt loading from year 2000 through 2010. This graph shows the salt load in tons on the left y-axis and incremental annual O&M cost on the right y-axis. The costs shown are based on one strategy and reflect the potential annual operation and maintenance (O&M) costs to fully offset each year's loading, assuming the

Figure ES-12

FUTURE ANNUAL SALT LOAD & REMOVAL COST (2)



O&M COST PER ACRE-FOOT (normalized for annual Zone 7 treated water deliveries)



NOTE: *1) Salt load calculation does not include:*

a) The impacts of increased future subsurface inflows due to increased agricultural irrigation outside the main basin.

b) The incremental increase in salt loading due to recycled water irrigation over the main basin.

2) Salt removal cost is based upon removal by Shallow Well GW Demin (1 - 4 TAF/Y) and Conjunctive use (3 - 7 TAF/Y) . For any other strategy or combination of strategies, the cost will change.

Figure ES-12

use of shallow well demineralization (1 to 4 TAF/Y) and conjunctive use (3 to 7 TAF/Y). Under any other strategy or composite strategies, the costs would differ.

The lower graph shows the incremental O&M cost per acre-foot of Zone 7 treated water deliveries on the left y-axis. The right y-axis shows this cost as a percentage over the base treated water rate. For years 2000 2002, the incremental cost would increase from about $3/AF/year (first bar on lower graph of Figure ES-12) or $1.50/houseold/year to about $25/AF/year (left y-axis) or $12.50/household/year. That would be an increase of about 5% (right y-axis) over the Zone 7 1998 base treated water rate ($528/AF).

A major change occurred in year 2003 with the cessation of the majority of the water and salt exports by the gravel-mining companies. To remain salt neutral, the SMP will have to be expanded to offset an additional 2,800 tons/year of salts. This will cause the incremental operational costs to increase by about $50/AF of Zone 7 treated water deliveries over base treated water rates. After 2003, the increase in salt loading is projected to be gradual, about 50 tons/year or 500 tons by 2010 primarily due to increased urban and agricultural development-related irrigation.

Zone 7 treated water deliveries are projected to increase each year successively at least through year 2010, increasing the base volume over which to distribute the increased O&M costs. Therefore, the incremental operational cost for salt management in 2010 would stabilize at around $45/AF/year. This represents about an 8% incremental cost over the Zone 7 1998 base treated water rate. If any of the other lower-cost salt removal strategies become feasible in the future, they will be integrated into the annual operations plan as part of the SMP adaptive management process and operational costs will be reduced.

These future salt loading estimates do not include impacts of potential increased future subsurface inflow or surface water runoff due to increased agricultural irrigation outside the Main Basin (to be tracked via the Salt Management Monitoring Plan). However, the potential loadings due to increases in subsurface flow are believed to be minimal and the effects of these impacts would not be seen for many decades due to the various geologic barriers between the fringe and the Main Basin (as documented in Chapter 3). The estimates shown also do not include any incremental increase in salt loading due to new or retrofit recycled water irrigation projects impacting the Main Basin. New and/or expanded salt management strategies and facilities will need to be implemented to offset these future potential salt sources to comply with the SMP goal of fully offsetting net salt loading.

SMP Next Steps

Zone 7 began implementing the SMP in the year 2000 by increasing conjunctive use (Strategy 5A). Zone 7 has wellhead demineralization facilities scheduled within its Capital Improvement Program (CIP). Further planning studies have been conducted that verified the feasibility of shallow groundwater demineralization as described in this SMP. Those studies also investigated, in more detail, alternative sites for the demineralization facilities.

A well master plan is being prepared that will in part also evaluate sites for shallow groundwater wells. Negotiations are continuing with DSRSD and Livermore on use of the LAVWMA facilities for RO concentrate disposal. Zone 7 has completed a Water Quality Master Plan. The SMP goals and operations have been integrated into and coordinated with the Water Quality Master Plan goals.

Given enough public support, Zone 7 and Livermore could begin exploring in more detail, summertime stream recharge with demineralized recycled water in the Arroyo Mocho near Isabel Avenue (strategies 17A and 17B). Zone 7 will continue discussions with Alameda County Water District on possible operational agreements that would identify conditions under which it would be acceptable for Zone 7 to conduct seasonal high TDS groundwater export (strategies 13B, 13C, and 13D). Zone 7 will contact the RWQCB to determine what type of permit, if any, is required to carry out this activity.

Zone 7's submittal of this SMP (Reference S) to RWQCB staff documents Zone 7's long-term plan and strategy for managing salts and mineral water quality within the Livermore-Amador Valley groundwater basin to promote the wise use of all water resources and to protect the long-term sustainable quality of potable water delivered within the valley.

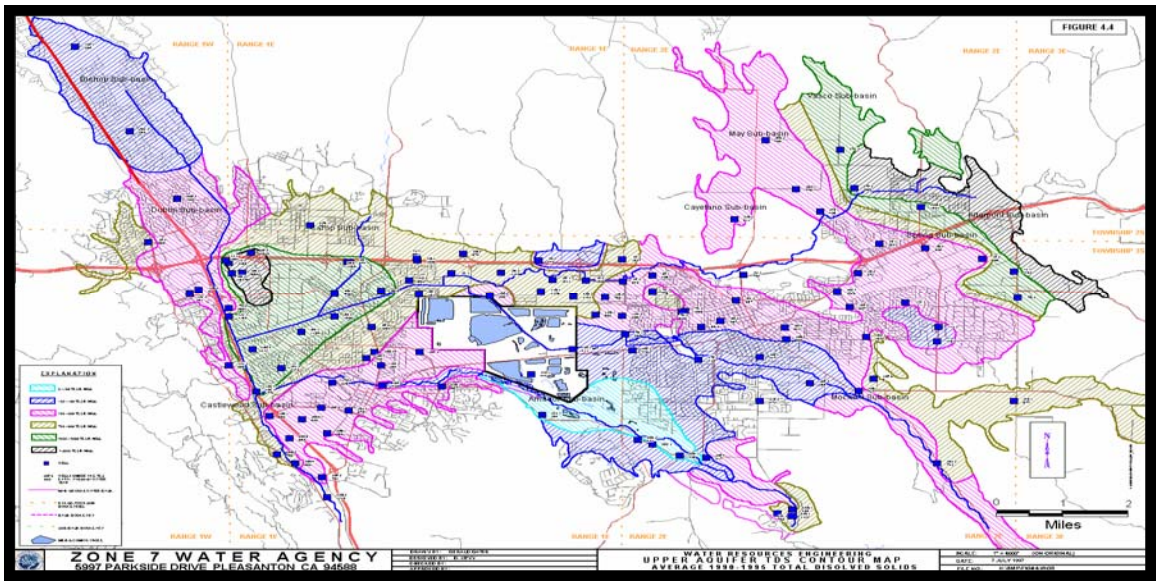
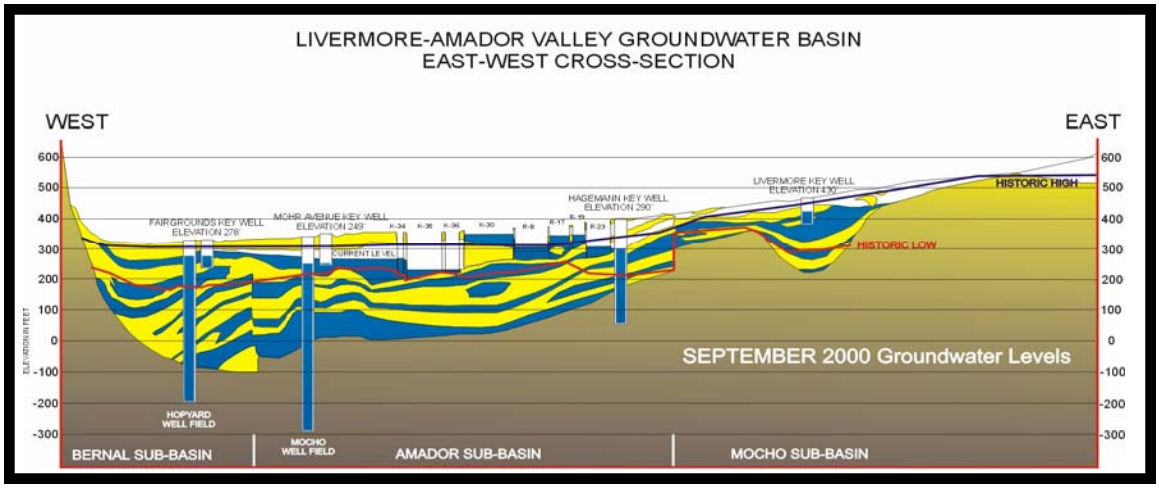


FIGURE 4.4
Miles
ZONE 7 WATER AGENCY
5997 PARKSIDE DRIVE PLEASANTON CA 94588
WATER RESOURCES ENGINEERING
UPPER AQUIFER TDS CONTOUR MAP
AVERAGE 1990-1995 TOTAL DISSOLVED SOLIDS


LIVERMORE-AMADOR VALLEY GROUNDWATER BASIN
EAST-WEST CROSS-SECTION
WEST
EAST
ELEVATION IN FEET
FAIRGROUNDS KEY WELL ELEVATION 278'
MOHR AVENUE KEY WELL ELEVATION 249'
HAGEMANN KEY WELL ELEVATION 290'
LIVERMORE KEY WELL ELEVATION 430'
CURRENT LEVEL
HISTORIC HIGH
HISTORIC LOW
SEPTEMBER 2000 Groundwater Levels
HOPYARD WELL FIELD
MOCHO WELL FIELD
BERNAL SUB-BASIN
AMADOR SUB-BASIN
MOCHO SUB-BASIN

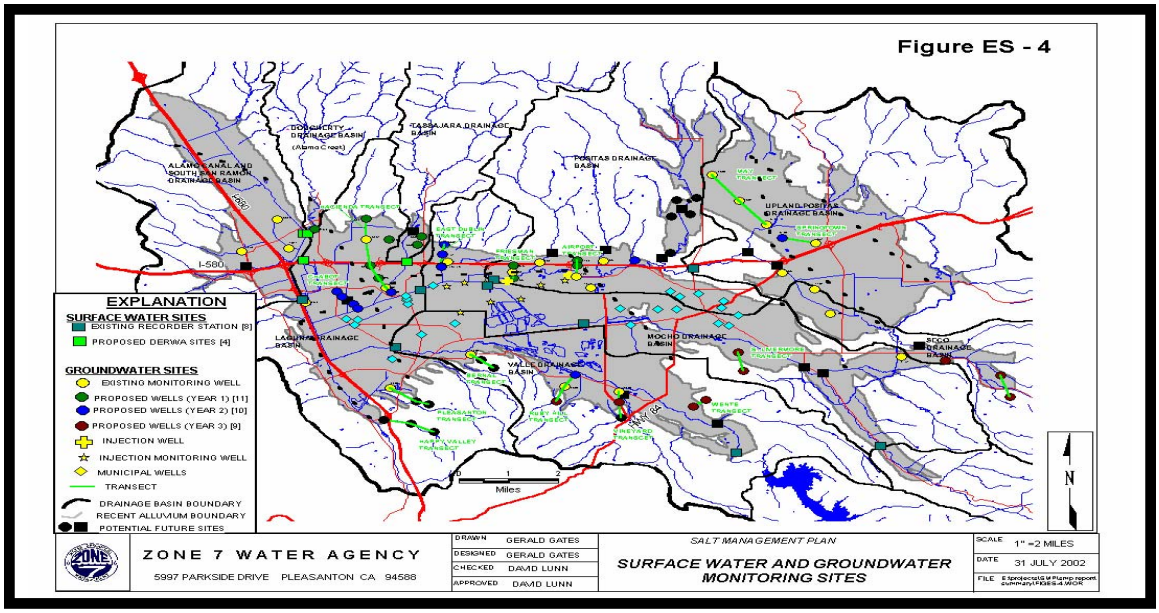


Figure ES - 4
EXPLANATION
SURFACE WATER SITES
EXISTING RECORDER STATION [8]
PROPOSED DERWA SITES [4]
GROUNDWATER SITES
EXISTING MONITORING WELL
PROPOSED WELLS (YEAR 1) [11]
PROPOSED WELLS (YEAR 2) [10]
PROPOSED WELLS (YEAR 3) [9]
INJECTION WELL
INJECTION MONITORING WELL
MUNICIPAL WELLS
TRANSECT
DRAINAGE BASIN BOUNDARY
RECENT ALLUVIUM BOUNDARY
POTENTIAL FUTURE SITES
I-580
I-680
Miles
N
ZONE 7 WATER AGENCY
5997 PARKSIDE DRIVE PLEASANTON CA 94588
DRAWN GERALD GATES
DESIGNED GERALD GATES
CHECKED DAVID LUNN
APPROVED DAVID LUNN
SALT MANAGEMENT PLAN
SURFACE WATER AND GROUNDWATER MONITORING SITES
SCALE 1" =2 MILES
DATE 31 JULY 2002

Appendix E

Resolutions and Policy Statements

D2

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

ZONE NO. 7

RESOLUTION NO. 728

Introduced by Director Zodtner

Seconded by Director Pearson

WHEREAS, Zone No. 7 of the Alameda County Flood Control and Water Conservation District under the District Act, in addition to other powers, is authorized to:

> "store water in surface or underground reservoirs within or outside of the district for the common benefit of the district or of any zone or zones affected; to conserve and reclaim water for present and future use within the district; to appropriate and acquire water and water rights, and import water into the district and to conserve within or outside, of the district, water for any purpose useful to the district; to commence, maintain, intervene in, defend or compromise, in the name of the district, or otherside, and to assume the costs and expenses of, any action or proceeding involving or affecting the ownership or use of waters or water rights within or without the district, used or useful for any purpose of the district or of common benefit to any land situated therein, or involving the wasteful use of water therein; to commence, maintain, intervene in, defend and compromise and to assume the cost and expenses of any and all actions and proceedings now or hereafter begun; to prevent interference with or diminution of, or to declare rights in the natural flow of any stream or surface or subterranean supply of waters used or useful for any purpose of the district or of common benefit to the lands within the district or to its inhabitants; to prevent unlawful exportation of water from said district; to prevent contamination, pollution or otherwise rendering unfit for beneficial use the surface or subsurface water used /emphasis added/ or useful in said district, and to commence, maintain and defend actions and proceedings to prevent any such interference with the aforesaid waters as may endanger or damage the inhabitants, lands, or use of water in, or flowing into, the district; provided, however, that said district shall not have power to intervene or take part in, or to pay the costs or expenses of, actions or controversies between the owners of lands or water rights which do not affect the interest of the district;" and

WHEREAS, Zone No. 7 has undertaken programs to manage the ground water resources of Livermore-Amador Valley for the benefit of the Zone and its inhabitants; and

WHEREAS, it is the intent of the Board of Directors of Zone No. 7 to continue its efforts in the development and implementation of a ground water management plan for the Livermore-Amador Valley;

NOW, THEREFORE, BE IT RESOLVED that the Zone No. 7 Board is cognizant of its power and duty to prevent contamination and pollution of the underground water basin; and

BE IT FURTHER RESOLVED that the Zone No. 7 Board construes its powers to include the authority to determine and define standards of ground water purity; and

BE IT FURTHER RESOLVED that it is the intent of the Zone No. 7 Board to take all necessary steps to protect the underground basin from contamination and pollution, including but not limited to:

1. To prepare criterion to determine if any proposed action of other agencies threaten this water resource;

2. Request any agency which plans a project which this Board determines may possibly threaten this water resource to submit evidence as to the project's anticipated affect on this water resource; and

3. Commence, maintain and defend actions including original actions to enjoin any proposed program by other agencies that the Board determines will threaten this water resource.

ADOPTED BY THE FOLLOWING VOTE:

AYES: Directors Becker, Harris, Pearson, Ryon, Zodtner and Chairman Concannon

NOES: None

ABSENT: Director Lydiksen

I certify that the foregoing is a correct copy of a resolution adopted by the Board of Directors of Zone No. 7 of the Alameda County Flood Control and Water Conservation District on October 30, 1974.

ATTEST: October 30, 1974

BY: R. C. Dickey
SECRETARY

D3

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

ZONE NO. 7

RESOLUTION NO. 768

Introduced by Director Zodtner

Seconded by Director Becker

WHEREAS, Zone 7 is presently managing the groundwater basin in the Livermore-Amador Valley, provides leadership in the measurement and monitoring of surface and ground waters, owns and operates a water importation, treatment and distribution system, maintains the major arroyos and waterways for flood control and drainage, operates ground water replenishment facilities, and otherwise acts to provide an overall water supply of good quality within its area; and

WHEREAS, Zone 7 encompasses the entire eastern portion of Alameda County including all of the Alameda Creek Watershed above Niles Canyon within Alameda County; and

WHEREAS, the Bay Area Sewage Services Agency (BASSA) has been in the process of determining and designating a responsible agency for waste water management for unurbanized areas of Alameda Creek Watershed above Niles and has inquired as to intentions of Zone 7; and

WHEREAS, the Alameda County Board of Supervisors, by Resolution No. 11265 of May 13, 1975, recognizes Zone 7 of Alameda County Flood Control and Water Conservation District as the most logical agency to serve as the overall water quality management planning agency for the Alameda Creek Watershed above Niles excluding therefrom those territories lying within the boundaries of the cities of Livermore and Pleasanton and Valley Community Services District and coordinate such overall watershed plan with the plans of other agencies including the Livermore-Amador Valley Water Management Agency and its constituent members and requested the Zone 7 Board of Directors to consider undertaking subject overall water quality management plan; and

WHEREAS, the California Regional Water Quality Control Board, San Francisco Bay Region, adopted a resolution on August 19, 1975 concurring in the Alameda County Board of Supervisors' resolution that Zone 7 of the Alameda County Flood Control and Water Conservation District be recognized as the most logical agency to serve as the overall water quality management planning agency for the Alameda Creek Watershed above Niles and urging the Zone 7 Board of Directors to consider proceeding with such planning including coordinating and/or entering any necessary agreements or contractual relations with other involved agencies;

NOW, THEREFORE, BE IT RESOLVED that it is the intention of the Zone No. 7 Board of Directors to proceed as follows:

1. To serve as overall water quality management planning agency for the Alameda Creek Watershed above Niles;

2. To cooperate and coordinate with the Livermore-Amador Valley Water Management Agency and other affected agencies in the development of an integrated water quality management plan;

3. To consider land development, financial and institutional factors and other environmental concerns in the development of a sound program for integrating various water quality management plans; and

BE IT FURTHER RESOLVED that upon completion and adoption of the integrated water quality management plan it is the intent of this Board to consider implementation of the plan by, but not limited to, contracting with others or by building and operating waste water collection systems, treatment works and disposal facilities to serve the area under consideration.

ADOPTED BY THE FOLLOWING VOTE:

AYES: Directors Becker, Concannon, Lydiksen, Pearson, Ryon, Zodtner and Chairman Harris

NOES: None

ABSENT: None

ABSTAIN: None

I certify that the foregoing is a correct copy of a resolution adopted by the Board of Directors of Zone No. 7 of the Alameda County Flood Control and Water Conservation District on September 17, 1975.

ATTEST: September 17, 1975

BY Robert M. Pearson
Secretary

Mr. Mar didn't feel that sending a more strongly worded letter would be a problem. Lone Star did retain a local counsel that gave them some advice on an earlier draft of the contract. That advice was that all of the details should be worked out and all of the engineering designs finalized before the contract is finalized. Mr. Mar indicated that his response to that idea was that we already have similar contracts with the other gravel companies, and we are dealing with these structures on a conceptual basis. The design will be based on engineering principles and practices in effect at the time. There is no need to complete the engineering before a contract is signed.

Director Walker pointed out that in order for Lone Star's mining permit to be valid, they must have a contract with us as required in the specific reclamation plan. Without an agreement with the Zone, then that specific plan is not in effect. He agreed with an earlier suggestion that we should ask the Board of Supervisors to revoke the permit unless Lone Star wants to sit down and talk about this agreement.

There was consensus on the Board to send concurrent letters to Planning and Lone Star regarding revocation of the Lone Star mining permit unless they proceed with finalizaton of an agreement with Zone 7.

ITEM 14a--GROUNDWATER COMMITTEE--DRAFT STATEMENT

Mr. Mar orally presented a few changes to the draft statement which had been suggested by staff. Other than that the draft statement as distributed at the last board meeting was acceptable.

Director McGrath moved for approval of the draft statement on groundwater policy as amended this evening. The motion was seconded by Director Tracy and passed by a vote of 7-0.

* * * * *

Item 15a was discussed earlier in the meeting.

ITEM 15b--CORRESPONDENCE LISTING

Staff then answered questions about the correspondence listing. Some of the topics covered included:

Item A.2, page 1: Relating to denial of appeal of Fayette Manufacturing over assessment of SDA 7-1 drainage fees--Mr. Wong advised that after denial of their appeal by both the Zone 7 Board and the District Board of Supervisors, Fayette is pursuing the matter in Superior Court. The amount in question from Fayette is about $67,000. The total amount we have collected from the wind farm industry is over $800,000.

I certify that the foregoing is a correct copy of a resolution adopted by the Board

STATEMENT ON ZONE 7 GROUNDWATER MANAGEMENT

August 19, 1987

Summary of Requirements and Policies

The groundwater basin, with its stored water, is a valuable resource and an integral part of the water supply system of the Livermore-Amador Valley. This resource is important because:

- It can be used conjunctively with other water supplies to improve the overall reliability of the Valley's water supply sources;
- It is a needed backup or reserve against infrequent but possibly extended periods of water shortages; and
- It is a very economical water source.

Therefore, it has been the Zone's goal to manage the basin so that it may be utilized for these purposes both now and in the future. Accordingly, general operational and maintenance policies are:

- To maintain the balance between the combination of natural and artificial recharge and withdrawal.
- To maintain water levels high enough to provide emergency reserves adequate for the worst credible drought.
- To protect and enhance the quality of the groundwater.
- To develop information, policies and procedures for the effective long-term management of the groundwater basin.
- To inform the public and relevant governmental agencies of the Zone's water supply potential and management policies, and to solicit their input and cooperation.

Background and Ongoing Activities

The central portion of the groundwater basin in Zone 7 underlies portions of the cities of Pleasanton and Livermore and is generally in the area between Vineyard Avenue and Interstate 580. This resource was the only water supply to the valley until the Zone began to import water via the State Water Project (SWP) in 1962. The need for the importation of water was created by a gradual depletion of the groundwater prior to 1960. To counteract this situation the Zone implemented a program of recharging imported water into the basin along with regulating municipal pumpage. It took several years to reverse the trend of dropping water levels.

After assignment of the Arroyo del Valle Water Rights Permit from the Pleasanton Township County Water District in the early 1970's, the Zone had an additional water source available for direct use or banking into the central portion of the groundwater basin. From 1978 to 1983 the recharge program was accelerated by using imported and local Arroyo del Valle waters to get the basin as full as possible and to avoid potentially higher costs for importing water after 1983. This returned the basin to an acceptable water level and for the last few years, the Zone has recharged only small quantities of local water.

The current estimated annual groundwater use is nearly equal to the average annual natural replenishment of 14,000 acre-feet annually (AFA). About half of this amount is pumped by the City of Pleasanton and California Water Service Company for distribution in their respective service areas; this amount of pumpage is generally referred to as the Independent Quota (IQ) agreed to by Zone 7. The remaining portion is used by the Zone, County Fairgrounds, Castlewood, agricultural irrigators, sand and gravel producers and other individuals and entities. It is important to note that individuals and entities are entitled to withdraw groundwater for "beneficial use" on their own land under California law. The Zone monitors, but does not directly control, such uses.

Quantity

The various sources of water supply in the Zone 7 area include State Water Project (SWP) imported water, groundwater, conserved local runoff and reclaimed wastewater. The amount of groundwater can be increased by artificial recharge with either imported water or local runoff.

It is the policy of Zone 7 to ensure that the average annual withdrawal of groundwater does not exceed the average annual natural and artificial recharge. Depletion of the resource will be prevented by using groundwater levels and estimates of withdrawals to manage the Zone's artificial recharge program. With the presently adequate supply of imported water the Zone has only had to use the groundwater basin for peaking during summer high demand periods and for emergencies. Therefore, the artificial recharge program has been reduced to maintenance levels.

In the future, additional withdrawals may be required, dependent upon availability of SWP imported and other waters and demands of population growth. If water consumption increases and approaches the quantity of available water, there will be greater reliance on the groundwater basin for banking and storing suitable waters for subsequent withdrawal; however, basin management cannot increase the total amount of water available, and other additional supplies may have to be acquired.

The Zone is looking for ways and opportunities to increase existing supplies to ensure a more adequate and reliable future supply for the Valley. Potential sources include, but are not limited to, entitlement transfers and exchanges with other SWP contractors and other water suppliers, the proposed Los Vaqueros Project, federal water, reclamation of wastewater, and undeveloped local water. Completion of the State Water Project could improve the quantity and reliability of existing supplies; however, there are no immediate projects to accomplish this, except for a groundwater banking project and off-aqueduct storage project which could provide a measure of help.

Zone 7 considers an interim groundwater elevation range of 280 feet to 300 feet in the Alameda Fairgrounds area to be an acceptable operating level. This is but one indicator selected to provide a simplified reference point. In practice, year-to-year variations in natural recharge, in the availability of water for artificial recharge, and in groundwater withdrawal cause the water levels to vary over a much wider range. The specific location of recharge and withdrawals in addition to the geologic makeup of the groundwater basin are other variables affecting water levels. The normal acceptable lower limit on the water table elevation is determined by the groundwater reserves required to sustain the Zone through the worst credible drought. Again using the simplified reference point, this is presently estimated to be approximately 250 feet at the Fairgrounds.

It has been estimated that an extended drought lasting for 6 years has a 0.25-1.0% probability of beginning in any given year. In such a drought, which the Zone defines as the worst credible drought, an extra 75,000 to 130,000 AF would have to be pumped from the groundwater basin to compensate for the reduced availability of imported water and local runoff. This amount of water is within the capacity of the basin if the groundwater level is maintained at or above 250 feet at the Fairgrounds.

The Zone will acquire in the future a chain-of-lakes, the product of the completion of mining sand and gravel in the Valley. Zone 7 will use it for water management purposes. Such a facility will enable the Zone to capture storm runoff which is now lost from the valley and to store and to transport stored water for subsequent recharge into the groundwater basin beneath Pleasanton. Zone 7 will permit a temporary lowering of the water table in order to facilitate deep gravel mining and development of the chain-of-lakes. This short-term accommodation entails minimal risk to the water supply, since it is expected to be completed well before water demand approaches the limits of our SWP imported water supply. The Zone will receive fees from the quarry operators in proportion to lost water to purchase water for recharge in the future.

Quality

While the natural quality of groundwater pumped for municipal purposes is good, it is generally harder and contains more dissolved minerals than imported supplies. The Zone has effected and will continue to effect programs to improve the quality of water. The artificial recharge program, in addition to maintaining quantity, improves quality by replacing withdrawn groundwater with surface water containing fewer dissolved salts. The policy of maintaining relatively high water levels also serves to slow the intrusion of saline water from the fringe areas of the basin.

In addition to these ongoing programs, the Zone's policy is to investigate and plan for possible active programs for the future. These include: (1) Recharging high quality filtered water into Zone 7 production wells when excess water treatment plant capacity is available for subsequent extraction during high demand summer months; (2) Demineralizing groundwater for use with disposal of the concentrated salts by export; and (3) Selectively recharging into the groundwater when the available water is of the highest quality.

In addition to natural water quality, the impact of human activities is a matter of concern. As part of its Wastewater Management Plan, the Zone has set water quality targets and criteria for various parts of the basin, and has developed policies relating to the use of septic tanks and local reuse or disposal of sewage effluent. In general, any practice which results in the recharge of reclaimed wastewater to the groundwater is discouraged as being potentially detrimental to groundwater quality.

Industrial chemicals and toxic wastes are also of concern, although the Zone does not have primary responsibility for monitoring or correcting problems of this sort. Zone 7 maintains close contact with the Regional Water Quality Control Board and the County Health Department, and closely monitors the progress of groundwater problem assessments and remediation.

The Zone does administer and enforce the Groundwater Protection Ordinance (73-68) to ensure the proper construction and destruction of wells. This reduces the potential for surface and near-surface toxic chemical problems to contaminate the groundwater resource.

Management

To enhance the understanding of the behavioral characteristics of the groundwater basin, collection and evaluation of water quality and quantity data are essential. Reliable bases for future groundwater management decisions are necessary if we are to ensure the greatest possible supply of good quality groundwater at a sustainable rate. Annual reports of the Zone's water data collection and evaluations programs include the following:

- Precipitation monitoring
- Surface water monitoring
- Groundwater level monitoring
- Groundwater quality monitoring
- Del Valle Reservoir operations
- Groundwater basin hydrologic inventory
- Mining area monitoring
- Groundwater Protection Ordinance enforcement
- Groundwater basin land and water use
- Groundwater level contours
- Groundwater basin natural yield

In addition to the above annual reports, the Zone maintains records on wells, precipitation and streamflow, geologic data, recharge capacities, evaporation, sand and gravel mining, storage factors, water level and quality variations, and toxic site investigations and drainage. These data are available for review on request and are used by Zone 7 staff to develop and refine management strategies, particularly when water supply limitations and future water demands will require more stringent management techniques.

ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

RESOLUTION NO 04-2662

INTRODUCED BY DIRECTOR MARCHAND
SECONDED BY DIRECTOR CONCANNON

Reliability Policy for Municipal & Industrial Water Supplies

WHEREAS, the Zone 7 Board of Directors desires to maintain a highly reliable Municipal and Industrial (M&I) water supply system so that existing and future M&I water demands can be met during varying hydrologic conditions; and

WHEREAS, the Board has an obligation to communicate to its M&I customers and municipalities within its service area the ability of the Zone's water supply system to meet projected water demands.

WHEREAS, the Board on May 15, 2002 adopted Resolution No. 02-2382 setting forth its Reliability Policy for Municipal & Industrial Water Supplies; and

WHEREAS, the Zone's current water supply policy includes a provision for a valley-wide groundwater production capability to meet 75% of valley-wide M&I demand in the event of an outage of the South Bay Aqueduct; and

WHEREAS, the Board desires to revise the Reliability Policy to include all Zone 7 water supply facilities and to clarify demand levels for planning purposes;

NOW, THEREFORE, BE IT RESOLVED that the Board hereby rescinds Resolution No. 02-2382 adopting the May 15, 2002 Reliability Policy for Municipal & Industrial Water Supplies; and

BE IT FURTHER RESOLVED that the Board hereby adopts the following policy goals regarding reliability[1] to guide the management of the Zone's M&I water supplies as well as its Capital Improvement Program (CIP)[2]:

GOAL 1. Meet 100% of its treated water customers water supply needs in accordance with Zone 7's most current Contracts for M&I Water Supply, including existing and projected demands for the next 20 years as specified in Zone 7's Urban Water Management Plan, (UWMP), which will be coordinated with Zone 7's M&I water Contractors. Zone 7 will endeavor to meet this goal during an average water year[3], a single dry water year[4], and multiple dry water years[5], and

GOAL 2: Provide sufficient treated water production capacity and infrastructure to meet at least 75% of the maximum daily M&I contractual demands should any one of Zone 7's major supply, production or transmission facilities experience an extended unplanned outage.

BE IT FURTHER RESOLVED that to ensure that this Board policy is carried out effectively, the Zone 7 General Manager will provide a water supply status report to the Board every five years with the Zone 7 Urban Water Management Plan that specifies how these goals can be, or are being, achieved.

If the General Manager finds that the goals might not be met, then the Board will hold a public hearing within two months of the General Manager's finding to consider remedial actions that will bring the Zone into substantial compliance with the stated reliability goals. Remedial actions may include, but are not limited to, voluntary conservation or mandatory rationing to reduce water demands, acquisition of additional water supplies, and/or a moratorium on new water connections. After reviewing staff analyses and information gathered at the public hearing, the Board shall, as expeditiously as is feasible, take any additional actions that are necessary to meet the reliability goals during the following five-year period; and

BE IT FURTHER RESOLVED that the Zone 7 General Manager shall prepare an Annual Review of the Sustainable Water Supply Report which includes the following information:

(1) An estimate of the current annual average water demand for M&I water as well as a five-year projection based on the same information used to prepare the UWMP and CIP;

(2) A summary of available water supplies[6] to Zone 7 at the beginning of the calendar year;

(3) A comparison of current water demands with the available water supplies; and

(4) A discussion of water conservation requirements and other long-term water supply programs needed to meet Zone 7 M&I water demands for a single dry water year and multiple dry years, as specified in the Zone's UWMP.

A summary of this review will be provided to M & I customers.

Definitions

[1]**Reliability**—the ability of a water supply system to provide water during varying hydrologic conditions without the need for reductions in water use.

[2]**Capital Improvement Program (CIP)**—the CIP is the Zone's formal program for developing surface and ground water supplies, along with associated infrastructure, including import water conveyance facilities, surface water treatment plants, groundwater wells, and M&I water transmission system to meet projected water demands.

[3]**Average water year**—the statistical average quantity of water from all of the water supplies available to Zone 7 on a contractual or legal basis (e.g., surface water runoff to Del Valle reservoir), based on the historical hydrologic records available to Zone 7.

[4]**Single dry water year**—for the purposes of meeting the requirements of the UWMP, the Zone 7 staff will identify and justify the selection of a calendar year from the historic record that represents the lowest yield from all normally contracted or legally available supplies.

[5]**Multiple dry water years**—for the purposes of meeting the requirements of the UWMP, the Zone 7 staff will identify and justify the selection of three or more consecutive dry years from the historic record that represent the lowest yields from all normally contracted or legally available supplies.

[6]**Available water supplies** consist solely of (1) water supplies that the Zone 7 has contracted for (e.g., listed under Schedule A of the State Water Contract, dry-year water options, special contracts with other water districts, etc.) and (2) water actually stored in surface and subsurface reservoirs.

ADOPTED BY THE FOLLOWING VOTE:

AYES: DIRECTORS CONCANNON, GRECI, KOHNEN, MARCHAND, QUIGLEY

NOES: NONE

ABSENT: DIRECTORS KALTHOFF, STEVENS

ABSTAIN: NONE

I certify that the foregoing is a correct copy of a resolution Adopted by the Board of Directors of Zone 7 of Alameda County Flood Control and Water Conservation District on

August 18, 2004

By _____

Vice - President, Board of Directors

ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

RESOLUTION NO 03-2494

INTRODUCED BY DIRECTOR MARCHAND
SECONDED BY DIRECTOR KALTHOFF

Water Quality Policy for Potable and Non-potable Water

WHEREAS, the Zone 7 Board of Directors is committed to delivering high quality water supplies, to its potable (treated drinking water) and non-potable water Contractors, that meet or exceed the California Department of Health Services and the United States Environmental Protection Agency's public health requirements in accordance with existing water supply agreements, in a manner that is fiscally responsible, proactive, and environmentally sensitive; and

WHEREAS, the Board desires to deliver potable water of an approximately equal quality to each Municipal and Industrial (M&I) Contractor without diminishing their existing water quality; and

WHEREAS, the Board desires to deliver non-potable water of an appropriate quality for irrigation users from current surface and ground water supplies, and as a blended source of untreated and recycled water, when available.

NOW, THEREFORE, BE IT RESOLVED that the Board hereby adopts the following policy goals regarding water quality to guide the Zone 7 potable and non-potable water operations and its Capital Improvement Program:

GOAL 1 – Zone 7 shall continue to meet all state and federal primary Maximum Contaminant Levels[1] (MCLs) for potable water delivered to the M&I Contractors' turnouts, in accordance with existing water supply agreements. In addition, Zone 7 shall deliver potable water of a quality that is as close as technically feasible and fiscally responsible to the Public Health Goals[2] (PHGs) and/or Maximum Contaminant Level Goals[3] (MCLGs). To ensure a margin of safety, the delivered water shall generally be of a quality that contains no greater than 80 percent of the applicable state or federal primary MCLs.

GOAL 2 – Zone 7 shall meet all state and federal secondary MCLs[1] in the potable water delivered to its M&I Contractors' turnouts. In addition, Zone 7 shall, within technical and fiscal constraints, proactively mitigate earthy-musty taste and odor events from surface water supplies and reduce hardness levels to "moderately hard", defined as 75 to 150 mg/L. Also, Zone 7 shall optimize its treatment processes to minimize chlorinous odors by maintaining consistent disinfectant dosage and residual.

GOAL 3 – Zone 7 shall endeavor to deliver to its non-potable Contractor turnouts, from a variety of sources, water of a quality that meets the irrigation needs of its Contractors and does not negatively impact vegetation, crops, or soils.

GOAL 4 – In order to achieve Goals 1 through 3, Zone 7 shall continue to work to improve the quality of its source waters. This may be achieved through Zone 7's Salt Management Plan, which will maintain or improve the water quality in the groundwater basin, and through advocacy of improvements in the State Water Project, its facilities and their operations, which may improve the source water of Zone 7's surface water supplies. In addition, Zone 7 will encourage the retailers to take similar steps as those outlined in this policy to improve the quality of the retail customers' water.

BE IT FURTHER RESOLVED that this Board policy be reviewed and updated as needed. Also, to ensure that this Board policy is carried out effectively, the Zone 7 General Manager shall implement the following actions:

- An Implementation Plan shall be prepared as a part of the Water Quality Management Program to implement treatment or other processes necessary to meet the water quality policy goals. Optimization of system operations will be recommended, wherever possible, prior to the identification of the need for capital improvements;

- The Implementation Plan shall be reviewed and updated every two years, or sooner if required, to reflect any emerging water quality issues and other relevant regulatory and/or technology development; and

- The Implementation Plan, and any subsequent updates, shall be incorporated into the annual updates of Zone 7's Five-year Capital Improvement Plan, as feasible.

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[1] Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

[1] Public Health Goal (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

[1] Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the United States Environmental Protection Agency.

ADOPTED BY THE FOLLOWING VOTE:

AYES: DIRECTORS CONCANNON, GRECI, JOHNSTON, KALTHOFF, LAYTON, MARCHAND

NOES: NONE

ABSENT: DIRECTOR STEVENS

ABSTAIN: NONE

I certify that the foregoing is a correct copy of a resolution Adopted by the Board of Directors of Zone 7 of Alameda County Flood Control and Water Conservation District on

April 16, 2003

By _____
President, Board of Directors

MINUTE BOOK — Board of Directors, Zone No. Seven,
Alameda County Flood Control and Water Conservation District.

REGULAR MEETING - CONTINUED

SEPTEMBER 6, 1960

The Board discussed the need for formally stating their policy in regard to the service of water from the facilities proposed in the Zone No. 7 Project. Since members of the city councils of both Livermore and Pleasanton have requested that such a policy be stated by resolution, Mr. Wente moved and Mr. Nielsen seconded that Resolution No. 38, which reads as follows be adopted.

RESOLUTION NO. 38

BE IT RESOLVED that it is the intention of this Board that Zone No. 7 will make available a wholesale, municipal, and industrial water supply to retail water agencies in the zone; and

BE IT FURTHER RESOLVED that it is the intention of this Board to encourage the development of the retail water distribution systems through the existing retail agencies; and

BE IT FURTHER RESOLVED that it is also the intention of this Board to encourage the use of water from the South Bay Aqueduct for agricultural purposes throughout the zone.

Adopted this 6th day of September, 1960, by the following vote:

AYES : Directors Callaghan, Chance, Koopmann, Lund, Nielsen, Taylor, and Wente

NOES : None

ABSENT: None

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

ZONE NO. 7

RESOLUTION NO. 311

Introduced by Karl L. Wente

Seconded by Hermann F. Koopmann

WHEREAS, one of the basic objectives of Alameda County Flood Control and Water Conservation District is to prevent waste of water or diminution of water supply in said District; and

WHEREAS, Zone No. 7 of said District is the holder of a permit from the State Water Rights Board for the conservation and beneficial use of surplus waters of Arroyo Mocho and Arroyo las Positas; and

WHEREAS, Zone No. 7 of said District is party to a contract with the State of California providing for delivery of imported water from the State Water Project into the Livermore Valley; and

WHEREAS, Zone No. 7 of said District operates artificial ground water recharge facilities diverting natural and imported waters of Arroyo las Positas into the Santa Rita Subbasin of the Livermore Valley Ground Water Basin for subsequent beneficial use; and

WHEREAS, the City of Livermore is currently discharging treated sewage effluent intermittently to Arroyo las Positas upstream from the Zone No. 7 diversion point and proposes to discharge treated sewage effluent continuously; and

WHEREAS, the City of Pleasanton is currently discharging treated sewage effluent to land surface disposal which land is a portion of the Alameda Creek watershed; and

WHEREAS, the Livermore-Amador Valley is currently unable to finance the disposal of its sewage effluent by means of an outfall pipeline, which therefore requires the investigation of reclamation of said effluent utilizing currently available techniques; and

WHEREAS, the unrestricted discharge of mineral waste into Livermore-Amador Valley sewage collection systems must be controlled in order that the feasibility of said reclamation be possible;

NOW, THEREFORE, BE IT RESOLVED that the San Francisco Bay Regional Water Pollution Control Board and all dischargers of sewage effluent within the Livermore-Amador Valley are urged by the Zone No. 7 Board of Directors to take positive action to eliminate sources of mineral degradation of such effluent to the fullest practicable extent; and

BE IT FURTHER RESOLVED that it is urged that said action specifically include the elimination, within a reasonable time period, of the discharge of mineral wastes from the regeneration of water softeners and other known discharges of mineral waste.

ADOPTED BY THE FOLLOWING VOTE:

AYES: : Directors Callaghan, Koopmann, Wente and Nielsen

NOES : Director Chance

ABSENT: None

ABSTAIN: Director Lund

I certify that the foregoing is a correct copy of a resolution adopted by the Board of Directors of Zone No. 7 of the Alameda County Flood Control and Water Conservation District on May 3, 1965.

ATTEST: May 3, 1965

BY : Edward E. Chance

SECRETARY

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

ZONE NO. 7

BOARD OF DIRECTORS

Resolution No. 1165

Introduced by: Director Schock
Seconded by: Director Tracy

WHEREAS, it is well established that although domestic septic tanks represent a source of degradation of the groundwater within Zone 7 some are permitted under strict conditions; and

WHEREAS, it may reasonably be anticipated that commercial and industrial facilities may generate sewage of higher toxicity and in larger volumes than domestic septic tank users; and

WHEREAS, the Zone has a policy of groundwater protection as expressed in the Wastewater Management Plan for the Unsewered, Unincorporated Area of Alameda Creek Watershed Above Niles, dated May 19, 1982, with strict controls on the disposal of treated sewage which may affect the quality of the groundwater; and

WHEREAS, such plan focused on the use of septic tanks for rural residential units and did not consider their use on new developments zoned for industrial or commercial use;

NOW, THEREFORE, BE IT RESOLVED that the Zone 7 Board of Directors of Alameda County Flood Control and Water Conservation District hereby finds that the use of septic tanks for new development zoned for commercial or industrial uses generally produces unacceptable risk to the quality of the groundwater resources; and

BE IT FURTHER RESOLVED that this Board hereby establishes a policy of prohibition to the use of septic tanks for new development zoned for commercial or industrial uses which overlies the central groundwater basin, any of its fringe areas or subbasins, or any body of groundwater hydrologically connected with the central basin unless it can be satisfactorily demonstrated to the Board that the wastewater loading will be no more than the loading from an equivalent rural residential unit and said septic tanks will be in compliance with all other conditions and provisions.

ADOPTED BY THE FOLLOWING VOTE:

AYES: DIRECTORS BUDDEMEIER, CONCANNON, SCHNEIDER, SCHOCK, TRACY, WALKER

NOES: NONE

ABSENT: DIRECTOR WENTE

ABSTAIN: NONE

I certify that the foregoing is a corre
copy of a resolution adopted by the Boa
of Directors of Zone No. 7 of the Alame
County Flood Control and Water Conserva
tion District on AUG 28 1985

ATTEST: _____

BY: _____

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

ZONE NO. 7

RESOLUTION NO. 1548

INTRODUCED BY Director Shulenberger

SECONDED BY Director Hagemann

ZONE 7 RESOLUTION OF INTENT
TO AFFIRM WATER RECYCLING PROGRAM

WHEREAS, Zone 7 of Alameda County Flood Control and Water Conservation District is the primary supplier to the water retailers of the Livermore-Amador Valley; and

WHEREAS, the groundwater basin of the Livermore-Amador Valley is a significant potable water source, and Zone 7 has assumed primary responsibility for the proper management and protection the basin; and

WHEREAS, Zone 7, the City of Livermore, and the Dublin San Ramon Services District have funded a study to develop a Valley-wide water recycling program, said study conducted by Brown & Caldwell Consultants in association with Eisenberg, Olivieri, & Associates, Inc. and David Keith Todd Engineers; and

WHEREAS, said study concluded that properly treated recycled water can be a safe and cost effective means to provide for additional water supply and wastewater disposal in the Livermore-Amador Valley; and

WHEREAS, said study also concluded that, with additional treatment over what would be required to meet State Department of Health Services and Regional Water Quality Control Board requirements, recycled water can improve the salt balance of the Livermore-Amador Valley groundwater basin; and

WHEREAS, said study recommended adoption of Policies and Implementation Strategies to advance proper water recycling programs and projects in the Livermore-Amador Valley;

NOW, THEREFORE BE IT RESOLVED, that the Board of Directors of Zone 7 of Alameda County Flood Control and Water Conservation District does hereby acknowledge the Policies and Implementation Strategies as recommended in the May 1992 Water Recycling Study by the Brown & Caldwell study team; and

BE IT FURTHER RESOLVED, that Zone 7 intends to work cooperatively with Livermore, Dublin San Ramon Services District, and any other entities to encourage the proper and orderly development of water recycling projects in the Livermore-Amador Valley to avoid degradation of groundwater quality; and

BE IT FURTHER RESOLVED, that the General Manager of Zone 7 is hereby directed to negotiate a Memorandum of Understanding with the City of Livermore, the Dublin San Ramon Services District, and other entities to jointly apply for a Valley-wide blanket permit from the Regional Water Quality Control Board for water recycling projects; and

BE IT FURTHER RESOLVED, that the General Manager is further directed to develop the contractual framework to jointly undertake water recycling projects with the City of Livermore and with the Dublin San Ramon Services District.

ADOPTED BY THE FOLLOWING VOTE:

AYES: Directors Concannon, Figuers, Hagemann, Marchand, Shulenberger, Tracy

NOES: None

ABSENT: Director Wente

I certify that the foregoing is a correct copy of a resolution adopted by the Board of Directors of Zone No. 7 of the Alameda County Flood Control and Water Conservation District on JUN 17 1992

ATTEST: JUN 25 1992

BY Sandra Francois

ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

RESOLUTION NO. 99-2068

INTRODUCED BY DIRECTOR LAYTON

SECONDED BY DIRECTOR MARCHAND

WHEREAS, Zone 7 serves as the overall water quality management agency for the Alameda Creek watershed above Niles and has primary responsibility for management of the Livermore-Amador Valley's surface and groundwater resources;

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of the Zone 7 Water Agency does hereby support the proposed Salt Management Program Implementation Plan and inclusion of the following policy goals in the Zone 7 annual operations plan:

- Offset the current 2200 tons per year of salt loading plus approximately 200 tons per year current projected annual increase;
- Maintain or improve groundwater mineral quality;
- Maintain or improve delivered water quality;
- Provide comparable delivered water quality to all retailers;
- Provide a mechanism for mitigation of all salt loading associated with recycled water use;
- Minimize total operational and maintenance costs through an adaptive management process.

BE IT FURTHER RESOLVED that the Zone 7 General Manager is hereby authorized to proceed with the recommended year 2000-2002 Salt Management Implementation Plan.

ADOPTED BY THE FOLLOWING VOTE:

AYES: DIRECTORS CONCANNON, FIGUERS, LAYTON, MARCHAND, STEVENS

NOES: NONE

ABSENT: DIRECTORS GRECI, KALTHOFF

ABSTAIN: NONE

I certify that the foregoing is a correct copy of a resolution adopted by the Board of Directors of Zone No. 7 of the Alameda County Flood Control and Water Conservation District on AUG 18 1999

ATTEST: _____

BY: Sandy Figuers

D9

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

ZONE NO. 7

RESOLUTION NO. 1037

Introduced by DIRECTOR WENTE

Seconded by DIRECTOR PHILCOX

WHEREAS, Zone 7 of Alameda County Flood Control and Water Conservation District has declared its intent with regard to protection of the surface and ground water resources within the Zone; and

WHEREAS, this declaration is expressed in Zone 7 Board Resolution No. 728 adopted on October 30, 1974, a copy of which is attached hereto and made a part hereof; and

WHEREAS, Zone 7 has an interim policy on wastewater reclamation expressed in Zone 7 Board Resolution No. 823 adopted on June 15, 1977, a copy of which is attached hereto and made a part hereof; and

WHEREAS, Zone 7 has expressed its intent to serve as the overall water quality management planning agency for the Alameda Creek Watershed above Niles, as expressed in Zone 7 Board Resolution No. 768 adopted on September 17, 1975, a copy of which is attached hereto and made a part hereof; and

WHEREAS, the California Regional Water Quality Control Board, San Francisco Bay Region, in their Resolution 75-16, and the Alameda County Board of Supervisors, by their Resolution No. 11265 of May 13, 1975, have expressed concurrence for having Zone 7 as the overall water quality management planning agency for the Alameda Creek Watershed above Niles; and

WHEREAS, on March 2, 1981, Zone 7 executed an agreement with the consulting engineering firm of Camp Dresser & McKee, Inc. (CDM), of Walnut Creek, California, to develop the Wastewater Management Plan for the Unsewered, Unincorporated Area of Alameda Creek Watershed Above Niles (WMP), and

WHEREAS, CDM completed the Draft WMP on March 3, 1982, with the results presented at the final public hearing on April 15, 1982, and comments have been received; and

WHEREAS, the public hearing process is now concluded;

NOW, THEREFORE, BE IT RESOLVED, that consistent with the information presented above, the Board of Directors of Zone 7 of Alameda County Flood Control and Water Conservation District does hereby adopt the final Wastewater Management Plan for the Unsewered, Unincorporated Area of Alameda Creek Watershed Above Niles (WMP) consisting of the Draft WMP and the modifications to the Draft WMP of May 12 and May 19;

BE IT FURTHER RESOLVED that the final WMP supersedes Zone 7 Board Resolution No. 823 where there is a conflict; and

BE IT FURTHER RESOLVED that the Board of Directors of Zone 7 of Alameda County Flood Control and Water Conservation District does hereby direct CDM to incorporate said modifications with the Draft WMP to produce the final WMP, and to thence make and present to Zone 7, 100 copies of said final WMP, at which time their work under Agreement No. A4-7.674 will thereby be completed.

ADOPTED BY THE FOLLOWING VOTE:

AYES: DIRECTORS DZAKOWIC, HAGEMANN, PHILCOX, TRACY, WALKER, WENTE, WILLIAMS

NOES: NONE

ABSENT: NONE

ABSTAIN: NONE

I certify that the foregoing is a correct copy of a resolution adopted by the Board of Directors of Zone No. 7 of the Alameda County Flood Control and Water Conservation District on MAY 19 1982

ATTEST:

BY:

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 PHONE (925) 454-5000

September 23, 2005

Mary Scruggs
Division of Planning and Local Assistance
Conjunctive Water Management Branch
PO Box 942836
Sacramento, CA 94236-0001

Subject: **Transmittal of Zone 7's Groundwater Management Plan**

Dear Ms. Scruggs:

Alameda County Flood Control and Water Conservation District, Zone 7 (Zone 7 Water Agency) is pleased to present our newly-adopted Groundwater Management Plan. Zone 7 Water Agency is a water wholesaler that delivers water to four retail water supply agencies, Dublin-San Ramon Services District, California Water Service Company and the Cities of Livermore and Pleasanton. The four retailers have formed the Tri-Valley Water Retail Group which has endorsed the plan (see attached letter). A copy of the Board Resolution adopting the plan is also attached.

Please feel free to contact me at (925) 454-5016, if you have any questions concerning the Groundwater Management Plan.

Sincerely,

G.F. Duerig
Acting Assistant General Manager

Attachments

cc (without attachments):
Kim Rosmaier, CA DWR – Central District
Dave Lunn
Tom Rooze
Sal Segura

Tri-Valley Water RETAILERS

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the City of Liv
Dublin San R
and the Calif

cc: JD
AOL
JO

RECEIVED
SEP 15 2005

September 14, 2005

Mr. Dale Myers, General Manager
Zone 7 Water Agency
100 N. Canyons Parkway
Livermore, CA 94550

Subject: Zone 7's Draft Groundwater Management Plan for Livermore-Amador Groundwater Basin-August 2005

Dear Mr. Myers:

The Tri-Valley Water Retailers Group thanks you and your staff for the opportunity to review Zone 7's draft *Groundwater Management Plan for Livermore-Amador Groundwater Basin* (GMP) dated August 2005. Specific comments on this important management document have been provided earlier by individual retail agencies to Jill Duerig of your staff. As stated in the Executive Summary, Zone 7 prepared the GMP to compile and document all of its current groundwater management policies and programs in a single document, and to satisfy the intent of the State's Groundwater Management Planning Act. The water retailers understand that the Planning Act is broad, and recognize that the Zone's GMP may not need to address specific issues regarding Zone 7's groundwater use and management that are still being worked out locally. The compilation of current management practices in a single GMP document will be helpful to provide retailers and Zone 7 a useful starting point for discussing future amendments to groundwater management policies and procedures that address these specific local issues.

The Tri-Valley Water Retailers Group acknowledges Zone 7's adoption of this GMP as a starting point for future local discussions and decisions on groundwater management. As such, we endorse transmittal of the Plan to the State Department of Water Resources, with the understanding that Zone 7 and the retailers will continue to work together toward mutually agreed upon groundwater management goals.

We look forward to working with Zone 7 in the future, using the GMP as a starting point, to frame, develop or modify groundwater management policies and procedures for the safe production, improved water quality and long-term sustainability of the Tri-Valley's valuable local groundwater resource.

Please provide a copy of this letter to your Board of Directors for their information in their consideration of the *Groundwater Management Plan for Livermore-Amador Groundwater Basin*.

Sincerely,

Bert Michalczyk
Chair, Tri-Valley Water Retailers Group

BM:ngh

Cc: Dan McIntyre, City of Livermore
John Freeman, California Water Service Company
Rob Wilson, City of Pleasanton

ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

RESOLUTION NO 06-2796

INTRODUCED BY DIRECTOR MARCHAND
SECONDED BY DIRECTOR STEVENS

RESOLUTION APPROVING AND ADOPTING THE FINAL GROUNDWATER MANAGEMENT PLAN

WHEREAS, following publication of notice and conducting a public hearing, a Notice of Intent to Draft and Adopt a Groundwater Management Plan ("Notice of Intent") was adopted by the Zone 7 Board on August 21, 2005; and

WHEREAS, Zone 7 published said Notice of Intent in accordance with the requirements set forth in the California Groundwater Management Planning Act (Water Code Sections 10750, et seq.); and

WHEREAS, such notice also included a written statement describing the manner in which interested parties could participate in providing input on the groundwater management plan;

WHEREAS, copies of the Draft Groundwater Management Plan were made available for public review in local libraries, at the Zone 7 office and on the Zone 7 website; and

WHEREAS, Zone 7 distributed additional copies of the Draft Groundwater Management Plan to its water retail agencies, Dublin San Ramon Services District, California Water Service Company and the Cities of Livermore and Pleasanton; and

WHEREAS, Zone 7 received public comments on the document; and

WHEREAS, comments received were addressed in drafting a final version of the Groundwater Management Plan; and

WHEREAS, on September 21, 2005 the Zone 7 Board of Directors conducted a second public hearing on the September 2005 Groundwater Management Plan; and

WHEREAS, the Zone 7 Board of Directors considered both written and oral comments received on the Groundwater Management Plan;

NOW, THEREFORE, THE ZONE 7 BOARD OF DIRECTORS DOES HEREBY RESOLVE that the September 2005 Groundwater Management Plan referenced and incorporated herein, is hereby approved and adopted by this Board of Directors and shall be the basis for Zone 7's groundwater management policy for future activities.

BE IT FURTHER RESOLVED, as the GMP is a compilation of existing Zone 7 policies and practices and does not involve any changes or additions thereto, the Board of Directors hereby finds that the GMP is not project for purposes of CEQA and is thus exempt therefrom and directs the Clerk of the Board to file a Notice of Exemption with the County Clerk in compliance with CEQA Guideline 15062.

ADOPTED BY THE FOLLOWING VOTE:

AYES: DIRECTORS CONCANNON, GRECI, KALTHOFF, KOHNEN, MARCHAND, QUIGLEY, STEVENS

NOES: NONE

ABSENT: NONE

ABSTAIN: NONE

I certify that the foregoing is a correct copy of a resolution Adopted by the Board of Directors of Zone 7 of Alameda County Flood Control and Water Conservation District on

September 21, 2005

By _____
President, Board of Directors

NOTICE OF EXEMPTION

To: ☐ Office of Planning and Research
For U.S. Mail:
P.O. Box 3044
Sacramento, CA 95812-3044

Street Address:
1400 Tenth Street, Room 121
Sacramento, CA 94514

To: ☒ County Clerk
County of Alameda
1106 Madison Street
Oakland, CA 94612

From: ZONE 7 WATER AGENCY
100 North Canyons Parkway
Livermore, CA 94551

Lead Agency (if different from above):

Project Title: Groundwater Management Plan for Livermore-Amador Groundwater Basin

Project Location – Specific: Livermore-Amador Valley

Project Location – City: Cities of Livermore, Pleasanton, Dublin and Unincorporated Eastern Alameda County

Project Location – County: Alameda

Description of Nature, Purpose, and Beneficiaries of Project:

The Zone 7 Groundwater Management Plan (GMP) is a summary written to combine all of Zone 7's existing groundwater management efforts into a single document. The GMP provides a detailed description of Zone 7's existing groundwater management practices throughout the Livermore-Amador Valley Groundwater Basin and a description of the regulatory setting that involves a GMP.

Name of Public Agency Approving Project: Zone 7 Water Agency

Name of Person or Agency Carrying Out Project: Zone 7 Water Agency

Exempt Status: *(check one)*

☐ Ministerial (Sec. 21080(b)(1); 15268);

☐ Declared Emergency (Sec. 21080(b)(3); 15269(a));

☐ Emergency Project (Sec. 21080(b)(4); 15269(b)(c));

☐ Categorical Exemption. State type and section number:

☒ Statutory Exemptions. State code number: 14 CCR 15061.b.3

Reasons why project is exempt:

This Groundwater Management Plan is a requirement in the preparation and for the adoption of an Urban Water Management Plan pursuant to Section 10652 of the Water Code. The Plan is merely a compilation and summary of existing policies and practices without any changes or additions thereto thus there is no possibility that this plan will have a significant effect on the environment, therefore per the general rule of CEQA Guideline 15061.b.3, this activity is not subject to CEQA.

Lead Agency Contact Person: Mary Lim
Area Code/Telephone/Ext: 925-454-5036

If filed by Applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? ☐ Yes ☐ No

Signature: Mary Lim Date: 9/22/05 Title: Environmental Services Program Manager

☑ Signed by Lead Agency Date received for filing at OPR: _____

☐ Signed by Applicant

Form 4. Environmental Declaration

*ENVIRONMENTAL DECLARATION

(Calif. Fish and Game Code Sec. 711.4)

NAME AND ADDRESS OF APPLICANT OR LEAD AGENCY:

Zone 7 Alameda County Flood Control and Water Conservation District

100 North Canyons Parkway

Livermore, CA 94551

FOR COURT USE ONLY

FILING NO.

CLASSIFICATION OF ENVIRONMENTAL DOCUMENT:

1. NOTICE OF EXEMPTION/STATEMENT OF EXEMPTION — PLU117

   ☒ A—STATUTORILY OR CATEGORICALLY EXEMPT
   $25.OO (Twenty-Five Dollars) – CLERK's FEE

   ☐ B—DE MINIMUS IMPACT – CERTIFICATE OF FEE EXEMPTION REQUIRED — PLU 117
   $25.OO (Twenty-Five Dollars) – CLERK's FEE

2. NOTICE OF DETERMINATION – FEE REQUIRED

   ☐ A—NEGATIVE DECLARATION — PLU 116
   $1,250.OO (Twelve Hundred Fifty Dollars) – STATE FILING FEE
   $25.OO (Twenty-Five Dollars) – CLERK's FEE

   ☐ B—ENVIRONMENTAL IMPACT REPORT — PLU 115
   $850.OO (Eight Hundred Fifty Dollars) – STATE FILING FEE
   $25.OO (Twenty-Five Dollars) – CLERK's FEE

3. ☐ OTHER (Specify)_____ — PLU117
   $25.OO (Twenty-Five Dollars) – CLERK's FEE

* THIS FORM MUST BE COMPLETED AND SUBMITTED WITH ALL ENVIRONMENTAL DOCUMENTS FILED WITH THE ALAMEDA COUNTY CLERK'S OFFICE.

FIVE COPIES OF ALL NECESSARY DOCUMENTATION ARE REQUIRED FOR FILING PURPOSES.

APPLICABLE FEES MUST BE PAID AT THE TIME OF FILING AN ENVIRONMENTAL DOCUMENT WITH THE ALAMEDA COUNTY CLERK'S OFFICE.

MAKE CHECK PAYABLE TO: ALAMEDA COUNTY CLERK

Rev. 1/15/91–1056

Check Date: 09/21/2005 DP Check No. 1014249

Invoice Number		Invoice Date	Voucher ID	Gross Amount	Discount Available	Paid Amount
9-19-05Exemptior	ZONE7	9/19/2005	00012582	25.00	0.00	25.00

Invoice Type : Government Fees Use Tax : 0.00

Payment Comments: NOTICE OF EXEMPTION RETURN CHECK TO QIC 90201 ATTN: M CHUN

Approved 09/20/2005 15.24.06 by ABAUTIST

Vendor Number	Vendor Name			Total Discounts$0.00	
0000032647	COUNTY OF ALAMEDA				
Check Number	Date		Total Amount	Discounts Taken	Total Paid Amount
1014249	9/21/2005		$25.00	$0.00	$25.00

Appendix E: DWR 2015 UWMP Tables

1. SBX7-7 Tables
2. DWR Tables

Appendix E-1: DWR 2015 UWMP
Tables SBX7-7 Tables

SB X7-7 Table 0: Units of Measure Used in UWMP* *(select one from the drop down list)*
Million Gallons
**The unit of measure must be consistent with Table 2-3*
NOTES:

SB X7-7 Table-1: Baseline Period Ranges			
Baseline	**Parameter**	**Value**	**Units**
10- to 15-year baseline period	2008 total water deliveries	2,636	Million Gallons
	2008 total volume of delivered recycled water	305	Million Gallons
	2008 recycled water as a percent of total deliveries	11.57%	Percent
	Number of years in baseline period[1]	10	Years
	Year beginning baseline period range	1999	
	Year ending baseline period range[2]	2008	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2004	
	Year ending baseline period range[3]	2008	

[1] If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period.

[2] The ending year must be between December 31, 2004 and December 31, 2010.

[3] The ending year must be between December 31, 2007 and December 31, 2010.

NOTES:

SB X7-7 Table 2: Method for Population Estimates	
Method Used to Determine Population (may check more than one)	
☐	**1. Department of Finance** (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
☐	**2. Persons-per-Connection Method**
☑	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review
NOTES:	

SB X7-7 Table 3: Service Area Population		
Year		Population
10 to 15 Year Baseline Population		
Year 1	1999	22,044
Year 2	2000	22,701
Year 3	2001	23,222
Year 4	2002	23,835
Year 5	2003	24,333
Year 6	2004	25,616
Year 7	2005	26,085
Year 8	*2006*	26,380
Year 9	*2007*	26,466
Year 10	*2008*	26,525
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2004	25,616
Year 2	2005	26,085
Year 3	*2006*	26,380
Year 4	*2007*	26,466
Year 5	*2008*	26,525
2015 Compliance Year Population		
2015		28,782
NOTES:2010 was the first year of more confident		

SB X7-7 Table 4: Annual Gross Water Use *								
	Baseline Year *Fm SB X7-7 Table 3*	**Volume Into Distribution System** *Fm SB X7-7 Table(s) 4-A*	**Deductions**					**Annual Gross Water Use**
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water *Fm SB X7-7 Table 4-B*	Water Delivered for Agricultural Use	Process Water *Fm SB X7-7 Table(s) 4-D*	
10 to 15 Year Baseline - Gross Water Use								
Year 1	1999	1899.47						1,899
Year 2	2000	2010.85						2,011
Year 3	2001	2193.03						2,193
Year 4	2002	2192.56						2,193
Year 5	2003	2017.56						2,018
Year 6	2004	2211.02						2,211
Year 7	2005	2158.73						2,159
Year 8	2006	2246.16						2,246
Year 9	2007	2364.82						2,365
Year 10	2008	2328.81						2,329
Year 11	0							
Year 12	0							
Year 13	0							
Year 14	0							
Year 15	0							
10 - 15 year baseline average gross water use								**2,162**
5 Year Baseline - Gross Water Use								
Year 1	2004	2,211						2,211
Year 2	2005	2,159						2,159
Year 3	2006	2,246						2,246
Year 4	2007	2,365						2,365
Year 5	2008	2,329						2,329
5 year baseline average gross water use								**2,262**
2015 Compliance Year - Gross Water Use								
2015		1,484						1,484
* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3								
NOTES:								

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)
Complete one table for each source.

Name of Source	Zone 7 Water Agency
This water source is:	
☐	The supplier's own water source
☑	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1999	1899.47		1,899
Year 2	2000	2010.85		2,011
Year 3	2001	2193.03		2,193
Year 4	2002	2192.56		2,193
Year 5	2003	2017.56		2,018
Year 6	2004	2211.02		2,211
Year 7	2005	2158.73		2,159
Year 8	2006	2246.16		2,246
Year 9	2007	2364.82		2,365
Year 10	2008	2328.81		2,329
Year 11				
Year 12				
Year 13				
Year 14				
Year 15				
5 Year Baseline - Water into Distribution System				
Year 1	2004	2211.02		2,211
Year 2	2005	2158.73		2,159
Year 3	2006	2246.16		2,246
Year 4	2007	2364.82		2,365
Year 5	2008	2328.81		2,329
2015 Compliance Year - Water into Distribution System				
2015		1484.46		1,484

** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-B: Indirect Recycled Water Use Deduction *(For use only by agencies that are deducting indirect recycled water)*

Baseline Year *Fm SB X7-7 Table 3*		**Surface Reservoir Augmentation**					**Groundwater Recharge**			**Total Deductible Volume of Indirect Recycled Water Entering the Distribution System**
		Volume Discharged from Reservoir for Distribution System Delivery	Percent Recycled Water	Recycled Water Delivered to Treatment Plant	Transmission/ Treatment Loss	Recycled Volume Entering Distribution System from Surface Reservoir Augmentation	Recycled Water Pumped by Utility*	Transmission/ Treatment Losses	Recycled Volume Entering Distribution System from Groundwater Recharge	
10-15 Year Baseline - Indirect Recycled Water Use										
Year 1	1999									
Year 2	2000									
Year 3	2001									
Year 4	2002									
Year 5	2003									
Year 6	2004									
Year 7	2005									
Year 8	2006									
Year 9	2007									
Year 10	2008									
Year 11	0									
Year 12	0									
Year 13	0									
Year 14	0									
Year 15	0									
5 Year Baseline - Indirect Recycled Water Use										
Year 1	2004									
Year 2	2005									
Year 3	2006									
Year 4	2007									
Year 5	2008									
2015 Compliance - Indirect Recycled Water Use										
2015										

**Suppliers will provide supplemental sheets to document the calculation for their input into "Recycled Water Pumped by Utility". The volume reported in this cell must be less than total groundwater pumped - See Methodology 1, Step 8, section 2.c.*

NOTES:

SB X7-7 Table 4-C: Process Water Deduction Eligibility *(For use only by agencies that are deducting process water) Choose Only One*	
☐	**Criteria 1**- Industrial water use is equal to or greater than 12% of gross water use. Complete SB X7-7 Table 4-C.1
☐	**Criteria 2** - Industrial water use is equal to or greater than 15 GPCD. Complete SB X7-7 Table 4-C.2
☐	**Criteria 3** - Non-industrial use is equal to or less than 120 GPCD. Complete SB X7-7 Table 4-C.3
☐	**Criteria 4** - Disadvantaged Community. Complete SB x7-7 Table 4-C.4
NOTES:	

SB X7-7 Table 4-C.1: Process Water Deduction Eligibility					
Criteria 1 Industrial water use is equal to or greater than 12% of gross water use					
Baseline Year *Fm SB X7-7 Table 3*		Gross Water Use Without Process Water Deduction	Industrial Water Use	Percent Industrial Water	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility					
Year 1	1999	1,899		0%	NO
Year 2	2000	2,011		0%	NO
Year 3	2001	2,193		0%	NO
Year 4	2002	2,193		0%	NO
Year 5	2003	2,018		0%	NO
Year 6	2004	2,211		0%	NO
Year 7	2005	2,159		0%	NO
Year 8	2006	2,246		0%	NO
Year 9	2007	2,365		0%	NO
Year 10	2008	2,329		0%	NO
Year 11	0				NO
Year 12	0				NO
Year 13	0				NO
Year 14	0				NO
Year 15	0				NO
5 Year Baseline - Process Water Deduction Eligibility					
Year 1	2004	2,211		0%	NO
Year 2	2005	2,159		0%	NO
Year 3	2006	2,246		0%	NO
Year 4	2007	2,365		0%	NO
Year 5	2008	2,329		0%	NO
2015 Compliance Year - Process Water Deduction Eligiblity					
2015		1,484		0%	NO
NOTES:					

SB X7-7 Table 4-C.2: Process Water Deduction Eligibility					
Criteria 2 Industrial water use is equal to or greater than 15 GPCD					
Baseline Year *Fm SB X7-7 Table 3*		Industrial Water Use	Population	Industrial GPCD	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility					
Year 1	1999		22,044	0	NO
Year 2	2000		22,701	0	NO
Year 3	2001		23,222	0	NO
Year 4	2002		23,835	0	NO
Year 5	2003		24,333	0	NO
Year 6	2004		25,616	0	NO
Year 7	2005		26,085	0	NO
Year 8	2006		26,380	0	NO
Year 9	2007		26,466	0	NO
Year 10	2008		26,525	0	NO
Year 11					
Year 12					
Year 13					
Year 14					
Year 15					
5 Year Baseline - Process Water Deduction Eligibility					
Year 1	2004		25,616	0	NO
Year 2	2005		26,085	0	NO
Year 3	2006		26,380	0	NO
Year 4	2007		26,466	0	NO
Year 5	2008		26,525	0	NO
2015 Compliance Year - Process Water Deduction Eligibility					
2015			28,782	0	NO
NOTES:					

SB X7-7 Table 4-C.3: Process Water Deduction Eligibility							
Criteria 3 Non-industrial use is equal to or less than 120 GPCD							
Baseline Year *Fm SB X7-7 Table 3*		Gross Water Use Without Process Water Deduction *Fm SB X7-7 Table 4*	Industrial Water Use	Non-industrial Water Use	Population *Fm SB X7-7 Table 3*	Non-Industrial GPCD	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility							
Year 1	1999	1,899		1,899	22,044	236	NO
Year 2	2000	2,011		2,011	22,701	243	NO
Year 3	2001	2,193		2,193	23,222	259	NO
Year 4	2002	2,193		2,193	23,835	252	NO
Year 5	2003	2,018		2,018	24,333	227	NO
Year 6	2004	2,211		2,211	25,616	236	NO
Year 7	2005	2,159		2,159	26,085	227	NO
Year 8	2006	2,246		2,246	26,380	233	NO
Year 9	2007	2,365		2,365	26,466	245	NO
Year 10	2008	2,329		2,329	26,525	241	NO
Year 11							
Year 12							
Year 13							
Year 14							
Year 15							
5 Year Baseline - Process Water Deduction Eligibility							
Year 1	2004	2,211		2,211	25,616	236	NO
Year 2	2005	2,159		2,159	26,085	227	NO
Year 3	2006	2,246		2,246	26,380	233	NO
Year 4	2007	2,365		2,365	26,466	245	NO
Year 5	2008	2,329		2,329	26,525	241	NO
2015 Compliance Year - Process Water Deduction Eligiblity							
2015		1,484		1,484	28,782	141	NO
NOTES:							

SB X7-7 Table 4-C.4: Process Water Deduction Eligibility				
Criteria 4 Disadvantaged Community *Use IRWM DAC Mapping tool* http://www.water.ca.gov/irwm/grants/resources_dac.cfm				
California Median Household Income		Service Area Median Household Income	Percentage of Statewide Average	**Eligible for Exclusion? Y/N**
2015 Compliance Year - Process Water Deduction Eligibility				
2010	$53,046	$99,683	188%	NO
A "Disadvantaged Community" is a community with a median household income less than 80 percent of the statewide average.				
NOTES:				

SB X7-7 Table 4-D: Process Water Deduction - Volume *Complete a separate table for each industrial customer with a process water exclusion*						
Name of Industrial Customer		*Industrial Customer 1*				
Baseline Year *Fm SB X7-7 Table 3*		Industrial Customer's Total Water Use	Total Volume Supplied by Water Agency	% of Water Supplied by Water Agency	Customer's Total Process Water Use	Volume of Process Water Eligible for Exclusion for this Customer
10 to 15 Year Baseline - Process Water Deduction						
Year 1	1999					0
Year 2	2000					0
Year 3	2001					0
Year 4	2002					0
Year 5	2003					0
Year 6	2004					0
Year 7	2005					0
Year 8	2006					0
Year 9	2007					0
Year 10	2008					0
Year 11						
Year 12						
Year 13						
Year 14						
Year 15						
5 Year Baseline - Process Water Deduction						
Year 1	2004					0
Year 2	2005					0
Year 3	2006					0
Year 4	2007					0
Year 5	2008					0
2015 Compliance Year - Process Water Deduction						
2015						0
NOTES:						

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1999	22,044	1,899	236
Year 2	2000	22,701	2,011	243
Year 3	2001	23,222	2,193	259
Year 4	2002	23,835	2,193	252
Year 5	2003	24,333	2,018	227
Year 6	2004	25,616	2,211	236
Year 7	2005	26,085	2,159	227
Year 8	2006	26,380	2,246	233
Year 9	2007	26,466	2,365	245
Year 10	2008	26,525	2,329	241
Year 11				
Year 12				
Year 13				
Year 14				
Year 15				
10-15 Year Average Baseline GPCD				**240**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2004	25,616	2,211	236
Year 2	2005	26,085	2,159	227
Year 3	2006	26,380	2,246	233
Year 4	2007	26,466	2,365	245
Year 5	2008	26,525	2,329	241
5 Year Average Baseline GPCD				**236**
2015 Compliance Year GPCD				
2015		28,782	1,484	141
NOTES:				

SB X7-7 Table 6: Gallons per Capita per Day *Summary From Table SB X7-7 Table 5*	
10-15 Year Baseline GPCD	240
5 Year Baseline GPCD	236
2015 Compliance Year GPCD	141
NOTES:	

SB X7-7 Table 7: 2020 Target Method *Select Only One*		
Target Method		Supporting Documentation
☑	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D *Contact DWR for these tables*
☐	Method 3	SB X7-7 Table 7-E
☐	Method 4	Method 4 Calculator
NOTES:		

SB X7-7 Table 7-A: Target Method 1 20% Reduction	
10-15 Year Baseline GPCD	2020 Target GPCD
240	192
NOTES:	

SB X7-7 Table 7-B: Target Method 2	Target
Landscape Water Use	

Tables for Target Method 2 (SB X7-7 Tables 7-B, 7-C, and 7-D) are not included in the SB X7-7 Verification Form, but are still required for water suppliers using Target Method 2. These water suppliers should contact Gwen Huff at (916) 651-9672 or gwen.huff@water.ca.gov

SB X7-7 Table 7-C: Target Method 2
Target CII Water Use

Tables for Target Method 2 (SB X7-7 Tables 7-B, 7-C, and 7-D) are not included in the SB X7-7 Verification Form, but are still required for water suppliers using Target Method 2. These water suppliers should contact Gwen Huff at (916) 651-9672 or gwen.huff@water.ca.gov

SB X7-7 Table 7-D: Target Method 2 Summary
Tables for Target Method 2 (SB X7-7 Tables 7-B, 7-C, and 7-D) are not included in the SB X7-7 Verification Form, but are still required for water suppliers using Target Method 2. These water suppliers should contact Gwen Huff at (916) 651-9672 or gwen.huff@water.ca.gov

SB X7-7 Table 7-E: Target Method 3				
Agency May Select More Than One as Applicable	Percentage of Service Area in This Hydrological Region	Hydrologic Region	"2020 Plan" Regional Targets	Method 3 Regional Targets (95%)
☐		North Coast	137	130
☐		North Lahontan	173	164
☐		Sacramento River	176	167
☐		San Francisco Bay	131	124
☐		San Joaquin River	174	165
☐		Central Coast	123	117
☐		Tulare Lake	188	179
☐		South Lahontan	170	162
☐		South Coast	149	142
☐		Colorado River	211	200
Target *(If more than one region is selected, this value is calculated.)*				**0**
NOTES:				

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target			
5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target*	Calculated 2020 Target *Fm Appropriate Target Table*	Confirmed 2020 Target
236	225	192	192
** Maximum 2020 Target is 95% of the 5 Year Baseline GPCD*			
NOTES:			

SB X7-7 Table 8: 2015 Interim Target GPCD		
Confirmed 2020 Target *Fm SB X7-7 Table 7-F*	10-15 year Baseline GPCD *Fm SB X7-7 Table 5*	2015 Interim Target GPCD
192	240	216
NOTES:		

SB X7-7 Table 9: 2015 Compliance								
		Optional Adjustments *(in GPCD)*						
Actual 2015 GPCD	2015 Interim Target GPCD	Extraordinary Events	Weather Normalization	Economic Adjustment	TOTAL Adjustments	Adjusted 2015 GPCD	2015 GPCD *(Adjusted if applicable)*	Did Supplier Achieve Targeted Reduction for 2015?
141	216	*No Extraordinary Events*	*No Weather Events*	*No Economic Adjustment*	0	141.304	141.304	YES
NOTES:								

Appendix E:-2 DWR 2015 UWMP
Tables DWR Tables

Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015
01-10-011	City of Livermore	10,170	1,484
	TOTAL	10,170	1,484
NOTES:			

Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable*
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

Table 2-3: Agency Identification	
Type of Agency (select one or both)	
☐	Agency is a wholesaler
☑	Agency is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables Are in Calendar Years
☐	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Date that the Fiscal Year Begins (mm/dd)	
Units of Measure Used in UWMP (select from Drop down)	
Unit	MG
NOTES:	

Table 2-4 Retail: Water Supplier Information Exchange
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name
Zone 7 Water Agency
NOTES:

Table 3-1 Retail: Population - Current and Projected						
Population Served	2015	2020	2025	2030	2035	2040*(opt)*
	28,782	29,213	31,700	32,391	32,391	32,391
NOTES: 15% projected population increase 2015-2020						

Table 4-1 Retail: Demands for Potable and Raw Water - Actual			
Use Type	2015 Actual		
May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool	Additional Description *(as needed)*	Level of Treatment When Delivered	Volume
Single Family		Drinking Water	679
Multi-Family		Drinking Water	81
Commercial		Drinking Water	308
Landscape		Drinking Water	259
Institutional/Governmental		Drinking Water	23
Losses		Drinking Water	134
		TOTAL	1,484
NOTES:			

Table 4-2 Retail: Demands for Potable and Raw Water - Projected					
Use Typ	Projected Water Use *Report To the Extent that Records are Available*				
	2020	2025	2030	2035	2040-opt
Single Family	938	1,017	1,039	1,039	
Multi-Family	112	121	124	124	
Commercial	425	461	471	471	
Landscape	358	388	396	396	
Institutional/Governmental	32	34	35	35	
Losses	185	201	205	205	
TOTAL	2,050	2,222	2,270	2,270	
NOTES: Volume in million gallons					

Table 4-3 Retail: Total Water Demands						
	2015	2020	2025	2030	2035	2040 *(opt)*
Potable and Raw Water *From Tables 4-1 and 4-2*	1,484	2,050	2,222	2,270	2,270	
Recycled Water Demand* *From Table 6-4*	760	875	1,006	1,157	1,330	
TOTAL WATER DEMAND	2,244	2,925	3,228	3,427	3,600	
NOTES: Volume in million gallons.						

Table 4-4 Retail: 12 Month Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss*
01/2015	134
** Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.*	
NOTES:	

Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook)	No
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, etc… utilized in demand projections are found.	
Are Lower Income Residential Demands Included In Projections?	Yes
NOTES: Housing Authority on Bluebell.	

Table 5-1 Baselines and Targets Summary *Retail Agency or Regional Alliance Only*					
Baseline Period	Start Year	End Year	Average Baseline GPCD*	2015 Interim Target *	Confirmed 2020 Target*
10-15 year	*1999*	*2008*	*240*	*216*	*192*
5 Year	*2004*	*2008*	*236*		
*All values are in Gallons per Capita per Day (GPCD)					
NOTES:					

Table 5-2: 2015 Compliance
Retail Agency or Regional Alliance Only

Actual 2015 GPCD*	2015 Interim Target GPCD*	Optional Adjustments to 2015 GPCD *From Methodology 8*					2015 GPCD* *(Adjusted if applicable)*	Did Supplier Achieve Targeted Reduction for 2015? Y/N
		Extraordinary Events*	Economic Adjustment*	Weather Normalization*	TOTAL Adjustments*	Adjusted 2015 GPCD*		
141	216	0	0	0	0	141	141	Yes

**All values are in Gallons per Capita per Day (GPCD)*

NOTES:

Table 6-1 Retail: Groundwater Volume Pumped						
☑	Supplier does not pump groundwater. The supplier will not complete the table below.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2011	2012	2013	2014	2015
Add additional rows as needed						
TOTAL		0	0	0	0	0
NOTES:						

Table 6-2 Retail: Wastewater Collected Within Service Area in 2015						
☐	There is no wastewater collection system. The supplier will not complete the table below.					
100%	Percentage of 2015 service area covered by wastewater collection system *(optional)*					
100%	Percentage of 2015 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected from UWMP Service Area 2015	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area?	Is WWTP Operation Contracted to a Third Party? *(optional)*
Add additional rows as needed						
City of Livermore	Metered	2,061	City of Livermore	Livermore Water Reclamation Plant	Yes	No
Total Wastewater Collected from Service Area in 2015:		2,061				
NOTES: Volume is in million gallons						

Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2015

☐ No wastewater is treated or disposed of within the UWMP service area.
The supplier will not complete the table below.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	2015 volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Add additional rows as needed										
Livermore Water Reclamation Plant	EBDA at Oro Loma	City discharges secondary effluent to the LAVWMA Pipeline.	CA0038008	Bay or estuary outfall	Yes	Secondary, Disinfected - 2.2	2,061	924	760	19
						Total	2,061	924	760	19

NOTES: Volume in million gallons

Table 6-4 Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area								
☐	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.							
Name of Agency Producing (Treating) the Recycled Water:		City of Livermore - Water Resources Division						
Name of Agency Operating the Recycled Water Distribution System:		City of Livermore Water Department						
Supplemental Water Added in 2015		0						
Source of 2015 Supplemental Water		N.A.						
Beneficial Use Type	General Description of 2015 Uses	Level of Treatment	2015	2020	2025	2030	2035	2040 (opt)
Agricultural irrigation								
Landscape irrigation (excludes golf courses)		Tertiary	174	201	231	265	305	
Golf course irrigation		Tertiary	142	164	188	216	249	
Commercial use		Tertiary	421	484	557	640	736	
Industrial use								
Geothermal and other energy production								
Seawater intrusion barrier								
Recreational impoundment								
Wetlands or wildlife habitat								
Groundwater recharge (IPR)*								
Surface water augmentation (IPR)*								
Direct potable reuse								
Other *(Provide General Description)*	Construction Water	Tertiary	23	26	30	35	40	
		Total:	760	875	1,006	1,157	1,330	
**IPR - Indirect Potable Reuse*								
NOTES:								

Table 6-5 Retail: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual			
☐	Recycled water was not used in 2010 nor projected for use in 2015. The supplier will not complete the table below.		
Use Type		**2010 Projection for 2015**	**2015 Actual Use**
Agricultural irrigation			
Landscape irrigation (excludes golf courses)		233	174
Golf course irrigation		132	142
Commercial use		179	421
Industrial use			
Geothermal and other energy production			
Seawater intrusion barrier			
Recreational impoundment			
Wetlands or wildlife habitat			
Groundwater recharge (IPR)			
Surface water augmentation (IPR)			
Direct potable reuse			
Other	*Construction Water*	36	23
	Total	580	760
NOTES:			

Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
☑	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Add additional rows as needed			
		Total	0
NOTES: No current plans to expand the current infrastructure. Will have new customers.			

Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☑	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
Page 41	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other agencies?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Agency *This may be a range*
	Drop Down List (y/n)	*If Yes, Agency Name*				
Add additional rows as needed						
NOTES: See Zone 7's 2015 UWMP to see new water supply projects in Chapter 6, Section 6.8						

Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2015		
		Actual Volume	Water Quality	Total Right or Safe Yield *(optional)*
Purchased or Imported Water	Purchased from Zone 7 Water Agency	1,484	Drinking Water	
Recycled Water	From City of Livermore WWTF	760	Recycled Water	
	Total	2,244		0
NOTES: Units in million gallons per year				

Table 6-9 Retail: Water Supplies — Projected						
Water Supply	Additional Detail on Water Supply	**Projected Water Supply** *Report To the Extent Practicable*				
		2020	**2025**	**2030**	**2035**	**2040** *(opt)*
		Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume
Purchased or Imported Water	Purchased from Zone 7 Water Agency	2,050	2,222	2,270	2,270	
Recycled Water	From City of Livermore WWTF	875	1,006	1,157	1,330	
	Total	2,925	3,228	3,427	3,600	
NOTES: Units in million gallons per year						

Table 7-1 Retail: Basis of Water Year Data

Year Type	Base Year *If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 1999-2000, use 2000*	Available Supplies if Year Type Repeats	
		☑	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location: Table 7-2, Table 7-3
		☐	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	**% of Average Supply**
Average Year			100%
Single-Dry Year			
Multiple-Dry Years 1st Year			
Multiple-Dry Years 2nd Year			
Multiple-Dry Years 3rd Year			
Multiple-Dry Years 4th Year *Optional*			
Multiple-Dry Years 5th Year *Optional*			
Multiple-Dry Years 6th Year *Optional*			

Agency may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If an agency uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.

NOTES:

Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 *(Opt)*
Supply totals *(autofill from Table 6-9)*	2,925	3,228	3,427	3,600	
Demand totals *(autofill from Table 4-3)*	2,925	3,228	3,427	3,600	
Difference	0	0	0	0	
NOTES: Volumes are in MG					

Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals	2,413	2,673	2,860	3,033	
Demand totals	2,413	2,673	2,860	3,033	
Difference	0	0	0	0	
NOTES: Assumes 25% demand reduction from Normal Year.					

Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	2,618	2,895	3,087	3,260	
	Demand totals	2,618	2,895	3,087	3,260	
	Difference	0	0	0	0	
Second year	Supply totals	2,618	2,895	3,087	3,260	
	Demand totals	2,618	2,895	3,087	3,260	
	Difference	0	0	0	0	
Third year	Supply totals	2,618	2,895	3,087	3,260	
	Demand totals	2,618	2,895	3,087	3,260	
	Difference	0	0	0	0	
NOTES: Assume 15% demand reduction of average supply available to City of Livermore Water for consecutive multiple years.						

Table 8-1 Retail **Stages of Water Shortage Contingency Plan**		
Stage	Complete Both	
	Percent Supply Reduction[1] *Numerical value as a percent*	Water Supply Condition (*Narrative description)*
Add additional rows as needed		
1	20%	Minimal Reductions Range 0% - 20%
2	20%	Moderate Reductions 0% - 20%
3	35%	Severe Reductions 20% - 35%
4	50%	Critical Reductions 35% - 50%
[1] *One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.*		
NOTES:		

Table 8-2 Retail Only: Restrictions and Prohibitions on End Uses			
Stage	Restrictions and Prohibitions on End Users ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? *Drop Down List*
Add additional rows as needed			
1	Landscape - Limit landscape irrigation to specific times	Minimal Conservation	No
1	Other - Require automatic shut of hoses	Minimal Conservation	No
2	Landscape - Limit landscape irrigation to specific times	Moderate Reduction	No
2	Other - Require automatic shut of hoses	Moderate Reduction	No
2	CII - Commercial kitchens required to use pre-rinse spray valves	Moderate Reduction	No
3	Landscape - Limit landscape irrigation to specific times	Severe Reductions	Yes
3	Landscape - Limit landscape irrigation to specific days	Severe Reductions	Yes
3	Landscape - Restrict or prohibit runoff from landscape irrigation	Severe Reductions	Yes
3	Other - Prohibit use of potable water for washing hard surfaces	Severe Reductions	Yes
3	Other - Require automatic shut of hoses	Severe Reductions	Yes
3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Severe Reductions	Yes
4	Landscape - Limit landscape irrigation to specific times	Critical Reductions	Yes
4	Landscape - Limit landscape irrigation to specific days	Critical Reductions	Yes
4	Landscape - Restrict or prohibit runoff from landscape irrigation	Critical Reductions	Yes
4	Landscape - Other landscape restriction or prohibition	Critical Reductions	Yes
4	Water Features - Restrict water use for decorative water features, such as fountains	Critical Reductions	Yes
4	CII - Restaurants may only serve water upon request	Critical Reductions	Yes
NOTES:			

Table 8-3 Retail Only: **Stages of Water Shortage Contingency Plan - Consumption Reduction Methods**		
Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
1	Offer Water Use Surveys	
1	Provide Rebates on Plumbing Fixtures and Devices	
2	Expand Public Information Campaign	Voluntary cutback requested.
2	Increase Frequency of Meter Reading	
2	Decrease Line Flushing	
2	Implement or Modify Drought Rate Structure or Surcharge	Implement Stage 2 water rates.
2	Other	Odd/Even irrigation. Only twice per week.
2	Other	Cover pools/spas when not in use.
2	Other	Use buckets to wash vehicles, boats, buildings no more than monthly. Encourage wash services that recycle.
2	Other	Require low-flow rinse nozzles at restaurants.
2		
3	Expand Public Information Campaign	Expanded outreach / Mandatory cutbacks requested
3	Increase Frequency of Meter Reading	Weekly reading of purchased water meters.
3	Decrease Line Flushing	Eliminate sewer flushing except when there are overflows or backups.
3	Increase Water Waste Patrols	Hand watering on Saturday or Sunday only.
3	Implement or Modify Drought Rate Structure or Surcharge	Implement Stage 3 water rates.
3	Other	Vehicle Wahing at Commercial establishments only
3	Other	Prohibit potable water for construction uses.
3	Other	Prohibit potable water use for street washing or flushing.
4	Expand Public Information Campaign	Aggressive outreach via Livermore Communicator. More mandatory cutbacks requested.
4	Increase Frequency of Meter Reading	Daily reading of purchased water meters.
4	Increase Water Waste Patrols	No turf irrigation; hand water Sat. or Sunday.
4	Implement or Modify Drought Rate Structure or Surcharge	Implement Stage 4 water rates.
4	Other	Prohibit draining/filling private swimming pools
4	Other	Prohibit potable water in fountains or ponds.
4	Other	Excessive use penalties in place as needed.
NOTES:		

Table 8-4 Retail: Minimum Supply Next Three Years			
	2016	2017	2018
Available Water Supply	1,650	1,665	1,682
NOTES:			

Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
City of Pleasanton	☑	☑
City of Dublin	☑	☑
Cal Water	☑	☑
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Alameda County	☑	☑
	☐	☐