City of Sacramento
City Council

915 I Street, Sacramento, CA, 95814
www.CityofSacramento.org

Meeting Date: **10/18/2011** **Report Type:** Public Hearing

Title: Urban Water Management Plan (Noticed on 8/8/11 & 8/19/11) (Continued from 10/4/11)

Report ID: 2011-00596

Location: Citywide

Recommendation: Conduct a public hearing and upon conclusion, adopt a Resolution adopting the City's 2010 Urban Water Management Plan update.

Contact: Bill Busath, Interim Engineering Manager, (916) 808-1434; Dan Sherry, Supervising Engineer, (916) 808-1419, Department of Utilities

Presenter: Dan Sherry, Supervising Engineer, 808-1419

Department: Department Of Utilities
Division: Cip Engineering
Dept ID: 14001321

Attachments:

1-Description/Analysis
2-Background
3-Resolution
4-Draft UWMP
5-Attachment 1 Comments from P Isenberg
6-Attachment 2 Response to P Isenberg Comments
7-Attachment 3 Changes to DRAFT UWMP

City Attorney Review
Approved as to Form
Joe Robinson
10/12/2011 11:22:50 AM

City Treasurer Review
Reviewed for Impact on Cash and Debt
Russell Fehr
10/11/2011 3:12:32 PM

Approvals/Acknowledgements

Department Director or Designee: Dave Brent - 10/12/2011 9:56:26 AM

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Description/Analysis

Issue: The California Water Code (Water Code) § 10620 requires urban water suppliers to prepare and adopt an Urban Water Management Plan (UMWP). Once adopted, Water Code § 10620 requires that the UWMP be updated every five years.

In general, the UWMP provides information on water demands projected over the next 20 years, and evaluates if there are sufficient water supplies to meet demands.

Policy Considerations: The adoption of the UWMP is consistent with the Council focus areas of Public Safety, Economic Development, and Sustainability and Livability, by planning for and ensuring a Safe and Reliable Water Supply.

Environmental Considerations: The California Environmental Quality Act (CEQA) does not apply to the preparation and adoption of Urban Water Management Plans [CEQA Guidelines Section 15282(v)].

Sustainability: A key element of the City's continued sustainability is the City's Water Conservation Program. The Urban Water Management Plan provides a description of the water conservation best management practices (BMPs), and a discussion of the methods to evaluate the effectiveness, implementation, schedule and cost of the BMPs.

Commission/Committee Action: Not applicable.

Rationale for Recommendation: Water Code § 10620 requires water suppliers to update and adopt the Urban Water Management Plan.

Financial Considerations: The adoption of the UWMP has no direct fiscal impact. However, completion of the update will allow the City to qualify for future State administered grants and loans.

Emerging Small Business Development (ESBD): Not applicable

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Background

The Urban Water Management Plan (UWMP) is a document which discusses a water purveyor's long term water resource plans to ensure adequate water supplies to meet existing and future demands for water.

The California Water Code (Water Code) § 10620 requires that each urban water supplier shall prepare and adopt an UMWP. Once adopted, Water Code § 10620 requires that the UWMP be updated every five years. As defined in the Water Code, an "urban water supplier" is a supplier, either publicly or privately owned, that provides water to more than 3,000 customers or supplies more than 3,000 acre-feet of water annually on a wholesale or retail basis or both. Currently, the City provides water service to approximately 133,700 connections and in 2010 produced approximately 108,300 acre-feet.

The City's first plan was prepared in 1991, and the City most recently adopted an UWMP update on November 14, 2006.

In general, the UWMP considers projected water supply demands in the City and areas outside the City that are within the places of use for the City's American River water right permits; the latter areas are served by other water purveyors that receive or may obtain wholesale water service from the City. A new requirement for this UWMP update is the identification of the City's target demand required by the year 2020 as required in SBx7 7. The City must achieve a demand of 223 gallons per capita per day (gpcd) by the year 2020. This is 20 percent less than the City's baseline (or historical average) demand of 279 gallons per capita per day. It is noteworthy that the average demand for 2010 was 207 gpcd.The UWMP indicates that the City has sufficient surface water entitlement and groundwater supply to accommodate projected City and wholesale demands over the next 20 years. Additional infrastructure will need to be constructed to meet the projected demands beyond 2030.

The Water Code requires that the UWMP be available for a 60 day public review period and be adopted after a public hearing. The draft UWMP was made available for review on the City's website at http://www.cityofsacramento.org/utilities/urbanwater/index.html, and notice of public hearing was published in accordance with Government Code Section 6066. Copies of the draft UWMP also were provided to the County of Sacramento, Sacramento Suburban Water District, California American Water, Fruitridge Vista Water Company, and Sacramento Regional County Sanitation District.

The City received one comment letter on the draft UWMP, from Mr. Phil Isenberg. A copy of Mr. Isenberg's comment letter, and the Department of Utilities' response, are attached as Attachment 1 and Attachment 2, respectively. The draft UWMP includes revisions made in response to Mr. Isenberg's comment letter, as noted in the Department of Utilities' response letter. These changes are presented in Attachment 3.

Within 30 days after adoption, the final UWMP must be filed with the Department of Water Resources, the California State Library, and the County of Sacramento.

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RESOLUTION NO.

Adopted by the Sacramento City Council

ADOPTION OF THE 2010 URBAN WATER MANAGEMENT PLAN

BACKGROUND

A. California Water Code § 10620 requires that urban water suppliers prepare and adopt an Urban Water Management Plan. Once adopted, the Water Code requires that the Urban Water Management Plan be updated every five years.

B. The City's most recent Urban Water Management Plan update was adopted on November 14th, 2006.

C. The City has prepared the 2010 update to its Urban Water Management Plan, consisting of the draft Urban Water Management Plan circulated for public review. City staff has proposed revisions to the Plan as indicated in Attachment 3 to the staff report for this item.

D. The City Council has held a public hearing on the Plan as required under Water Code § 10642.

BASED ON THE FACTS SET FORTH IN THE BACKGROUND, THE CITY COUNCIL RESOLVES AS FOLLOWS:

Section 1. The City Council adopts the City's 2010 Urban Water Management Plan update, with the revisions identified in Attachment 3 to the staff report, and directs the Director of Utilities to file copies of the plan with the State Department of Water Resources, the California State Library, and the County of Sacramento. If the State Department of Water Resources requires any revisions prior to acceptance of the Urban Water Management Plan, any such Plan revisions shall be approved by the Director of Utilities prior to resubmittal.

Section 2. Exhibit A, and Attachment 3 to the staff report, are made a part of this Resolution.

Exhibit A - 2010 Urban Water Management Plan update

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7/27/2011

7/27/2011

City of Sacramento

2010 URBAN WATER MANAGEMENT PLAN

DRAFT
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City of Sacramento

2010 URBAN WATER MANAGEMENT PLAN

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Chapter 1

PLAN PREPARATION

1.1 PURPOSE

The California Water Code requires urban water suppliers within the state to prepare and adopt Urban Water Management Plans (UWMPs) for submission to the California Department of Water Resources (DWR). The UWMPs, which must be filed every five years, must satisfy the requirements of the Urban Water Management Planning Act (UWMPA) of 1983, including amendments that have been made to the Act. The UWMPA requires urban water suppliers servicing 3,000 or more connections, or supplying more than 3,000 acre-feet (AF) of water annually, to prepare a UWMP.

The purpose of the UWMP is to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during water drought conditions. This report, which was prepared in compliance with the California Water Code, and as set forth in the guidelines and format established by the DWR, constitutes the City of Sacramento (City) 2010 UWMP.

The UWMP can be considered a “snapshot” of current conservation programs, and additional planning for water conservation and water management will take place over the next few years. The City has engaged in an ongoing process to evaluate its water conservation programs, which has involved or will involve the City Council, City staff, the City’s Water Conservation Advisory Group, and the public. The City’s water conservation programs may be revised when this process is complete. Important elements include finalization of the Water Conservation Plan expected by the spring of 2012, and a preliminary conservation pricing study to be completed this fall, with additional conservation pricing work in the future. Additional conservation work (both planning and implementation) will likely result as part of the input provided from the Water Conservation Advisory Group.

It is anticipated that any changes in Sacramento’s water conservation programs will reflect the benefits (and costs) of water conservation in this region, including benefits associated with protecting the environmental health of the rivers that are integral to the region’s quality of life. Moreover, as discussed in the Climate Change chapter of this UWMP (Chapter 7), water conservation is an important measure to both reduce greenhouse gas generation and to adapt to a predicted future outcome – decreased snowpack in the Sierra Nevada Mountains.

1.2 BACKGROUND

1.2.1 Urban Water Management Planning Act

In 1983, State Assembly Bill 797 modified the California Water Code Division 6 by creating the UWMPA. Several amendments to the original UWMPA, which were introduced since

1983, have increased the data requirements and planning elements to be included in the 2005 and 2010 UWMPs.

Initial amendments to the UWMPA required that total projected water use be compared to water supply sources over the next 20 years, in 5-year increments. Recent DWR guidelines also suggest projecting through a 25-year planning horizon to maintain a 20-year timeframe until the next UWMP update has been completed.

Other amendments require that UWMPs include provisions for recycled water use, demand management measures (DMMs), and a water shortage contingency plan. Recycled water was added in the reporting requirements for water usage and figures prominently in the requirements for evaluation of alternative water supplies, when future projections predict the need for additional water supplies. Each urban water purveyor must coordinate the preparation of the water shortage contingency plan with other urban water purveyors in the area, to the extent practicable. Water suppliers must also describe their water DMMs that are being implemented or are scheduled for implementation. In addition to the UWMPA and its amendments, there are several other regulations that are related to the content of the UWMP. In summary, the key relevant regulations are:

- Assembly Bill 1420: Requires implementation of DMMs/Best Management Practices (BMPs) and meeting the 20-by-2020 targets to qualify for water management grants or loans.
- Assembly Bill 1465: Requires water suppliers to describe opportunities related to recycled water use and stormwater recapture to offset potable water use.
- SB 610 (Costa, 2001), and AB 901 (Daucher, 2001) (Effective beginning January 1, 2002): Require counties and cities to consider information relating to the availability of water to supply new large developments by mandating the preparation of further water supply planning (Daucher) and Water Supply Assessments (Costa).
- SB 221: A companion measure to SB 610, requires written verification of sufficient water supply for a residential subdivision for city or county approval.
- Senate Bill 1087: Requires water suppliers to report single-family residential (SFR) and multi-family residential (MFR) projected water use for lower income areas separately.
- SB 318 (Alpert, 2004): Requires the UWMP to describe the opportunities for development of desalinated water, including but not limited to, ocean water, brackish water, and groundwater, as long-term supply.
- AB 105 (Wiggins, 2004): Requires urban water suppliers to submit their UWMPs to the California State Library.
- Senate Bill x7-7: Requires development and use of new methodologies for reporting population growth estimates, base per capita use, and water conservation. This water bill also extended the 2010 UWMP submittal deadline for retail agencies to July 1, 2011. An agency can choose from four methods to establish its intermediate (2015) and year 2020 water conservation targets.

1.2.2 Previous Urban Water Management Plan

Pursuant to the UWMPA, the City previously prepared an UWMP in 2005, which was approved and adopted on November 14, 2006. Following adoption, the 2005 UWMP was submitted to and formally approved by DWR. This 2010 UWMP report serves as an update to the 2005 UWMP.

1.2.3 Resource Maximization/Import Minimization

Maintaining and delivering a high-quality, reliable water supply is a primary focus of the City. Although water is a renewable resource, it is limited. A long-term reliable supply of water is essential to protect the local and state economy. Water conservation in the City has multiple benefits – it can make more water available to improve American River flow conditions, it can improve water quality in the American and Sacramento Rivers and the Delta, it can improve the long-term reliability of the region's water supply, and it can lower the cost of water service to the City's customers.

The City is in the process of improving its water conservation programs and has already institutionalized water conservation by adopting several City ordinances and water conservation plans, becoming a signatory to the California Urban Water Conservation Council's (CUWCC) Memorandum of Understanding (MOU) in 1991, and approving the Water Forum Agreement in 2000. Continual support and enhancement of these programs is a primary objective for the City to ensure adequate water supply for the future. These actions have helped the City promote water conservation while managing increasing water demands due to extensive growth within the City's service area. Reducing the demand of current and future water customers, and assuring that all new system uses are efficient, will reduce the amount of water the City will need to meet potable water demands at buildout.

1.3 PLAN PREPARATION

This 2010 UWMP was prepared in compliance with the UWMPA (California Water Code §10610 et seq.) and the Water Conservation Bill of 2009 (SBX7-7). The 2010 UWMP was prepared by Carollo Engineers. Contact information for Carollo Engineers is included on the submittal letter to the City at the beginning of this document.

The information contained herein is based on City data, data included in available water supply planning documents, and review and update of data contained in the City's 2005 UWMP.

This section includes specific information on how the UWMP was prepared, coordinated with other agencies and the public, adopted, and implemented.

1.3.1 Coordination with Appropriate Agencies

The UWMPA requires that the UWMP identify the water agency's coordination with appropriate nearby agencies; see excerpt below.

10620 (d) (2) Each urban water supplier shall 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.

10621 (b). Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

10635 (b). The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

The City coordinated its efforts with the County of Sacramento (County), the Regional Water Authority (RWA), and other water purveyors in the County to ensure that the data and issues discussed in the plan are presented accurately. Table 1 summarizes how the UWMP preparation was coordinated with different agencies in area.

Table 1 Coordination with Appropriate Agencies (Guidebook Table 1)
2010 Urban Water Management Plan
City of Sacramento

Coordinating Agencies	Participated in Developing the Plan	Commented on the Draft	Attended Public Meetings	Was Contacted for Assistance	Was Sent a Copy of the Draft Plan	Was Sent a Notice of Intention to Adopt	Not Involved No Information
County of Sacramento					✓	✓	
Sacramento County Water Agency					✓	✓	
Regional Water Authority					✓	✓	
Sacramento Groundwater Authority					✓	✓	
Sacramento Central Groundwater Authority					✓	✓	
California American Water					✓	✓	
Sacramento Suburban Water District					✓	✓	
Sacramento Regional County Sanitation District					✓	✓	
Fruitridge Vista Water Company					✓	✓	
Delta Stewardship Council					✓		
Sacramento Water Conservation Advisory Group					✓		
General Public			✓				

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.

The City has worked with the cities of West Sacramento, Roseville, the County of Sacramento, and the East Bay Municipal Utilities District to develop a Sacramento River Watershed Sanitary Survey. This was prepared in accordance with the California Surface Water Treatment Rule that requires public water supply agencies using surface water sources to conduct a Watershed Sanitary Survey for their water source.

The City provided formal written notification to the County, the RWA, and the City's wholesale customers (California American Water Company and Sacramento Suburban Water District) regarding the preparation of this UWMP 2010 Update, Public Hearing, and distributed copies of the updated Draft UWMP for their review and comment. In accordance with the UWMPA, this notification was provided at least 60 days prior to the public hearing of the plan. The notice of intention to adopt correspondence is included in Appendix A.

Following plan adoption, a copy of this 2010 UWMP was provided to the County and the City's wholesale customers in accordance with the requirements of the UWMPA.

1.3.2 Public Participation

The UWMPA requires that the UWMP show the water agency solicited public participation; see excerpt below.

> *10642. Each urban water supplier shall 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. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published … After the hearing, the plan shall be adopted as prepared or as modified after the hearing.*

It is the City's policy to encourage public participation when adopting plans such as the UWMP. Therefore, the City sought public input while developing this updated UWMP. The updated Draft UWMP was available for public review from August 29, 2011, to September 12, 2011, prior to the scheduled Public Hearing, which was held on September 13, 2011. During this review period, the Draft UWMP was available at the City's offices during normal business hours and made available at the Central Sacramento public library (Located at 828 I Street, Sacramento, CA 95814). Notices for the Public Hearing were placed on August 23, 2011, and August 30, 2011, in a local newspaper (The Sacramento Bee) and posted at City offices. The hearing provided an opportunity for the City's customers, residents, and employees to learn and ask questions about the current and future water supply of the City. A copy of the notice for the review period and the Public Hearing are provided in Appendix A.

1.3.3 Plan Adoption, Submittal, and Implementation

The City prepared this 2010 UWMP during the spring and summer of 2011. The plan was adopted by its City Council on September 27, 2011 (see City Resolution in Appendix B). Within 30 days of submitting the UWMP to DWR, the adopted UWMP will be available for

public review and will be submitted to the California State Library and any City or County to which the City provides water.

1.3.3.1 Implementation

Review of the City's 2005 UWMP indicated that the implementation plan and schedule of action items by the City through 2009 were accomplished. Updated implementation plans and schedules for on-going and/or future actions are provided in this 2010 UWMP.

1.4 ABBREVIATIONS AND DEFINITIONS

To conserve space and improve readability, the following abbreviations are used in this report. The abbreviations are spelled out in the text the first time the phrase or title is used in each chapter and subsequently identified by abbreviation only.

AF	acre-feet
AFY	acre-feet per year
BMPs	Best Management Practices
BuRec	United States Bureau of Reclamation
CDPH	California Department of Public Health
cfs	Cubic feet per second
CII	Commercial, Industrial, Institutional
CIMIS	California Irrigation Management Information System
City	City of Sacramento
County	County of Sacramento
CREEC	California Regional Environmental Education Community
CSS	Combined Sewer System
CSCGWMP	Central Sacramento County Groundwater Management Plan
CUWCC	California Urban Water Conservation Council
CWTP	Combined Wastewater Treatment Plant
DOF	State of California Department of Finance
DOU	City of Sacramento Department of Utilities
DMMs	Demand Management Measures

DWR	California Department of Water Resources
ETo	Evapotranspiration
^{o}F	Degrees Fahrenheit
FY	Fiscal year
FWTP	E.A. Fairbairn Water Treatment Plant
GIS	Geographic Information System
gpcd	Gallons per capita per day
GWMP	Groundwater Management Plan
MFR	Multi-Family Residential
MG	Million gallons
mg/L	Milligrams per liter
mgd	Million gallons per day
MOU	Memorandum of Understanding
MSL	Mean sea level
NIE	Newspaper in Education Program
POU	Place of Use
PSA	Purveyor Specific Agreement
RHNP	Regional Housing Needs Plan
RWA	Regional Water Authority
RWEP	RWA Water Efficiency Program
RWQCB	Regional Water Quality Control Board
SACOG	Sacramento Area Council of Governments
SAFCA	Sacramento Area Flood Control Agency
SASD	Sacramento Area Sewer District
SAWWA	Sacramento Area Water Works Association
SCGA	Sacramento Central Groundwater Authority
SCWA	Sacramento County Water Agency

SFR	Single-Family Residential
SGA	Sacramento Groundwater Authority
SMUD	Sacramento Municipal Utility District
SMWA	Sacramento Metropolitan Water Authority
SRCSD	Sacramento Regional County Sanitation District
SRWTP	Sacramento River Water Treatment Plant
SRWWTP	Sacramento Regional Wastewater Treatment Plant
SSS	Separated Sewer System
SSWD	Sacramento Suburban Water District
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
UARP	Upper American River Project
UWMP	Urban Water Management Plan
UWMPA	Urban Water Management Planning Act
WFA	Water Forum Agreement
WTP	Water Treatment Plant

Chapter 2

SYSTEM DESCRIPTION

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) include a description of the water purveyor's service area and various aspects of the area served including climate, population, and other demographic factors; see excerpt below.

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631. (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.*

2.1 SERVICE AREA PHYSICAL DESCRIPTION

The City of Sacramento (City) is located in the Central Valley of California, in Sacramento County (County). The City is also located at the confluence of the Sacramento and American Rivers. The Sacramento River flows south from Lake Shasta, while the American River flows west from the Sierra Nevada Mountains.

The City limits span the area north of the City of Elk Grove, west of the City of Rancho Cordova, east of the Sacramento River, and south of Placer and Sutter Counties (Figure 1). Covering approximately 63,182 acres, the City's retail water service area boundary is largely contiguous with the City limits as shown in Figure 2, with some exceptions. Sacramento Suburban Water District (SSWD) serves a small portion of City residents and businesses on the eastern portion of the City near the Business 80 freeway, and the City serves a number of customers in the unincorporated portion of the County adjacent to the Fruitridge Vista Water Company service area. The population within both of these areas is roughly equivalent.

The City has extensive surface water entitlements, consisting of five appropriative water right permits issued by the State Water Resources Control Board (SWRCB), pre-1914 rights and a water rights settlement contract with the Bureau of Reclamation (BuRec). These water entitlements allow the City to divert water from the Sacramento and American Rivers.

The City's authorized Places of Use (POU) for the Sacramento River and American River water supplies are shown in Figure 2. The POU for the American River supply covers approximately 96,685 acres and includes the City limits, as well as portions of service areas of other water purveyors. The POU for the Sacramento River supply includes all the land within the City limits.

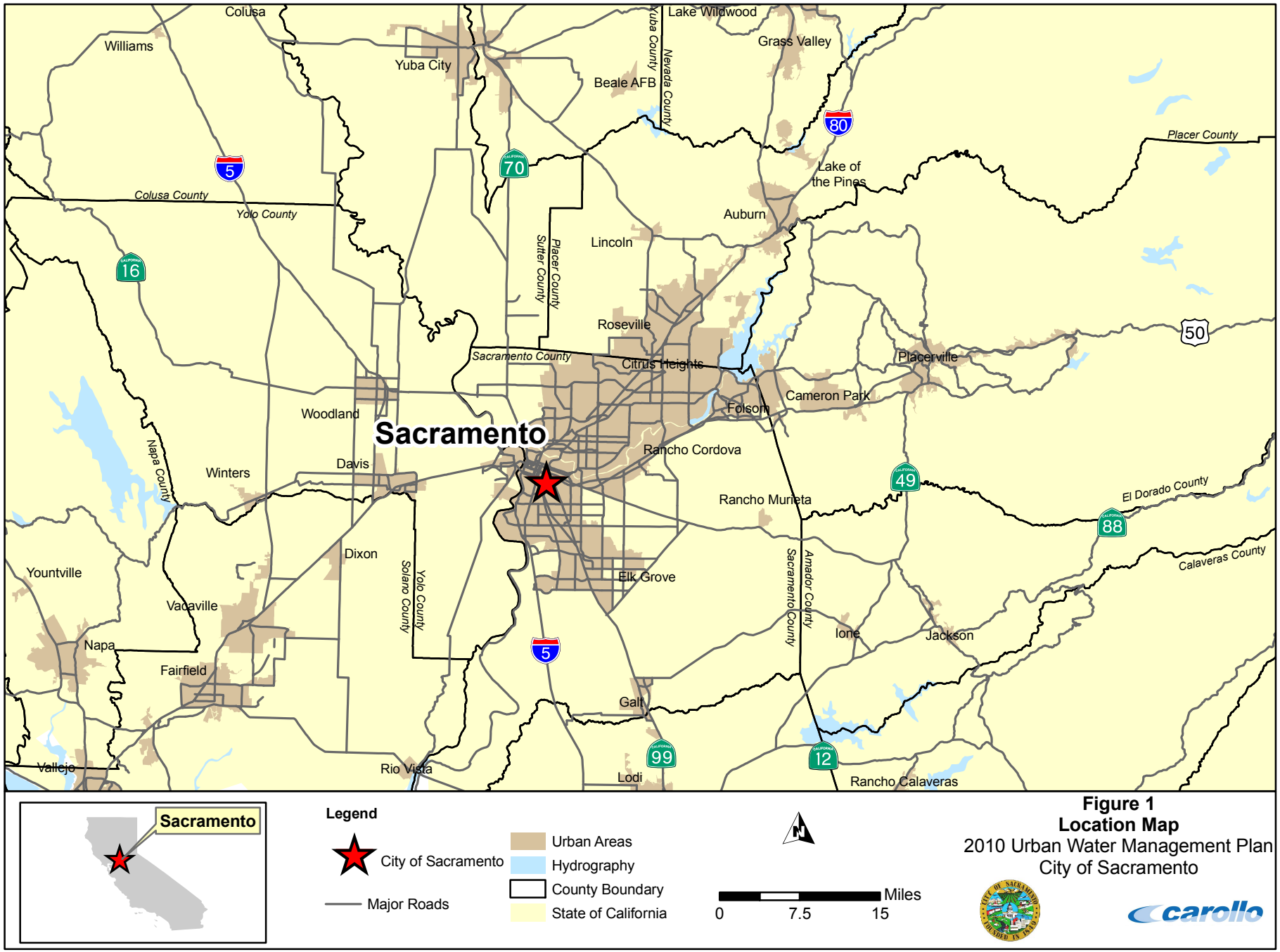

Figure 1
Location Map
2010 Urban Water Management Plan
City of Sacramento

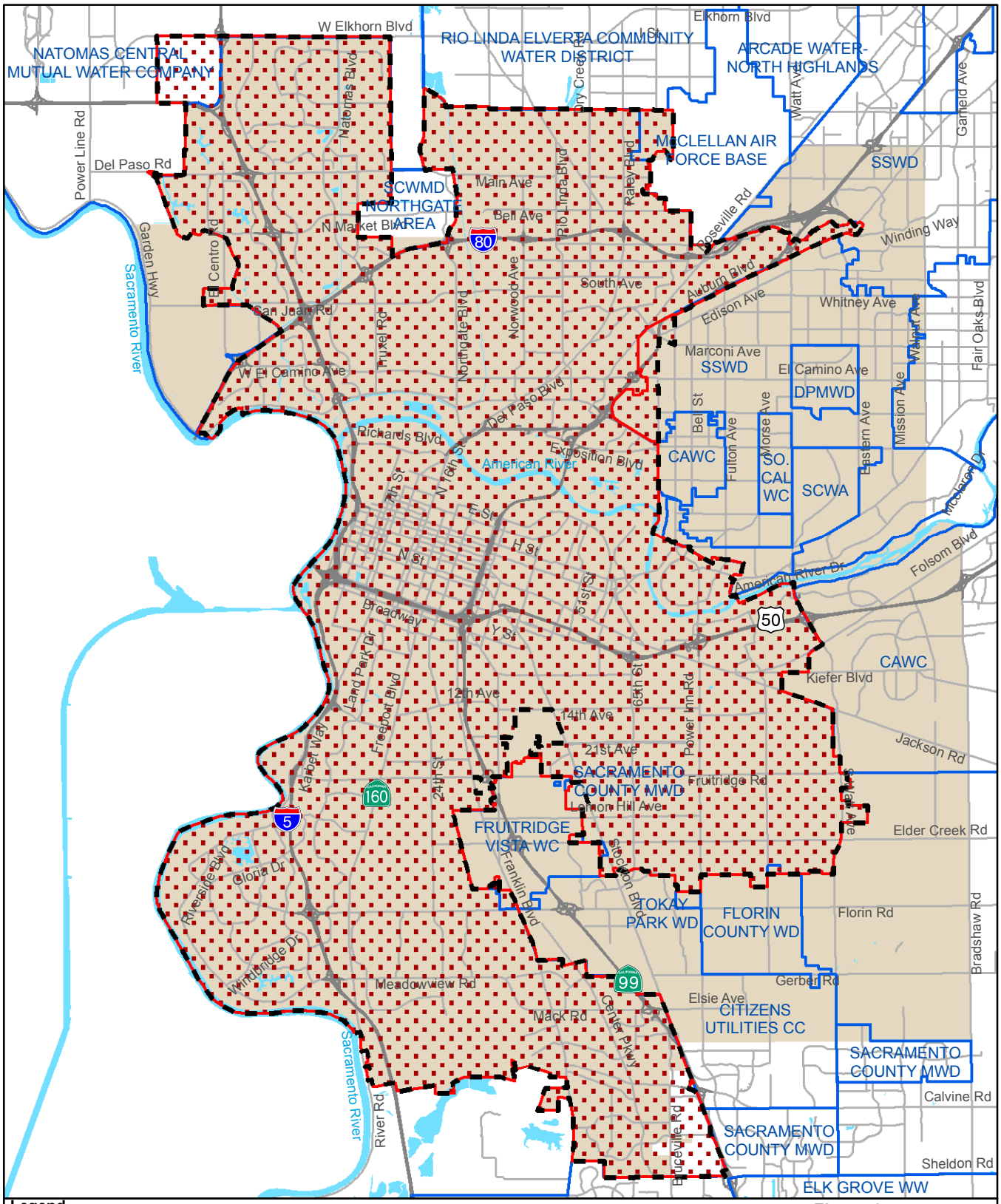

Figure 2
City Service Area, Limits, and Places of Use
2010 Urban Water Management Plan
City of Sacramento

The City is both a water retailer and a water wholesaler/wheeler. The City's wholesale and wheeling deliveries are detailed in Chapter 3.

Ground surface elevations generally range from about 5 feet above sea level east of the Sacramento River to approximately 75 feet above sea level in the northeast part of the service area. The City is within the reclaimed flood plain of the Sacramento River.

2.1.1 Description of Transmission, Treatment, and Distribution Facilities

The City's Department of Utilities (DOU) is responsible for providing and maintaining water, sewer collection, storm drainage, and flood control services along with solid waste removal for residents and businesses within the City Limits.

The City's existing distribution system consists of two water supply and water treatment plants (WTPs), two pressure zones, groundwater wells, storage tanks, pumping facilities, and distribution/transmission pipelines. Additionally, a separate distribution system serves the automobile dealerships near the Haggin Oaks Golf Complex area. Figure 3 shows the location of the City's system components.

2.1.1.1 Surface Water Treatment

The City treats surface water diverted from the Sacramento and American Rivers through the Sacramento River Water Treatment Plant (SRWTP) and the E.A. Fairbairn Water Treatment Plant (FWTP), respectively.

2.1.1.1.1 *Sacramento River Water Treatment Plant*

The SRWTP began operation in 1924 with an initial capacity of 32 million gallons per day (mgd), and treats water diverted approximately one-half mile downstream of the American River confluence. A new intake structure, located approximately 700 feet downstream of the old intake structure, was completed in 2003. Other expansions and modifications completed by the City since the 1920's have increased the plant's design capacity to 160 mgd. Currently, due to the conditions of the existing facilities and hydraulic constraints, the SRWTP's reliable capacity is limited to 135 mgd. Design is underway for a project to rehabilitate the older facilities at the SRWTP to bring the capacity back to 160 mgd.

The SRWTP currently has three treatment trains consisting of disinfection, grit removal, coagulation, flocculation, sedimentation, and filtration; all three-process trains are recombined after filtration before post-chlorination.

2.1.1.1.2 *Fairbairn Water Treatment Plant*

The FWTP is located approximately seven miles upstream of the American and Sacramento River confluence. The FWTP began operation in 1964 and has a current design capacity of 200 mgd following the expansion completed in late 2005. Currently, the California Department of Public Health (CDPH) has permitted a capacity of 160 mgd. However, the amount of water diverted is further limited by the Hodge Flow

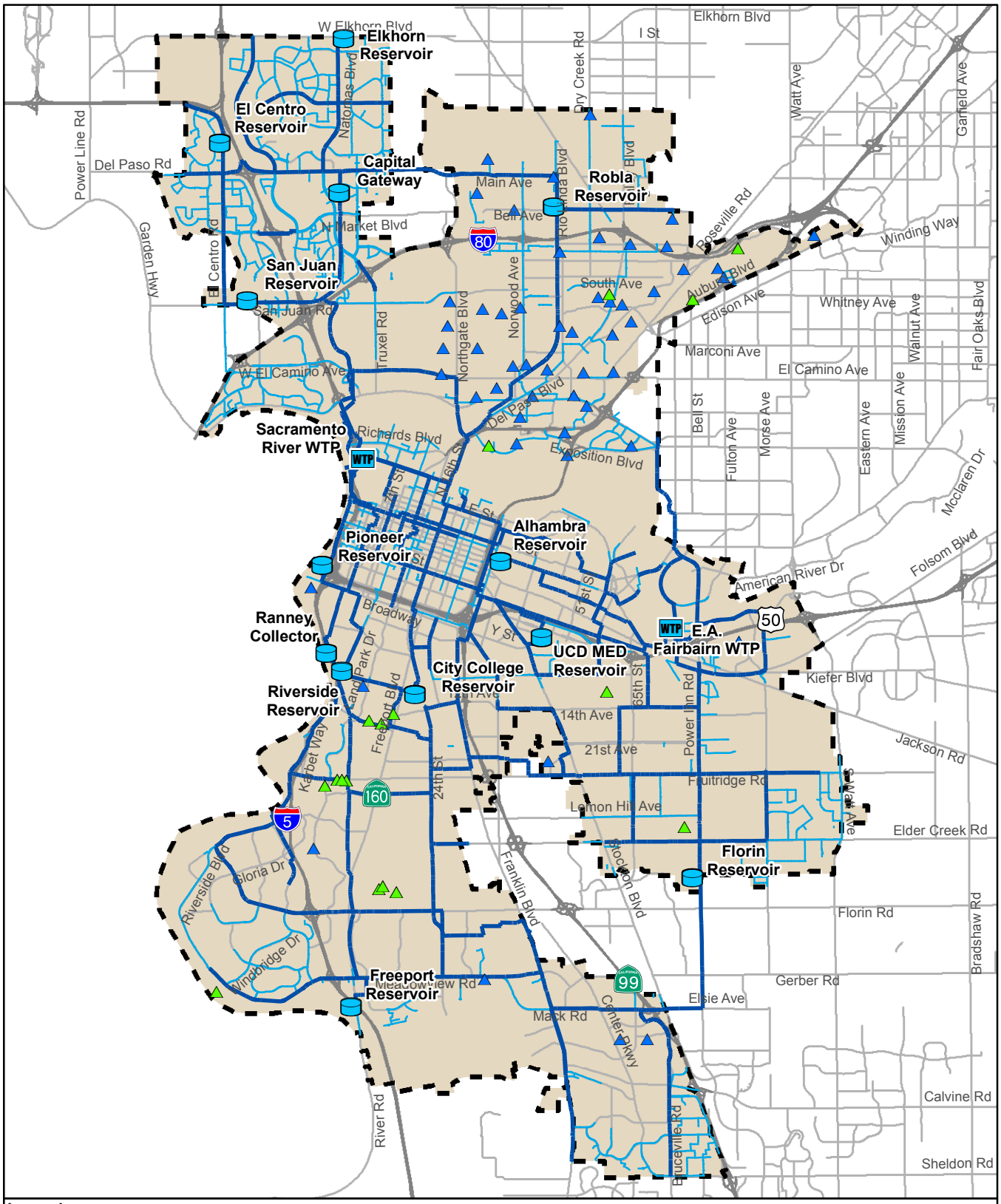

Figure 3
City Water Treatment and Distribution Components
2010 Urban Water Management Plan
City of Sacramento

Criteria (refer to Chapter 4). Generally, during the time of peak demand, most often in June, July, or August, the Hodge Flow Criteria could limit the diversion rate at the FWTP to 100 mgd. Treatment consists of disinfection, grit removal, coagulation, flocculation, sedimentation, and filtration. Filtered water is recombined before post-chlorination.

2.1.1.2 Groundwater Wells

The City currently operates 27 municipal groundwater supply wells; 25 wells are located in the northern portion of the City, north of the American River, while the remaining 2 are located south of the American River. Fourteen additional wells are operated separately from the drinking water system and are used to meet irrigation demands of City parks. The total pumping capacity of the City's municipal supply wells is approximately 20.7 mgd, assuming 90 percent of the production capacity is available.

2.1.1.3 Distribution and Storage Facilities

The City's existing distribution system, including storage facilities, is shown in Figure 3.

2.1.1.3.1 *Pressure Zones*

High service pumps at each of the WTPs pump water directly into the distribution system creating a pressure zone that encompasses the majority of the City. The Bell Avenue Booster Pump Station is an in-system booster pump station that creates a small pressure zone in the northeastern part of the City.

2.1.1.3.2 *Storage Facilities*

The City currently has 16 storage facilities: 11 distributed storage tanks are located throughout the City, while 5 clearwells are located at the WTPs (2 at FWTP and 3 at SRWTP). Ten of the storage tanks located throughout the City have a capacity of 3 million gallons (MG) each, while one storage tank (Florin Reservoir) has a capacity of 15 MG, for a cumulative storage capacity of 45 MG. The combined plant clearwells have a nominal capacity of approximately 45 MG and a usable capacity of 32 MG. Figure 3 shows the location of the storage tanks located throughout the City.

2.1.1.3.3 *Pumping Facilities*

The City currently operates high lift pump stations at both the SRWTP and the FWTP. The City also has an additional ten pump stations located at each storage tank within the distribution system, except for the Freeport Storage Tank.

2.1.1.3.4 *Transmission and Distribution Mains*

The City maintains just over 1,760 miles of transmission and distribution system mains ranging in size from 4 to 60 inches in diameter; only 154 miles consists of pipe that are 14 inches in diameter or larger.

2.1.2 Climate

The City's climate is characterized by hot dry summers and cool moist winters with moderate rainfall. The dry hot summers result in heavy irrigation water use while the winter demands are mostly for domestic uses.

Rainfall occurs generally from October to April, averaging 20.0 inches a year, but varying widely from year to year. Monthly precipitation has been as high as 10.06 inches (February 2000) and as low as 0.0 inches.

Temperatures range from lows in the 20's in the winter to above 100 degrees Fahrenheit in the summer and fall, and the relative humidity ranges from 41 to 92 percent. Evapotranspiration (ETo) values, which serve as indicators of how much water is required to maintain healthy agriculture and landscaping, range from 0.94 inches during December to 8.02 inches in June.

The climate values shown in Table 2, are based on data for Station 131 obtained from the California Irrigation Management Information System (CIMIS) website.

Table 2 Climate Characteristics
2010 Urban Water Management Plan
City of Sacramento

Month	Standard Monthly Average ETo[1] (inches)	Monthly Average Rainfall (inches)	Monthly Average Temp (°F)		
			Maximum	Minimum	Average
January	1.08	3.43	56.04	39.66	47.38
February	1.70	3.71	60.86	41.81	50.81
March	3.46	2.19	67.11	43.75	55.20
April	4.41	1.96	70.28	46.04	57.89
May	6.50	0.83	80.48	51.67	66.06
June	7.55	0.03	87.60	57.05	72.06
July	8.02	0.00	93.54	60.44	76.43
August	7.12	0.00	91.76	59.19	74.65
September	5.25	0.06	87.43	56.59	71.01
October	3.35	1.26	76.43	49.83	62.25
November	1.63	1.74	64.25	42.95	52.81
December	0.94	4.78	56.00	39.88	47.54

Notes:
1. Source: CIMIS Station 131. Represents monthly average from January 2000 to December 2010.

2.2 SERVICE AREA POPULATION

This section summarizes historical, current, and projected population trends in the City. Population projections are essential to the planning process and form the basis for most planning decisions, yet projecting future growth is far from an exact science given the complex set of variables that can affect the rate of growth. Typically, projections are developed by taking past patterns and combining them with assumptions regarding the future to obtain an estimate of future growth rates. These projections serve to provide the City insight on the type and quantity of future growth as well as guidance regarding future planning activities; therefore, such planning activities can only be as effective as the ability of local officials to anticipate population growth.

The City was founded in 1849 with a population of 9,087 people, and in 1920, voters adopted a City Charter (municipal constitution) and a City Council-City Manager form of government; this form of government is still in use today. The City's population grew slowly between the end of the Gold Rush period and World War II; however, annual annexations along with expansions of the aerospace industry and military installations caused the City's population to grow significantly from shortly before World War II through today. Over the past twenty years, the City's population has increased from 369,365 in 1990 to 466,488 in 2010. Table 3 contains the current and projected populations for the City from 2010 to 2035.

Table 3 Population - Current and Projected (Guidebook Table 2)
2010 Urban Water Management Plan
City of Sacramento

	Years						
	2010	**2015**	**2020**	**2025**	**2030**	**2035**	**Data Source**
Service Area Population(1)	466,488	510,086	553,724	597,362	641,000	685,000	Community Development Dept(2)

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare of 2010 Urban Water Management Plan" by DWR.

1. Service area population is defined as the population receiving retail water service. Although a small portion of the City population receives water from the SSWD it is nearly equally offset by the County population in a portion of Fruitridge Area that receives water from the City.
2. 2010 population from the Department of Finance. Geographic information system (GIS) data from the City's Community Development Department provided population estimates for 2030 and 2050. Population values for 2015, 2020, 2025, and 2035 were interpolated from years 2010 and 2030 and 2030 to 2050.

The historical data shown in Figure 4 are from the California Department of Finance (DOF) (1982-1999 and 2001-2010), the 2000 United States Census (2000), and Geographic information system (GIS) data from the City's Community Development Department provided population estimates for 2030 and 2050. Population values for 2015, 2020, 2025, and 2035 were interpolated from years 2010 and 2030, and 2030 to 2050.

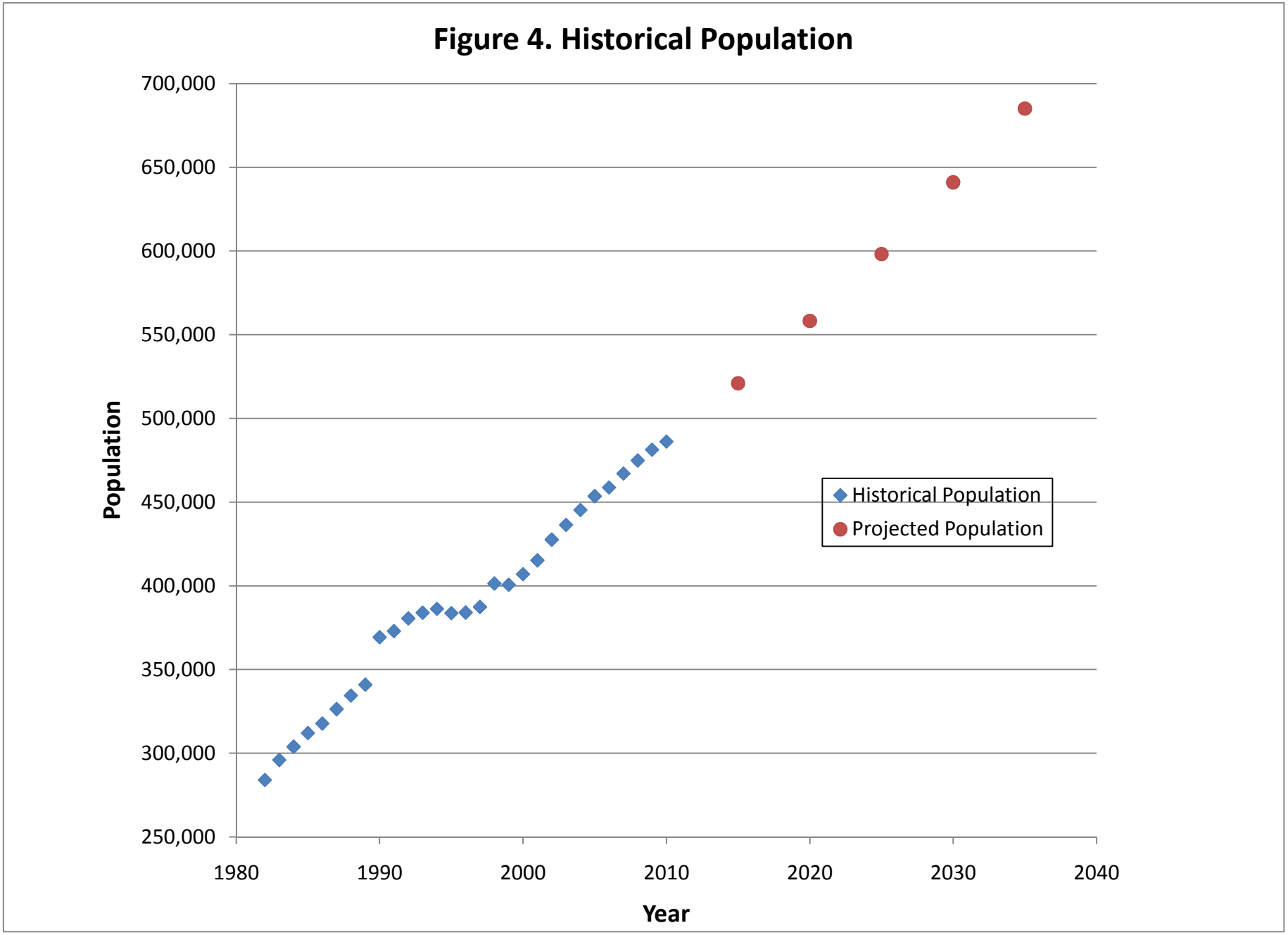
Figure 4. Historical Population
700,000
650,000
600,000
550,000
500,000
450,000
400,000
350,000
300,000
250,000
Population
1980
1990
2000
2010
2020
2030
2040
Year
Historical Population
Projected Population

2.2.1 Other Demographic Factors

Other demographics information for the City is listed in Table 4. This information is used by the City to develop targets for some of the Demand Management Measures (DMMs).

Table 4 Other City Demographics
2010 Urban Water Management Plan
City of Sacramento

Demographic	Single-Family	Multi-Family
2005 housing stock (units-rounded)	119,000	60,000
Average units per connection	1	6

Notes: Source: City of Sacramento General Plan Master EIR and 2010 Interim Water Conservation Plan.

The population of the City is racially and ethnically diverse, represented by a mix of White, African-American, Asian, and Latino people. Approximately 45 percent of the City's population is estimated to be low or very low income compared to the estimated countywide median income. Since 1990, a total of 72,000 jobs were added in Sacramento, and approximately 136,000 jobs are forecast to be added by 2030. Government and service jobs are the most common in the City, together making up 75 percent of the City's job base.

The City's average household size is larger for owner-occupied than rental units, and has increased steadily since 1990. The population that is of retirement age (over 65) has increased since 1990, while the population of young children (under 10) has shown a decline. Adolescents (10-19), young adults (20-29), and older adults (50-59) are the fastest growing age groups in the City.

The City experienced a trend toward rising household sizes in the 1990s. Sacramento's average household size in 1990 was 2.50, which increased to 2.57 in 2000. This trend may reflect young people living at home longer or moving back in with their parents, shared housing for affordability, and new populations with larger extended families. In 2005, the City's household size has shown a continued growth trend and increased to 2.69 persons, almost matching the County at 2.70 persons per household.

The number of jobs is within the City is projected to increase from 339,000 jobs in 2005 to 475,000 by 2030 (2030 General Plan). Likewise, the number of residential units within the City is projected to increase from 179,000 units in 2005 to 276,000 units in 2030 (2030 General Plan).

The number of accounts to which the City supplies potable water has increased from 135,636 in fiscal year (FY) 2008 to 136,713 in FY 2010. Most of the new accounts in 2010 were multi-family accounts. The potable water customers have been primarily residential, with about 92 percent of the City's customers being residential; about 7 percent commercial/institutional, and 1 percent irrigation (2010 Meter Records).

2.3 PLANNED DEVELOPMENT

The California Water Code requires public water systems, as part of the Water Supply Assessment process required by the California Environmental Quality Act (CEQA), to determine whether the water demand associated with a major development (or "project") is included in the agency's most recently adopted UWMP. Inclusion of the water demand associated with proposed development projects in the UWMP greatly simplifies the Water Supply Assessment process, because the UWMP can be referenced directly in the Water Supply Assessment. Therefore, it benefits the City to incorporate any major developments in the UWMP that are considered "projects" by the California Water Code, as defined below

> *10910. (a) Any city or county that determines that a project, as defined in section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.*
>
> *10912. For the purpose of this part, the following terms have the following meanings:*
>
> *10912 (a) "Project" means any of the following:*
> *(1) A proposed residential development of more than 500 dwelling units.*
> *(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.*
> *(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.*
> *(4) A proposed hotel or motel, or both, having more than 500 rooms.*
> *(5) A proposed industrial, manufacturing or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.*
> *(6) A mixed-use project that includes one or more of the projects specified in this subdivision.*
> *(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.*

In the City's 2030 General Plan, future planned development at buildout (2030) is anticipated to be a mix of infill of vacant properties, and reuse and redevelopment of existing economically under-performing or obsolete developments. Most future residential development is expected to be in multi-family units. The future water demands discussed and accounted for in this UWMP include the projected water demands associated with all of the development projected and analyzed in the 2030 General Plan and 2030 General Plan Master Environmental Impact Report.

SYSTEM DEMANDS

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) identify the quantity of water supplied to the agency's customers including a breakdown by user classification; see excerpt below.

> *10631 (e) (1) Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors including, but not necessarily limited to, all of the- following uses:*
>
> *(A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; and (I) Agricultural.*
>
> *(2) The water use projections shall be in the same 5-year increments to 20 years or as far as data is available.*

This section describes the baseline (base daily per capita daily) water use, the interim and urban water use targets, water system demands, water demand projections, and water use reduction plan.

3.1 BASELINES AND TARGETS

The UWMPA requires that the UWMP identify the baseline water demand, urban water use target, and interim urban water use target for the City of Sacramento (City); see excerpt below.

> *10608.20 (e) (1) An urban retail water supplier shall include in its urban water management plan…due in 2010 the 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.*

The base daily per capita use is the first step in determining the City's various urban water use targets over the 20-year planning horizon. The current per capita use sets the "baseline" on which the urban and interim water use targets are determined. These targets are necessary to judge compliance with the 2020 use reductions set forth in the Water Conservation Bill of 2009.

3.1.1 Baseline

The first step in developing the baseline water use for the City is determining the applicable range and years for which the baseline average will be calculated. The UWMPA stipulates an agency may use either a 10 or 15-year average to determine their baseline. If 20 percent of total water deliveries in 2008 were from recycled water, then the agency can use a 15-year average baseline. Since the City had no recycled water deliveries in 2008, a 10-year average was used for baseline determination. In addition to the 10-year baseline,

a 5-year baseline is also calculated, which will be used to establish the minimum criteria for the City's use reduction targets. A summary of the 2008 total and recycled water deliveries, 10-year baseline range, and 5-year baseline range is included in Table 5.

Table 5	**Base Period Ranges (Guidebook Table 13) 2010 Urban Water Management Plan City of Sacramento**		
Base	**Parameter**	**Value**	**Units**
10 to 15-Year Base Period	2008 total water deliveries	132,451	AFY
	2008 total volume of delivered recycled water	0	AFY
	2008 recycled water as a percent of total deliveries	0	Percent
	Number of years in base period	10	Years
	Year beginning base period range	1996	
	Year ending base period range	2005	
5-Year Base Period	Number of years in base period	5	Years
	Year beginning base period range	2003	
	Year ending base period range	2007	
Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by Department of Water Resources.			

The data used to calculate the 10-year baseline is included in Table 6. The UWMPA requires a continuous range, with the end of the range ending between December 31, 2004 and December 31, 2010, be used for baseline determination.

Table 6	Base Daily Per Capita Water Use – 10-Year Range (Guidebook Table 14) 2010 Urban Water Management Plan City of Sacramento			
Base Period Year		**Distribution System Population**	**Daily System Gross Water Use (mgd)**	**Annual Daily Per Capita Water Use (gpcd)**
Sequence	**Calendar Year**			
1	1996	384,090	107.5	280
2	1997	387,440	112.3	290
3	1998	401,411	103.4	258
4	1999	400,665	117.3	293
5	2000	407,018	117.1	288
6	2001	415,281	120.2	290
7	2002	427,637	119.7	280
8	2003	436,470	121.4	278
9	2004	445,353	124.6	280
10	2005	466,488	117.5	259
Base Daily Per Capita Water Use				**279**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
Source: City records and Department of Finance.

The data used to calculate the 5-year baseline is included in Table 7. The UWMPA requires a continuous range, with the end of the range ending between December 31, 2007 and December 31, 2010, be used for baseline determination.

Table 7	Base Daily Per Capita Water Use – 5-Year Range (Guidebook Table 15) 2010 Urban Water Management Plan City of Sacramento			
Base Period Year		**Distribution System Population**	**Daily System Gross Water Use (mgd)**	**Annual Daily Per Capita Water Use (gpcd)**
Sequence	**Calendar Year**			
1	2003	436,470	121.4	278
2	2004	445,353	124.6	280
3	2005	466,488	117.5	259
4	2006	458,773	116.9	255
5	2007	467,120	123.8	265
Base Daily Per Capita Water Use				**267**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
Source: City records and Department of Finance.

3.1.2 Targets

The UWMPA requires urban water suppliers to determine the interim and urban water use targets for 2015 and 2020, respectively. Four target methods have been developed by legislation, and identify the specific steps water suppliers shall follow to establish these targets. The City chose Method 1, which requires an urban water supplier to first determine the base daily per capita use. In order to determine the target using Method 1, 80 percent of the base daily per capita use is calculated. Based on the daily per capita use of 279 gallons per capita per day (gpcd) determined previously (Table 6), the target use for Method 1 is 223 gpcd.

3.1.2.1 Minimum Water Use Reduction Requirement

The final step in determining the applicability of the water use target for the City is to confirm that the water use targets meet the minimum reduction requirements as defined by DWR. To confirm the target, the 5-year average baseline (267 gpcd) previously determined (Table 7) is used. In order to meet the minimum criteria, the chosen 2020 water use target must fall below 95 percent of the 5-year baseline, which for the City is 254 gpcd.

3.2 SUMMARY OF BASELINES AND TARGETS

Based on the water use targets calculated above, the City's water use target for 2020 is 223 gpcd. Based on the 10-year baseline of 279 gpcd, the 2015 interim water use target is 256 gpcd. This 2020 target was determined using Method 1, which corresponds to 80 percent of the 10-year baseline. According to the DWR guidelines, this target is valid since

it is less than the target confirmation criteria of 254 gpcd. A summary of the various baselines, use target determined based on various methodologies, and the final use target and interim target are summarized in Table 8.

Table 8 Baseline and Targets Summary
2010 Urban Water Management Plan
City of Sacramento

Baselines[1] (gpcd)		Target Confirmation[2] (gpcd)	Target[3] (gpcd)	Interim Target[4] (gpcd)
10-Year	**5-Year**	254	223	256
279	267			

Notes:
1. Refer to Tables 5, 6, and 7 for source of data.
2. Defined as 95 percent of the 5-year base daily per capita water use.
3. Urban Water Use Target determined using Method 1.
4. Interim Urban Water Use Target defined as the average of the 10-year base per capita water use and Urban Water Use Target.

3.3 WATER DEMANDS

Water demands served by the City are primarily residential, with commercial, institutional, and landscape irrigation. In 2010, the City maintained approximately 53,296 water meters, which represents nearly 40 percent of the total connections in the service area. The City classified these meters into the following categories: 43,148 single-family residential, 2,113 multi-family residential, 5,975 commercial, 642 institutional, and 1,320 landscape irrigation.

Water demands have been decreasing in the City since the year 2000, except for recent dramatic increases observed since 2008. There are a number of reasons for the decreasing trend in water demands in Sacramento, including:

- The City's increased water conservation efforts, including the revitalization of the City's Water Conservation Ordinance;
- Newer buildings were constructed with water conserving fixtures;
- Recession impacts (increased vacancies and reduced economic activity);
- Replacement of dilapidated water pipelines and subsequent reduction of leaks;
- Increased public awareness of drought conditions and the reduced supplies in the Sacramento-San Joaquin Delta;
- Meter retrofit program, making customers with meters more conscious of the water use through economic incentives..

The past and current water system demands by category, as well as the projected water use over the planning horizon of the 2010 UWMP, are provided in Tables 9 through 13. The projected annual water per capita demands for year 2015 were developed by multiplying the projected 2015 population by the City's 2015 interim water use target (256 gpcd). The projected annual per capita water demands for year 2020 and beyond were developed by multiplying the projected population by the City's 2020 water use target (223 gpcd).

Table 9 Retail Water Deliveries – Actual 2005 (Guidebook Table 3)
2010 Urban Water Management Plan
City of Sacramento

	2005				
	Metered(1)		**Not Metered(1)**		**Total**
Water Use Sectors	**# of accounts**	**Deliveries AFY**	**# of accounts**	**Deliveries AFY**	**Deliveries AFY**
Single Family Residential	15,994	5,271	113,850	37,518	42,789
Multi-Family Residential	466	1,024	10,800	23,726	24,750
Commercial	5,034	12,272	10,078	24,569	40,247
Industrial(2)	0	0			
Institutional	470	3,253			
Other	44	153			
Landscape Irrigation	1,147	0	1,619	0	0
Agriculture	0	0	0	0	0
Total	**23,155**	**21,972**	**136,347**	**85,814**	**107,786**
Total Water Production including Wholesale and Wheeling Deliveries					**131,564**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
-- = Information not available
1. Meter information no longer available to estimate demands. Demands estimation was made using 2010 unit demands from metered information.
2. The City does not track industrial water use sectors. Industrial uses of water are reported in the commercial water use sector.

Table 10	Retail Water Deliveries – Actual 2010 (Guidebook Table 4) 2010 Urban Water Management Plan City of Sacramento				
	2010				
	Metered		Not Metered[1]		Total
Water Use Sectors	**# of accounts**	**Deliveries AFY**	**# of accounts**	**Deliveries AFY**	**Deliveries AFY**
Single Family Residential	43,148[2]	14,219	70,227	23,143	37,362
Multi-Family Residential	2,113	4,642	7,752	17,030	21,672
Commercial	5,958	14,525	2,049	4,995	19,520
Industrial[3]	0	0	0	0	0
Institutional	642	4,443	320	2,215	6,658
Landscape Irrigation	1,320	4,579	57	198	4,777
Agriculture	0	0	0	0	0
Other	98	1,845	12	226	2,071
Total	**53,279 [3]**	**44,254**	**80,417**	**47,806**	**92,060**
Total Water Production including Wholesale and Wheeling Deliveries					**108,276**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
-- = Information not available

1. Deliveries for non-metered are rough estimates. Estimates were made by calculating a ratio of proportions of metered to non-metered accounts (I. e. Non Metered Deliveries = 14,219 AFY x 70,030 metered accounts / 43,148 metered accounts = 37,362 AFY)
2. At the end of 2010, 43,148 SFRs had meters installed, but the number of SFRs billed on a metered rate is less. The City is in the process of installing meters on non-metered services, those SFRs will be billed on a metered basis after meter installation projects are accepted from the installation contractors, and a one-year comparative billing period occurs.
3. The City does not track industrial water use sectors. Industrial uses of water are reported in the commercial water use sector.

Table 11	Retail Water Deliveries – Projected 2015 (Guidebook Table 5) 2010 Urban Water Management Plan City of Sacramento				
	2015				
	Metered		**Not Metered**		**Total**
Water Use Sectors	**# of accounts**	**Deliveries AFY**	**# of accounts**	**Deliveries AFY**	**Deliveries AFY**
Single Family Residential	83,540	40,700	38,335	18,676	59,375
Multi-Family Residential	8,807	21,704	5,168	12,737	34,441
Commercial	7,463	26,222	1,366	4,800	31,021
Industrial	0	0	0	0	0
Institutional	845	8,451	213	2,130	10,581
Landscape Irrigation	1,477	7,401	38	191	7,592
Agriculture	0	0	0	0	0
Other	113	3,074	8	218	3,291
Total	**102,245**	**107,552**	**45,128**	**38,750**	**146,300**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.

Table 12	Retail Water Deliveries – Projected 2020 (Guidebook Table 6) 2010 Urban Water Management Plan City of Sacramento				
	2020				
	Metered		Not Metered		Total
Water Use Sectors	**# of accounts**	**Deliveries AFY**	**# of accounts**	**Deliveries AFY**	**Deliveries AFY**
Single Family Residential	108,207	47,682	19,168	8,447	56,129
Multi-Family Residential	15,501	27,906	2,584	4,652	32,558
Commercial	8,951	27,246	683	2,079	29,325
Industrial	0	0	0	0	0
Institutional	1,048	9,076	107	927	10,002
Landscape Irrigation	1,634	7,095	19	82	7,177
Agriculture	0	0	0	0	0
Other	128	3,017	4	94	3,111
Total	**135,469**	**122,022**	**22,565**	**16,280**	**138,300**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.

Table 13	Retail Water Deliveries – Projected 2025, 2030, 2035 (Guidebook Table 7) 2010 Urban Water Management Plan City of Sacramento					
	2025		**2030**		**2035**	
	Metered		**Metered**		**Metered**	
Water Use Sectors	**# of accounts**	**Deliveries AFY**	**# of accounts**	**Deliveries AFY**	**# of accounts**	**Deliveries AFY**
Single Family Residential	132,875	60,552	138,375	64,976	143,875	69,441
Multi-Family Residential	22,195	35,124	26,305	37,690	30,415	40,280
Commercial	10,438	31,636	11,243	33,948	12,048	36,280
Industrial	0	0	0	0	0	0
Institutional	1,251	10,791	1,348	11,579	1,444	12,374
Landscape Irrigation	1,791	7,742	1,929	8,308	2,067	8,878
Agriculture	0	0	0	0	0	0
Other	143	3,355	154	3,600	165	3,847
Total	**168,693**	**149,200**	**179,354**	**160,100**	**190,014**	**171,100**
Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.						

3.3.1 Sales to Other Agencies

The City's water rights and water supply facilities provide regional benefits by making water available on a wholesale (City water) and wheeling (non-City water) basis for the benefit of areas adjacent to the City.

The City wholesales water to Sacramento Suburban Water District (SSWD), Fruitridge Vista Water Company, and the California American Water Company, wheels water to the Sacramento County Water Agency Zone 40, and wholesale/wheels water to the Sacramento International Airport and Metro Air Park.

The wholesale agreement allows California American Water Company to receive a maximum annual delivery of 4,831 acre-feet (AF). Water delivered to the California American Water Company is a mixture of groundwater and surface water.

Sacramento County Water Agency Zone 40 obtains water diverted under Sacramento County's entitlements at the City's Sacramento River Water Treatment Plant (SRWTP) and wheeled through the City system from a connection along Franklin Boulevard. The agreement between Zone 40 and the City allows Zone 40 to receive a maximum annual delivery of 12,350 AF.

Sacramento International Airport and Metro Air Park receive a maximum annual delivery of 1,420 and 233 AF, respectively. Fruitridge Vista Water Company receives a maximum annual delivery of 300 AF.

Supplies to SSWD vary depending on lower American River flow conditions – no water is delivered when flows fall below the "Hodge Flow" levels. The average annual delivery during a wet year is 9,300 AF, average year is 3,500 AF, drier year is 1,400 AF, and driest year is 0 AF.

In the future, the City may expand its role as a wholesaler/wheeler for the benefit of other water purveyors and their customers in the region. Figure 5 presents the City's existing and potential wholesale and wheeling customers.

This Urban Water Management Plan is presenting three different scenarios for water sales to other agencies: 1) obligated sales to other water agencies, 2) likely sales to other water agencies, and 3) maximum projected sales to other water agencies. These different scenarios are further defined as follows:

1. **Likely Sales.** Water Agencies that are planning to purchase water from the City are included under this scenario. The estimates are from other agencies master plans or have been identified to the City by a letter or verbally.

2. **Maximum Projected Sales.** The scenario assumes that all water agencies that could potentially purchase surface water from the City do so.

3. **Obligated Sales.** This scenario includes the estimated sales to water agencies that currently have a wholesale or wheeling agreement with the City.

Table 14 contains the historical, current, and most probable projected sales to other water agencies. Most probable projected sales are the sales that other water agencies have identified in their Infrastructure Master Plans or UWMPs, or for which other water agencies have communicated their intent to utilize City wholesale water. Table 15 presents the maximum projected sales if all water agencies that are within the City's place of use purchase water and if the Sacramento County Water Agency continues to purchase wheeled water for its Zone 40 service area and wheeled/wholesaled water to the Airport and Metro Air Park. Table 16 presents the historical and future projected commitments to wholesale and wheeling customers per the existing agreements the City has with other water agencies.

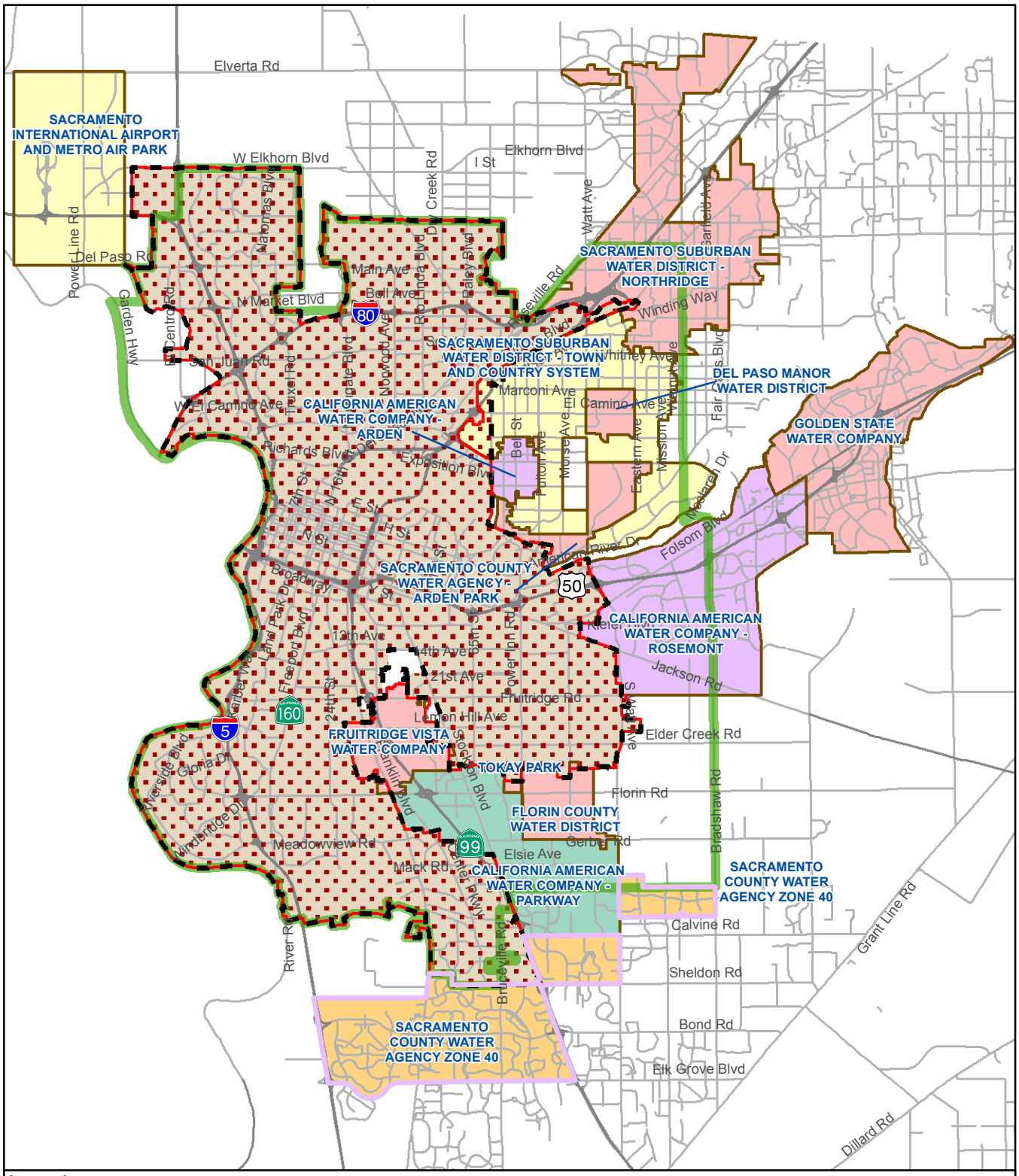

Figure 5
Wholesale and Wheeling Customers
2010 Urban Water Management Plan
City of Sacramento

Table 14 Potential Sales to Other Water Agencies (Guidebook Table 9)
2010 Urban Water Management Plan
City of Sacramento

Customer	Sales, AFY						
	2005	2010	2015	2020	2025	2030	2035
Sacramento International Airport and Metro Air Park	0	296	1,876	3,456	5,036	5,293	5,293
Sacramento Suburban Water District - Town and Country System(1)	0	2,225	16,593	16,593	16,593	16,593	16,593
California American Water Company - Arden	0	0	228	457	685	913	913
California American Water Company - Rosemont	0	0	1,540	3,080	4,620	6,160	6,160
California American Water Company - Parkway	2,478	1,030	1,120	2,240	3,360	4,480	4,480
Sacramento County Water Agency Zone 40 Wholesale	0	0	2,661	5,322	7,983	10,644	10,644
Sacramento County Water Agency Zone 40 Wheeling	4,720	1,540	3,088	6,175	9,263	12,350	12,350
Fruitridge Vista Water Company	0	0	3,629	3,629	3,629	3,629	3,629
Total, AFY	**7,198**	**5,091**	**30,735**	**40,952**	**51,169**	**60,062**	**60,062**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare of 2010 Urban Water Management Plan" by DWR.
Source: 2005 data from the City annual Report. 2010 data from spreadsheet titled WaterFlow2010.xlxs provided by the City.

1. This is the maximum that Sacramento Suburban Water District (SSWD) would take if American River Water was available throughout the year, and if SSWD elected to purchase it from the City. See Chapter 4 regarding diversion limitations.

Table 15 Maximum Projected Sales to Other Water Agencies
2010 Urban Water Management Plan
City of Sacramento

Customer	Sales, AFY						
	2005	2010	2015	2020	2025	2030	2035
Sacramento International Airport and Metro Air Park	0	296	1,545	2,795	4,044	5,293	5,293
Sacramento Suburban Water District - Town and Country System(1)	0	2,225	20,064	20,064	20,064	20,064	20,064
Sacramento Suburban Water District - Northridge	0	0	1,065	2,130	3,195	4,260	4,260
Golden State Water Co.	0	0	259	519	778	1,037	1,037
Sacramento County Water Agency - Arden Park	0	0	1,053	2,106	3,158	4,211	4,211
Del Paso Manor Water District	0	0	336	672	1,008	1,344	1,344
California American Water Company - Arden	0	0	464	928	1,391	1,855	1,855
California American Water Company - Rosemont	0	0	2,542	5,083	7,625	10,166	10,166
California American Water Company - Parkway	2,478	1,030	2,782	4,533	6,285	8,036	8,036
Sacramento County Water Agency Zone 40 Wholesale	0	0	2,661	5,322	7,983	10,644	10,644
Sacramento County Water Agency Zone 40 Wheeling	4,720	1,540	4,243	6,945	9,648	12,350	12,350
Tokay Park	0	0	24	48	71	95	95
Fruitridge Vista Water Company	0	0	2,173	4,346	6,519	8,692	8,692
Florin County Water District	0	0	459	919	1,378	1,837	1,837
Total, AFY	**7,198**	**5,091**	**39,670**	**56,410**	**73,147**	**89,884**	**89,884**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare of 2010 Urban Water Management Plan" by DWR.
Source: 2005 data from the City annual Report. 2010 data from spreadsheet titled WaterFlow2010.xlxs provided by the City.
1. This is the maximum that SSWD would take if American River Water was available throughout the year, and if SSWD elected to purchase it from the City. See Chapter 4 regarding diversion limitations.

Table 16 Obligated Sales to Other Water Agencies (Guidebook Table 9)
2010 Urban Water Management Plan
City of Sacramento

Customer	Sales, AFY						
	2005	2010	2015	2020	2025	2030	2035
Sacramento International Airport and Metro Air Park	0	296	1,876	3,456	5,036	5,293	5,293
Sacramento Suburban Water District - Town and Country System(1)	0	2,225	16,593	16,593	16,593	16,593	16,593
California American Water Company - Arden	0	0	4,831	4,831	4,831	4,831	4,831
California American Water Company - Rosemont	0	0					
California American Water Company - Parkway	2,478	1,030					
Sacramento County Water Agency Zone 40 Wheeling	4,720	1,540	3,088	6,175	9,263	12,350	12,350
Fruitridge Vista Water Company	0	0	3,629	3,629	3,629	3,629	3,629
Total, AFY	**7,198**	**5,091**	**30,017**	**34,684**	**39,352**	**42,696**	**42,696**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare of 2010 Urban Water Management Plan" by DWR.
Source: 2005 data from the City annual Report. 2010 data from spreadsheet titled WaterFlow2010.xlxs provided by the City.

1. This is the maximum that Sacramento Suburban Water District (SSWD) would take if American River Water was available throughout the year, and if SSWD elected to purchase it from the City. See Chapter 4 regarding diversion limitations.

3.3.2 Other Water Demands

Additional water uses and losses in the City's service area are presented in Table 17. Additional water losses are accounted for in Tables 9 through 13.

Table 17 Additional Water Uses and Losses (Guidebook Table 10)
2010 Urban Water Management Plan
City of Sacramento

Water Use[1]	2005	2010	2015	2020	2025	2030	2035
Saline Barriers	0	0	0	0	0	0	0
Groundwater Recharge	0	0	0	0	0	0	0
Conjunctive Use	0	0	0	0	0	0	0
Raw Water	0	0	0	0	0	0	0
Recycled Water	0	0	0	0	0	0	0
System Losses	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Total, AFY	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare of 2010 Urban Water Management Plan" by DWR.
1. Additional water losses are accounted for in Guidebook Tables 3 through 7 and Table 9.

3.3.3 Total Water Demands

The City's total average annual demands, based on the figures presented in Tables 9 through 13, are presented in Table 18. This represents the demands from likely wholesale customers. Table 19 presents the maximum potential water demands if all potential wholesale customers purchased water from the City.

Many other factors affect future City and regional water consumption. These factors could result in greater water use than is identified in this UWMP. Items that could increase the water use in the future includes development that exceeds current growth projections, future annexations to the City, and/or expansion of the City's surface water rights place of use to include additional areas; these factors are too speculative to include in this UWMP analysis. It also should be noted that the City anticipates continued population and job growth after the year 2035, and water demands will likely continue to increase as well, even with improvements in water use efficiency. For the year 2050, the City anticipates a population increase of up to 75 percent over the City's current population (from 466,000 to 817,000), and an increase in the number of jobs of up to 56 percent over current job numbers (from 339,000 to 530,000). This does not include the areas outside the City limits but within the City's surface water place of use. The areas that are outside of the City limits, but within the water rights place of use, also can be expected to see additional population and job growth beyond the year 2035.

Table 18	Total Water Use (Guidebook Table 11) 2010 Urban Water Management Plan City of Sacramento						
Water Use	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Total water deliveries(1)	131,564	108,276	146,300	138,300	149,200	160,100	171,100
Sales to other water agencies(2)	7,198	5,091	30,735	40,952	51,169	60,062	60,062
Additional water uses and losses(3)	0	0	0	0	0	0	0
Total, AFY	**138,762**	**113,367**	**177,035**	**179,252**	**200,369**	**220,162**	**231,162**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare of 2010 Urban Water Management Plan" by DWR.
1. Data from Tables 9 through 13.
2. Data from Table 14.
3. Data from Table 17.

Table 19	Maximum Total Water Use – All Wheeling and Wholesale Customers 2010 Urban Water Management Plan City of Sacramento						
Water Use	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Total water deliveries(1)	131,564	108,276	146,300	138,300	149,200	160,100	171,100
Sales to other water agencies(2)	7,198	5,091	39,670	56,410	73,147	89,884	89,884
Additional water uses and losses(3)	0	0	0	0	0	0	0
Total, AFY	**138,762**	**113,367**	**185,970**	**194,710**	**222,347**	**249,984**	**260,984**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare of 2010 Urban Water Management Plan" by DWR.
1. Data from Tables 9 through 13.
2 Data from Table 15.
3. Data from Table 17.

3.3.4 Lower Income Household Water Use Projections

Section 10631.1 (a) of the California Water Code requires that retail urban water suppliers include projected water use for lower income single family and multifamily households. Section 50079.5 of the Health and Safety Code defines lower income households as 80 percent of the median income, adjusted for family size.

The most recent SACOG Regional Housing Needs Plan (RHNP) does not provide low-income projections beyond 2013. The RHNP allocated 2,582 low-income housing units for 2006-2013. The SACOG is in the process of updating the RHNP, which will include projections from 2013 to 2021.

Specific low-income water use projections will be included in the 2015 UWMP update after SACOG has published the update to the RHNP. Additionally, the City will work on determining the estimated water demand per low-income housing unit for the 2015 UWMP update. Guidebook Table 8 (Low Income Projected Water Demands 2015-2035) has not been included in this UWMP. The water demands for low-income units are included in the future water demand projects for single-family and multi-family homes listed in Tables 9 through 13.

3.4 WHOLESALE DEMAND PROJECTIONS

The City has not purchased water from a wholesale supplier, nor does the City anticipate any in the future. Therefore, Guidebook Table 12 (Retail Agency Demand Projections Provided to Wholesale Suppliers 2010-2035) has not been included in this UWMP. The inclusion of this table will be revisited during the 2015 UWMP update.

3.5 WATER USE REDUCTION PLAN

The City determined its 10-year baseline water use and urban water use targets in accordance with the methods described in the DWR 2010 UWMP Guidebook. After doing so, the interim 2015 target (256 gpcd) and 2020 target (223 gpcd) per capita water uses were both higher than the current (2010) per capita water use (207 gpcd). If the City can maintain its low water consumption rates, it will meet the 2020 conservation goals. However, it is unknown if this level of use will continue in future years, since it is likely influenced by the economic slowdown, cooler than normal temperatures, and other factors that may change in future years.. If consumption rates begin to rise above interm and 2020 target water use goals, the City will need to implement additional conservation measures to meet its 2020 goals.

The City, in cooperation with the Water Forum, has prepared an Interim Water Conservation Plan (IWCP) to identify the funding for the City's near term conservation efforts and will be the basis for maintaining the targets. The authors of the IWCP will need additional information to finalize the plan, including the avoided cost of capital. The avoided

cost of capital is being developed in the update of the City's Water Master Plan, scheduled to be completed by the end of this year.

Additionally, the City has convened a Water Conservation Advisory Group to review the IWCP, and provide advice on the City's water conservation program. The revised water conservation plan (RWCP) will not be ready for this UWMP. If the RWCP requires substantial revisions to the UWMP, than a revised UWMP will be prepared and brought before the City Council for adoption.

SYSTEM SUPPLIES

4.1 WATER SOURCES

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) include a description of the agency's existing and future water supply sources for the next 20 years. The description of water supplies must include detailed information on the groundwater basin such as water rights, determination if the basin is in overdraft, adjudication decree, and other information from the groundwater management plan (GWMP); see excerpt below.

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631 (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a) [to 20 years or as far as data is available]. If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:*
>
> *10631 (b) (1) A copy of any groundwater management plan adopted by the urban water supplier…*
>
> *10631 (b) (2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or board has adjudicated the rights to pump groundwater…For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted…*
>
> *10631 (b) (3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic records.*
>
> *10631 (b) (4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonable available, including, but not limited to, historic use records.*

The City of Sacramento (City) obtains its water supply from two surface water sources (Sacramento and American Rivers) and groundwater pumped from the North American and South American subbasins of the Sacramento Valley Groundwater Basin. Consequently, the City has its own water entitlements and does not receive any water supply derived from the water entitlements of another water agency.

The City treatment facilities include two independent water treatment plants (WTPs) and well head treatment. The combination of surface water and groundwater results in a high reliability water source for the City.

The purpose of this chapter is to discuss the City's surface water entitlements to the Sacramento and American Rivers, and the availability and management of groundwater within the two subbasins.

4.1.1 Water Supply Facilities

As previously discussed, the City's existing surface water supply facilities include the Sacramento River Water Treatment Plant (SRWTP) and the E.A. Fairbairn Water Treatment Plant (FWTP). Although the SRWTP has a design capacity of 160 million gallons per day (mgd), the SRWTP currently has a reliable capacity of 135 mgd. Improvements scheduled to be completed by 2016 will restore the reliable capacity to 160 mgd.

Although the FWTP has a design capacity of 200 mgd, the FWTP currently has a reliable capacity during peak demand times of 100 mgd due to the Hodge constraints (refer to Section 4.1.2.5.2). The FWTP has a Department of Public Health (DPH) permitted capacity of 160 mgd (248 cubic feet per second (cfs)).

Both WTPs utilize grit removal, flocculation, coagulation, sedimentation, filtration, and chlorination to treat river water. The SRWTP was originally constructed in the 1920s, with major plant expansions in the 1930s and 2003. The FWTP was originally constructed in the early 1960's, with a major plant expansion in 2005. The SRWTP treats water diverted from the Sacramento River and the FWTP treats water diverted from the Lower American River.

4.1.2 Water Rights

The City's surface water entitlements include five appropriative water rights permits issued by the State Water Resources Control Board (SWRCB), pre-1914 rights, and a water rights settlement contract with the U.S. Bureau of Reclamation (BuRec). Table 20 summarizes the City's water rights permits, including application number and priority date, permit number and issuance date, rate of diversion in cfs, annual limit in acre-feet (AF), purpose of use, period of use, place of use, and the current deadline to perfect full use. Each water rights permit is discussed in more detail below. Copies of the City's BuRec contract and water agreements are provided in Appendix C.

Surface water is currently diverted at two locations: Off the American River downstream from the Howe Avenue Bridge, and off the Sacramento River downstream of the confluence of the American and Sacramento Rivers. The City's current authorized Place of Use (POU) for water diverted under the Sacramento River permit includes all the land within the City limits, while the POU for water diverted under the American River permits includes the City limits and adjacent portions of service areas of several other water purveyors (refer to Figure 2).

Table 20 City State Water Right Permits Summary
2010 Urban Water Management Plan
City of Sacramento

Application Permit and License Number	Priority Date	River Source	Maximum Amount Specified		Purpose of Use	Season of Diversion and Re-diversion	Place of Use	Deadline to Perfect by Full Use
			cfs	acre-ft/yr				
A. 1743 P. 992	3/30/1920	Sacramento	225	81,800	Municipal	Jan 1 to Dec 31	City of Sacramento	12/31/2030
A. 12140 P. 11358	10/29/1947	American	675[1]	245,000[1]	Municipal	Nov 1 to Aug 1	79,500 acres within and adjacent to the City	12/1/2030
A. 12321 P. 11359	2/13/1948	Tributaries of American			Municipal	Nov 1 to Aug 1[2]	96,000 acres within and adjacent to the City	12/31/2030
A. 12622 P. 11360	7/29/1948	Tributaries of American			Municipal	Nov 1 to Aug 1[2]	96,000 acres within and adjacent to the City	12/31/2030
A. 16060 P. 11361	9/22/1954	American			Municipal	Nov 1 to Aug 1	79,500 acres within and adjacent to the City	12/1/2030

Notes:
1. Aggregate maximum applicable to City's diversions under all four American River permits pursuant to the City/Bureau of Reclamation water right settlement contract.
2. Year-round period for re-diversion of water previously diverted by SMUD Upper American River Project Reservoirs. SMUD's season of diversion is Nov 1 to Aug 1.

4.1.2.1 Sacramento River

The City has pre-1914 and post-1914 appropriative rights for water from the Sacramento River. The City has used Sacramento River water since 1854 and claims a pre-1914 appropriative right to divert 75 cfs from the Sacramento River.

The City's post-1914 Sacramento River permit (Permit 992) authorizes the City to take water from the Sacramento River by direct diversion, and has a priority date of March 30, 1920. Permit 992 authorizes the City to divert up to 81,800 acre-feet per year (AFY) with a maximum flow of 225 cfs.

Permit 992 allows the City to use water diverted from the Sacramento River within the city limits (refer to Figure 2), as this area changes from time to time through annexations.

4.1.2.2 American River

The City has four water rights permits authorizing diversions of American River water. American River Permits 11358 and 11361 authorize the City to divert water from the American River by direct diversion, with a combined maximum allowable rate of diversion of 675 cfs, with priority dates of October 29, 1947, and September 22, 1954, respectively. The POU for both permits is 79,500 acres within and adjacent to the City.

The other two American River permits (Permits 11359 and 11360) authorize re-diversion for consumptive uses of American River tributary water previously diverted by the Sacramento Municipal Utility District's (SMUD) Upper American River Project (UARP). Permits 11359 and 11360 have priority dates of February 13, 1948, and July 29, 1948, respectively, and the POU for both permits is 96,000 acres within and adjacent to the City. The combined maximum allowable diversion under these permits includes re-diversion of up to 1,510 cfs of UARP direct diversion water and up to 589,000 AFY of UARP stored water. Refer to Figure 2 for the combined POU for American River water.

The City's diversions of American River water to the City's FWTP also are subject to limitations during certain time periods specified in the Water Forum Agreement (refer to Section 4.1.2.1).

4.1.2.3 Bureau of Reclamation Settlement Contract

The City also has a water rights settlement contract entered into in 1957 by the City and the BuRec. At that time, the State Water Rights Board was deciding how to allocate water rights on the American River among numerous competing applicants, including the City and the BuRec. The City and the BuRec had protested each others' applications. This contract settled their differences and enabled both parties to drop their protests, to the benefit of both parties.

The essence of the City/BuRec settlement contract is that the City agreed to limit its combined rate of diversion under its American River water rights permits to a maximum of 675 cfs. The City's diversions under its American River water rights permits may scale up to 245,000 AFY by the year 2030. The City also agreed to limit its rate of diversion under its Sacramento River water rights Permit 992 to a maximum of 225 cfs and a maximum amount of 81,800 AFY. This limits the City's total diversions of Sacramento and American River water under its water rights permits to 326,800 AFY. In return, the settlement contract requires the BuRec to make available in the rivers at all times enough water to enable the agreed-upon diversions by the City. The City agreed to make an annual payment to the BuRec for Folsom Reservoir storage capacity used to meet the BuRec's obligations under the contract, beginning with payment for 8,000 AF of storage capacity in 1963 and building up, more or less linearly, to payment for the use of 90,000 AF of storage capacity in 2030. The settlement contract is permanent and not subject to deficiencies. The BuRec contract, in conjunction with the City's water rights, provides the City with a very reliable and secure water supply.[1]

4.1.2.4 Summary of Surface Water Entitlements

As discussed above, the City holds pre-1914 rights, as well as five permits to divert or re-divert water from the Sacramento and American Rivers. The 1957 settlement contract with the BuRec sets forth a diversion schedule (Schedule A) that assures, as well as limits, the total diversion available to City from the Sacramento and American Rivers.

Table 21 presents the City's maximum allowed diversion, as specified in Schedule A, from the Sacramento and American Rivers combined, and the maximum allowed diversion from the American River by itself. The maximum allowed diversion from the Sacramento River is 81,800 AFY during any year, but the total combined diversion from both rivers cannot exceed the total requirement specified in Schedule A.

4.1.2.5 Water Forum Agreement

The Water Forum was started in 1993 by a group of water managers, local governments, business leaders, agricultural leaders, environmentalists, and citizen groups with two "co-equal" goals: to provide a reliable and safe water supply through the year 2030, and to preserve the wildlife, fishery, recreational, and aesthetic values of the Lower American River. In 1999, after six years of intense interest-based negotiation, the Water Forum participants approved the 2000 Water Forum Agreement (WFA).

As part of the WFA, each purveyor signed a purveyor specific agreement (PSA) that specified that purveyor's Water Forum commitments; a copy of the City's PSA is provided in Appendix C. The City's PSA limits the quantity of water diverted from the American River to the FWTP during two conditions: extremely dry years (i.e., "Conference Years") and periods when river flows are below the "Hodge Flow Criteria" issued by Judge Richard Hodge in the *Environmental Defense Fund v. East Bay Municipal Utility District* litigation. A copy of the

[1] The descriptions and discussion in this UWMP of the City's water rights and water right settlement contract are provided solely for informational purposes, and nothing in this UWMP is intended to, nor shall any provision of this UWMP be interpreted, to modify or affect in any way such rights and contract.

Hodge Flow Criteria is presented in the City's WFA PSA (Appendix C). These two conditions, collectively referred to as the "PSA Limitations," are described in more detail below.

Table 21 Maximum Annual Diversion Allowed to the Year 2030
2010 Urban Water Management Plan
City of Sacramento

Year[1]	Maximum Diversion from the Sacramento River, AFY[2]	Maximum Diversion from the American River, AFY[3]	Maximum Combined Diversion, AFY
2010	81,800	170,500	227,500
2015	81,800	189,000	252,000
2020	81,800	208,500	278,000
2025	81,800	228,000	304,000
2030	81,800	245,000	326,800
2035	81,800	245,000	326,800

Notes:
1. Data obtained from Schedule A of the 1957 Water Rights Settlement Contract between the U.S. Bureau of Reclamation and the City.
2. The City may divert up to 81,800 AFY from the Sacramento River as long as the total combined diversion from both the Sacramento and American Rivers does not exceed the Maximum Combined Diversion.
3. The City may divert up to the Maximum Diversion from the American River as long as the total combined diversion from both the Sacramento and American Rivers does not exceed the Maximum Combined Diversion.

The terms of the City's PSA were negotiated prior to approval of the WFA based on a common understanding among the Water Forum participants that the existing flow standard applicable to operation of the BuRec water storage facilities above the Lower American River was outdated and inadequate to preserve and protect the river's instream resources. These terms were agreed to before the approval of the WFA because there was no flow standard assuring adequate flow releases from the BuRec upstream facilities, nor was the BuRec a party to the Water Forum. The City's WFA PSA recognized the City's right to pursue revisions to the Hodge flow limitations if it is demonstrated that modifying the limitations would not have significant adverse impacts upon the public trust values of the American River below the Fairbairn Water Treatment Plant. This might be the case if an updated flow management plan governing flow releases from the BuRec upstream facilities were implemented to better preserve and protect downstream resources.

4.1.2.5.1 *Extremely Dry Years (Conference Years)*

The PSA defines extremely dry years (i.e., "Conference Years") as years in which the Department of Water Resources (DWR) projects an annual unimpaired flow into Folsom Reservoir of 550,000 AFY or less, or the projected March through November unimpaired flow into Folsom Reservoir is less than 400,000 AFY. During extremely dry years, the City

has agreed to limit its diversions for water treated at the FWTP to 155 cfs and 50,000 AFY. Any additional water needs must be met by diversions at other locations and/or other sources.

Conference Years have occurred on the American River only twice over the period of record historical hydrology (1922-2010). These years were water year 1924 and water year 1977; a water year is the 12-month period, starting October 1 and ending on September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. For example, the year ending September 30, 1992 is called the "1992 water year."

4.1.2.5.2 *Hodge Flow Conditions*

The Water Forum parties agreed to use the Hodge Flow Criteria as a minimum flow that would preserve and protect the instream resources of the Lower American River. The PSA negotiated by the City restricted the City from using a portion of the FWTP diversion capacity during periods when these flows were not met.

Under the City's PSA, the FWTP may divert up to 310 cfs (200 mgd) as long as the flow in the river is greater than the Hodge criteria flow (Table 22). The 310 cfs is approximately equal to 205,000 AFY assuming the FWTP is down for one month during the year for maintenance, and can only operate for 334 days continuously. If needed, the plants could operate year-round.

During the early summer in many years, but not all, the American River flows above the Hodge criteria. However, in drier years in early summer, and in most years after August 15, the American River flows below the Hodge criteria, limiting FWTP withdrawal and potable water production. Whenever the river flow is less than the Hodge criteria flow, the FWTP cannot divert more than the maximum diversions shown in Table 22.

Table 22 Hodge Flow Criteria for FWTP Defined
Water Treatment Plants Rehabilitation Project
City of Sacramento Department of Utilities

River Flow at the Intake (cfs)	<2,000		<3,000			<1,750				<2,000		
Time of Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct 14th	Oct 15th	Nov	Dec
Max Diversion at FWTP (mgd)	77		77			100	100		77	65	65		

Notes: Source: Water Forum Agreement January 2000 Appendix C.

As shown in Table 23, the total annual diversion to the FWTP during a year when flows passing the FWTP are below Hodge Flow Criteria every day of the year (a hypothetical Hodge Flow year), and assuming the FWTP is down for maintenance one month of the year, is approximately 82,260 AFY.

Table 23 Diversion Limit During Hodge Flow Years at FWTP Water Treatment Plants Rehabilitation Project City of Sacramento Department of Utilities			
Month	**Hodge Year Flow Condition, mgd**	**Total Diversion, MG**	**Total Diversion, AF**
January	Assumed FWTP is down for Maintenance		
February	77.6	2,173	6,669
March	77.6	2,406	7,384
April	77.6	2,328	7,145
May	77.6	2,406	7,384
June	100.2	3,006	9,226
July	100.2	3,106	9,533
August	100.2	3,106	9,533
September	77.6	2,328	7,145
October	64.6	2,003	6,147
November	64.6	1,938	5,948
December	64.6	2,003	6,147
	Total	**26,800**	**82,260**

Notes: For planning purposes in this UWMP, it was assumed that the FWTP is shutdown for one month during the winter for maintenance, and can only operate for 334 days per year. Shutdowns of City's water treatment are not planned to occur every year.

"Hodge Flow Year" is a hypothetical year when flows passing the FWTP are below Hodge Flow Criteria every day of the year.

4.2 GROUNDWATER

The City has historically relied on groundwater to satisfy a portion of its demand. The City overlies two subbasins of the Sacramento Valley Groundwater Basin (the North American and South American subbasins). The City is one of many water purveyors that utilize groundwater from the subbasins. As previously discussed in Chapter 2, the City operates 25 municipal supply wells and 5 irrigation wells north of the American River, and operates 2 municipal supply wells and 9 irrigation wells south of the American River. Hence, the City pumps groundwater from both subbasins, although approximately 95 percent of the amount pumped by the City is pumped from the North American subbasin. The City pumped 17,772 AF of groundwater from the North American subbasin and 665 AF from the South American subbasin for potable water consumption in 2010.

Figure 6 illustrates the location of the City's groundwater wells (both municipal and irrigation) within each subbasin. Table 24 contains the groundwater wells and their status and pumping capacities within the City limits.

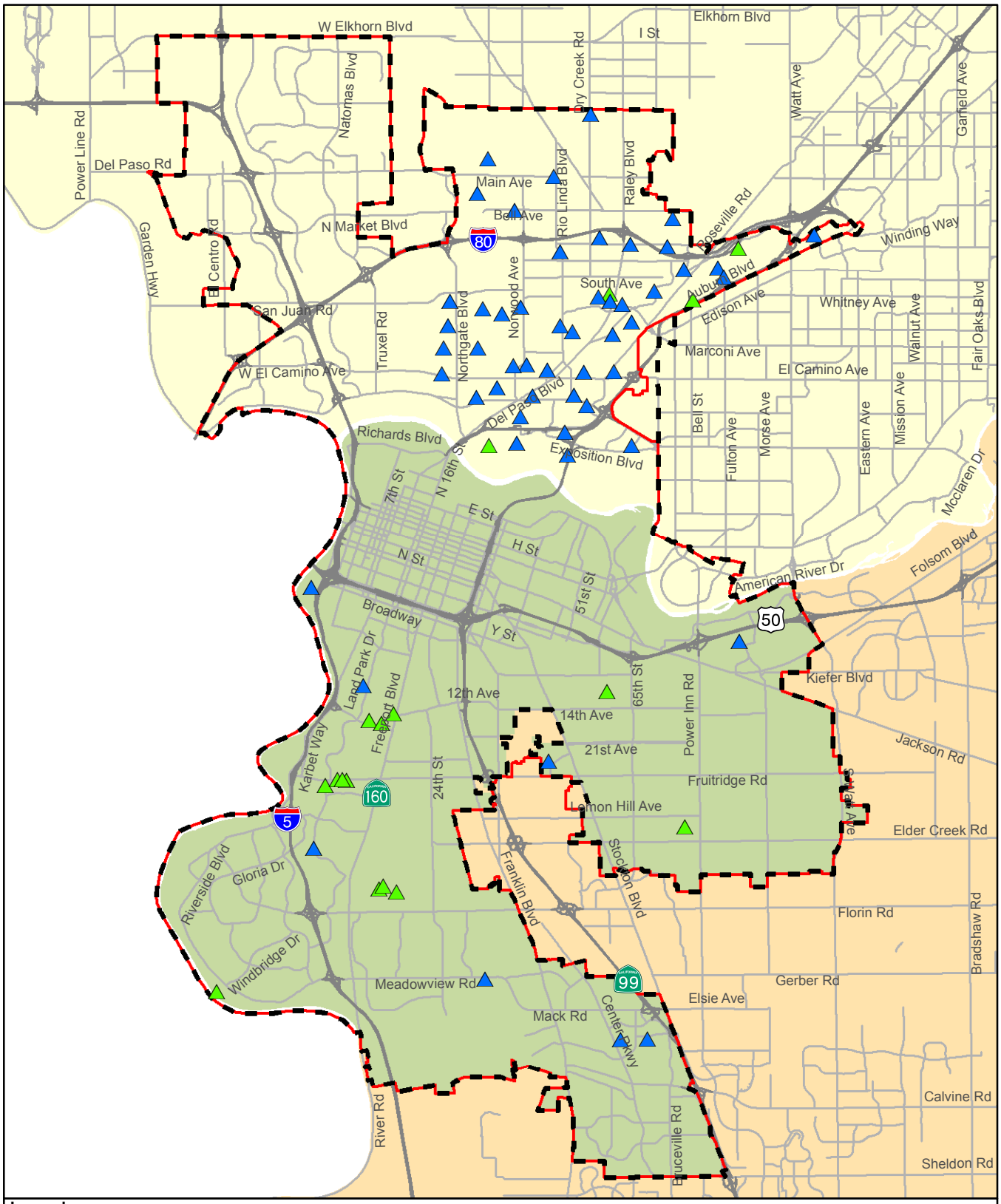

Figure 6
Groundwater Wells and Subbasins
2010 Urban Water Management Plan
City of Sacramento

* Note: The Central Basin was developed by the Sacramento County Water Agency (SCWA) to reflect the hydrogeologic and political boundaries of water purveyors/districts, cities, and the County of Sacramento. The portion of the South American subbasin underlying the City is considered to be the Central Basin.

Table 24 Groundwater Wells Water Treatment Plants Rehabilitation Project City of Sacramento Department of Utilities		
Well No.	**Well Status**	**Pumping Capacity, gpm**
083	Active	406
092	Active	813
093	Active	415
094	Active	855
107	Active	635
116	Active	620
120	Active	550
122	Active	467
124	Active	572
126	Active	625
127	Active	535
129	Active	524
131	Active	424
133	Active	783
134	Active	723
137	Active	535
138	Active	529
142	Active	970
143	Active	397
144	Active	482
153A	Active	1,076
154	Active	551
155	Active	825
156	Active	472
158	Active	754
159	Active	472
164	Not permitted to operate by CDPH	847
Total Well Pumping Capacity(1) (gpm)		**16,010**
Total Well Pumping Capacity(1) (mgd)		**23.1**
90% Well Pumping Capacity – Firm Capacity(1) (mgd)		**20.7**

Notes:
1. Well 164 not included.

In addition to any groundwater supplied to areas outside of the City's surface water POUs, the City's present desire is to maintain the flexibility to use surface water exclusively or use a combination of surface water and groundwater when desired. The City anticipates maintaining groundwater production facilities for redundancy and operational flexibility, including future conjunctive use operations. Existing regulations do not directly limit the use or expansion of groundwater pumpage by the City. However, the City's groundwater supplies may be subject to future federal and state regulations that may place restrictions on acceptable concentration levels of radon, arsenic, and other water quality parameters.

A description of both groundwater subbasins follows, including discussion on the quality, water level, and management conditions.

4.2.1 Description of the Groundwater Subbasins

The North and South American Subbasins are located within the larger Sacramento Valley Groundwater Basin. The North American Subbasin is bound by Bear River to the north, Feather River to the west, the Sacramento and American Rivers to the south, and a north-south line extending from the Bear River to Folsom Lake to the east. The South American Subbasin is bound by the Sierra Nevada to the east, the Sacramento River to the west, the American River to the north, and the Cosumnes and Mokelumne Rivers to the south. The DWR Bulletin 118–Update 2003, "California's Groundwater" contains a detailed descriptions, characteristics, and conditions of the Subbasins. Copies of the DWR Bulletin 118 sections are included in Appendix D.

The various geologic formations that constitute the water-bearing deposits underlying both the North and South American subbasins are described in the 2003 Update to the DWR Bulletin 118. These formations include an upper, unconfined aquifer system, and a lower, semi-confined aquifer. The upper aquifer system consists of the Modesto, Riverbank, Turlock Lake, Victor, Fair Oaks, and Laguna Formations, along with Arroyo Seco and South Fork Gravels; the lower aquifer consists primarily of the Mehrten Formation.

It should be noted that as part of the Water Forum process, a groundwater model was developed by the Sacramento County Water Agency (SCWA). The model defined a Central Basin boundary which took into account the hydrogeologic boundaries and the political boundaries of organized water purveyors/districts, cities, and the County of Sacramento. Essentially, the Central Basin boundary overlies the DWR South American Subbasin; however, the boundaries are slightly different because the Central Basin boundary was developed from the Sacramento County groundwater model grid (Central Sacramento County Groundwater Management Plan 2006). However, the portion of the South American subbasin underlying the City is considered to be the Central Basin.

4.2.2 Groundwater Quality

Groundwater underlying the City's service area generally meets primary and secondary drinking water standards for municipal water use, and is described as being calcium-magnesium-bicarbonate type water, with minor fractions of sodium-magnesium-

bicarbonate. Due to high concentrations of iron and manganese in the lower aquifer system, the upper aquifer system is usually the preferred source of groundwater.

The lower aquifer system also contains higher concentrations of total dissolved solids (TDS) than the upper aquifer. The TDS concentration in most wells is within secondary drinking water standards, but varies quite significantly throughout the area (from 21 to 657 milligrams per liter (mg/L), with an overall average of 221 mg/L). TDS concentrations exceed 2,000 mg/L at depths of approximately 1,200 feet or greater. However, most wells do not extend into this poorer quality groundwater.

4.2.3 Groundwater Levels

As will be discussed in subsequent sections, the Sacramento Groundwater Authority (SGA) adopted the SGA Groundwater Management Plan (SGA GWMP) on December 11, 2008, to help establish a framework for maintaining a sustainable groundwater resource in the North American Subbasin. The Water Forum and SCWA completed a Central Sacramento County Groundwater Management Plan (CSC GWMP) in February 2006 for an area approximately the same as the South American Subbasin.

Groundwater level trends for the North American Subbasin were obtained from the SGA GWMP. Groundwater level trends in the South American Subbasin were obtained from DWR Bulletin 118 Update 2003. Groundwater level trends are discussed separately for each subbasin below. Neither subbasin has been described to be in overdraft in DWR Bulletin 118, nor has Bulletin 118 projected either basin to become overdrafted with the current management of the subbasins.

4.2.3.1 Groundwater Level Trends in the North American Subbasin

A collection of municipalities, cities, water districts, agriculture, and private users overlying the subbasin have historically used groundwater from the North American Subbasin. The SGA GWMP evaluated the effect of groundwater pumping in the portion of the North American Subbasin located within Sacramento County, but north of the American River (i.e., within the SGA's planning area), by dividing the SGA's planning boundary into three separate general areas as follows:

- **Western:** (bounded by the Sacramento River on the west and extends east to approximately the boundary between Natomas Central Mutual Water Company and Rio Linda/Elverta Community Water District). Groundwater elevations range from about five feet below mean sea level (MSL) to 20 feet above MSL. Groundwater elevations have been fairly stable over the period of record, with very modest increases in 2003 and 2004. These wells typically experience only seasonal fluctuations (2008 SGA GWMP).
- **Central Area:** (bounded roughly on the west by the boundary between Natomas Central Mutual Water Company and Rio Linda/Elverta Community Water District and to the east by a line running approximately along San Juan Avenue). Groundwater elevations currently range from about 10 feet above MSL to 40 feet below MSL. The

drawdown in these wells over the past 60 years has been in excess of about 70 feet. Groundwater elevations in this area continued to decline every year until around the mid-1990s, when groundwater elevations stabilized due, at least in part, to expanded conjunctive use operations. Groundwater elevations have increased slightly over previous years despite the increase in groundwater extraction in the basin in 2007. This is likely because groundwater for public supply has been reduced in the immediate vicinity of McClellan to help contain the movement of contamination (2008 SGA GWMP).

- **Eastern Area:** (extends roughly east of San Juan Avenue to the eastern edge of the basin). Groundwater elevations can be highly varied from one well to another, as the area has rolling topography and the groundwater elevation tends to mimic ground elevations. Hydrographs indicate that groundwater elevations have not changed greatly with time, reflecting the limited use of groundwater in the area. There were no notable changes in recent groundwater elevations (2008 SGA GWMP).

In general, past data shows that in the central portion of the North Area Basin, groundwater elevations declined at a rate of nearly 1.5 feet per year from around the 1950s through the mid-1990s. Since the mid-1990s, groundwater elevations have stabilized within the regional cone of depression and, in some cases, groundwater elevations are continuing to increase slightly (2008 SGA GWMP).

4.2.3.2 Groundwater Level Trends in the South American Subbasin

A collection of municipalities, cities, water districts, agriculture, and private users overlying the subbasin have historically pumped groundwater from the South American Subbasin. As described in Bulletin 118 Update 2003, eighteen long-term hydrographs developed by DWR indicate that groundwater elevations within the entire South American Subbasin have, in general, consistently declined by approximately 20 feet from the mid-1960's to about 1980, but recovered by about 10 feet from 1980 to 1983, where water levels remained stable until the 1987 to 1992 drought. During the drought, water levels declined by about 15 feet, but recovered to levels higher than those observed prior to the drought by 2000.

There are two exceptions to these trends. The first involves wells in and adjacent to the City, where water levels fluctuated by less than 10 feet since the mid-1970s. The fluctuation is likely related to natural seasonal fluctuations. The other exception involves wells near Rancho Cordova, where water levels appear to have recovered less than other wells in the South American Subbasin.

4.2.4 Groundwater Management

The number and type of groundwater users differs significantly between the subbasins. The North American Subbasin consists mainly of cities, water districts, and water agencies, while the South American Subbasin consists of private irrigation and residential users in addition to cities, water districts, and water agencies. The management of each subbasin is discussed separately below.

4.2.4.1 Management of the North American Subbasin

The City has invested substantial time and resources to participate in the following regional planning activities affecting the management of groundwater resources in the North American Subbasin:

- Sacramento Groundwater Authority
- Sacramento Water Forum
- American River Basin Cooperating Agencies Regional Water Master Plan
- Sacramento Metropolitan Water Authority (SMWA)
- Regional Water Authority (successor to the SMWA)

The SGA was formed as a joint powers authority in 1998 to collectively manage Sacramento County's portion of the North American Subbasin. SGA is governed by a joint powers agreement between the City of Sacramento, Sacramento County, City of Folsom, and the City of Citrus Heights, who each have police power to manage and protect the underlying groundwater basin. Appointed representatives of local water purveyors (including a City representative) and a representative from both the agricultural and private pumpers serve as the Board of Directors to the SGA. The members of the SGA collectively provide high quality, reliable water supply to over 500,000 people within the SGA boundaries, in addition to irrigation supply.

As discussed previously, on December 11, 2008, the SGA adopted the SGA GWMP to help establish a framework for maintaining a sustainable groundwater resource for the various purveyors overlying the groundwater basin within Sacramento County and north of the American River. The SGA GWMP also detailed specific goals, objectives, and an action plan to provide a "road map" for coordination among the overlying water purveyors.

In particular, the SGA GWMP divides the management plan into five component categories. The five components include programs for stakeholder involvement, monitoring, data management and analysis, groundwater resource protection, and groundwater sustainability.

A copy of the SGA GWMP (December 2008) is included in Appendix E. The City is a member of the SGA and participated in the GWMP update.

4.2.4.2 Management of the South American Subbasin

The City has also invested substantial time and resources to participate in the following regional planning activities affecting the management of groundwater resources in the South American Subbasin:

- Sacramento Central Groundwater Authority (SCGA)
- Sacramento Water Forum
- RWA

The South American Subbasin consists of major water purveyors and more than 6,000 private agricultural and residential users. In 2002, the Central Sacramento County Groundwater Forum was formed to fulfill an element of the WFA, and was aimed at developing recommendations for the management of the Central Sacramento Groundwater Basin, which is a portion of the South American Subbasin. As described above, the City overlies a portion of the Central Sacramento Groundwater Basin, although, as noted previously, the City is not a major groundwater pumper in this area. The City is investigating increasing groundwater extractions from the Subbasin as part of its Water Master Plan.

The SCGA was formed on September 20, 2006, and is a joint powers authority, similar to the SGA as a form of governance. The SCGA board adopted the Central Sacramento County GWMP on November 8, 2006.

A copy of the Central Sacramento County GWMP is included in Appendix E.

4.2.5 Conjunctive Use Program

As mentioned previously, the City has historically relied on groundwater to satisfy a portion of its demand. Groundwater has been the source of approximately 15 to 20 percent of the City's water supply. As part of a conjunctive use program, the City plans to vary the extraction rates in the future depending on the hydrologic conditions in the American River Basin. The definition and impact of hydrologic conditions is discussed further in Chapter 5.

In general, the City will utilize more groundwater to supply demand in dryer years and more surface water in wetter years. The City does not currently have the infrastructure necessary to implement a comprehensive conjunctive use program but will include this program in future planning. Analysis of the conjunctive use program will be included in the City's Water Master Plan Update, expected to be completed in 2011.

4.2.6 Existing and Projected Groundwater Pumping

The historical volume of groundwater pumped by the City over the past five years is provided in Table 25. The total firm pumping capacity of the City's groundwater wells is currently approximately 20.7 mgd or about 22,403 AFY. This assumes that 10 percent of the well production is out of service for maintenance at any time.

Groundwater production does decay over time, decreasing as wells age, in part from waterways becoming mechanically or chemically plugged. Groundwater production can be partially restored in existing wells by prudently rehabilitating and maintaining wells.

Table 25 Groundwater – Volume Pumped (Guidebook Table 18) 2010 Urban Water Management Plan City of Sacramento						
Basin Name	**Metered or Unmetered**	**2006 AFY**	**2007 AFY**	**2008 AFY**	**2009 AFY**	**2010 AFY**
Sacramento Valley (North Basin)	Metered	20,917	19,842	18,414	21,609	17,722
Sacramento Valley (Central Basin)	Metered	982	1,734	1,081	1,255	655
	Total	**21,899**	**21,576**	**19,495**	**22,864**	**18,377**
Percent of total water supply(1)		**16.7%**	**15.6%**	**14.7%**	**18.8%**	**17.0%**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
Source: Water Diversion and Pumping 2006-2010 City data.
1. Total supply does not include wheeled/wholesaled water.

For the purposes of this UWMP, the projected amount of groundwater to be pumped through year 2035 is assumed to be 22,300 AF. This quantity will be reevaluated in the Water Master Plan (currently under way). It should be noted that the City may employ a conjunctive use program by decreasing the amount pumped in a wet year and increasing the amount pumped in a dry or drought year. This is also being evaluated in the Water Master Plan. Table 26 presents the future quantities from the North and Central Basin to the year 2035.

Table 26 Groundwater – Volume Projected to be Pumped (Guidebook Table 19) 2010 Urban Water Management Plan City of Sacramento					
Basin Name	**2015 AFY**	**2020 AFY**	**2025 AFY**	**2030 AFY**	**2035 AFY**
Sacramento Valley (North Basin)	20,000	20,000	20,000	20,000	20,000
Sacramento Valley (Central Basin)	2,300	2,300	2,300	2,300	2,300
Total	**22,300**	**22,300**	**22,300**	**22,300**	**22,300**
Percent of Total Water Supply(1)	**16.6%**	**17.0%**	**16.2%**	**15.4%**	**14.2%**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
1. Total supply does not include wheeled/wholesaled water.

Existing regulations do not directly limit the use or expansion of groundwater pumping activities by the City. For reliability planning purposes in this UWMP, it was assumed that the City would maximize the use of its surface water supplies, and use up to its maximum groundwater pumping capacity during drought periods. The City retains the option to also increase its water supply and water supply reliability by increasing its groundwater pumping facilities.

4.3 WHOLESALE SUPPLIES

The City does not obtain wholesale supplies from other water agencies. Therefore, Guidebook Table 17 (Existing and Planned Wholesale Supply Sources) is not included in this UWMP. Wholesale supply sources will be included in the 2015 UWMP if necessary.

4.4 TRANSFER OPPORTUNITIES

The UWMPA requires the UWMP to address the opportunities for development of short or long-term transfer or exchange opportunities; see excerpt below.

> *10631 (d. Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.*

Although the City possesses surface water rights, as described previously, opportunities to exchange or transfer these rights are limited since the City's BuRec settlement contract entitles the BuRec to use any supply of water exceeding the amounts specified in the settlement contract and prohibits the City from encumbering its water rights in any way that would impair the parties' ability to perform the contract.

The City has participated in two previous water transfer efforts: In 2002, the City participated in a BuRec-approved pilot program to make surface water available to the Environmental Water Account by reducing surface water diversions and in 2009, the City participated in the Drought Water Bank, where the City utilized groundwater in lieu of surface water.

The City is making improvements to its groundwater production infrastructure to increase capacity available for drought bank or similar transfers. Improvements include rehabilitation of its groundwater wells and the planned construction of up to three new wells.

Table 27 presents the City's transfer and exchange opportunities.

Table 27 Transfer and Exchange Opportunities (Guidebook Table 20)
2010 Urban Water Management Plan
City of Sacramento

Transfer Agency	Transfer or Exchange	Short Term or Long Term	Proposed Volume
Drought Bank	Exchange	Short Term	5,000 AF
		Total	**5,000 AF**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare of 2010 Urban Water Management Plan" by DWR.

4.5 DESALINATED WATER OPPORTUNITIES

The UWMPA requires that the UWMP address the opportunities for development of desalinated water, including ocean water, brackish water, and groundwater; see excerpt below.

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631 (i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long term supply.*

At the present time, the City does not foresee any opportunities for the use of desalinated water, including ocean water, brackish ocean water, and brackish groundwater, as a long-term supply because there is no source of sea water or brackish groundwater near the City.

4.6 RECYCLED WATER OPPORTUNITIES

The UWMPA requires that the UWMP address the opportunities for development of recycled water, including the description of existing recycled water applications, quantities of wastewater currently being treated to recycled water standards, limitations on the use of available recycled water, an estimate of projected recycled water use, the feasibility of said projected uses, and practices to encourage the use of recycled water; see excerpt below.

> *10633. Provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.*

Recycled water is highly treated wastewater and is typically used for outdoor irrigation, industrial purposes, and groundwater recharge. The City does not utilize recycled water at this time. Recycled water is commonly conveyed in a separate distribution system from the potable system. There is a growing interest throughout the State to implement recycled water as a means to lessen the impact of drought on water supplies, and to reduce water diversions or groundwater extractions. Recycled water is important to the region in that it reduces the amount of treated wastewater effluent that is sent to the Sacramento River. There are no recycled water customers in the City at this time.

4.6.1 Agency Coordination

The City does not have a formal recycled water plan at this time; however, work is ongoing to identify recycled water projects in the Water Master Plan, which is scheduled to be completed at the end of 2011. Initial analysis suggests that recycled water projects are significantly more expensive than providing potable water.

4.6.2 Wastewater Collection and Treatment Systems

The City currently collects and transports wastewater through two separate systems: the Combined Sewer System (CSS) and the Separated Sewer System (SSS) to deliver the sewage to the Sacramento Regional Wastewater Treatment Plant (SRWWTP) for treatment and disposal. Because the City conveys its wastewater outside the service area to the SRWWTP, this UWMP focuses on the SRWWTP and recycled water activities associated with the SRCSD.

4.6.2.1 Combined Sewer System

The older, central areas of the City are served by a collection system built well over 100 years ago that combines sewage with stormwater into a single network of pipes. The approximate area of the City served by the CSS extends from the Sacramento River on the west, to 65th Street on the east, to the American River to the north, and to Sutterville Road to the south. The City stopped expanding the CSS service area in 1946. Figure 7 illustrates the approximate area served by the CSS.

4.6.2.2 CSS Pumping Stations

The CSS conveys sewage via two pump stations: Pump Station 1/1A and Pump Station 2/2A. Pump Station 1/1A consists of two buildings located at the southeast corner of U and Front Streets. Pump Station 1/1A is not normally used during the summer (i.e., during dry weather periods), and is only operated as needed during wet weather or large storm events. Pump Station 2/2A is located at the southeast corner of Riverside Boulevard and 11th Avenue. Pump Station 2/2A is the primary pump station for the CSS, operated continuously throughout the year.

4.6.2.3 Pioneer Reservoir

The Pioneer Reservoir was constructed in 1978 along Front Street, adjacent to the Sacramento River, northwest of the Interstate 5 and 80-freeway interchange to provide 23 million gallons (MG) of temporary storage to reduce overflows to the Sacramento River. The Pioneer Reservoir is a pile-supported, covered, reinforced-concrete structure that encompasses an area of approximately 3.5 acres. The reservoir has a peak hydraulic capacity of 350 mgd.

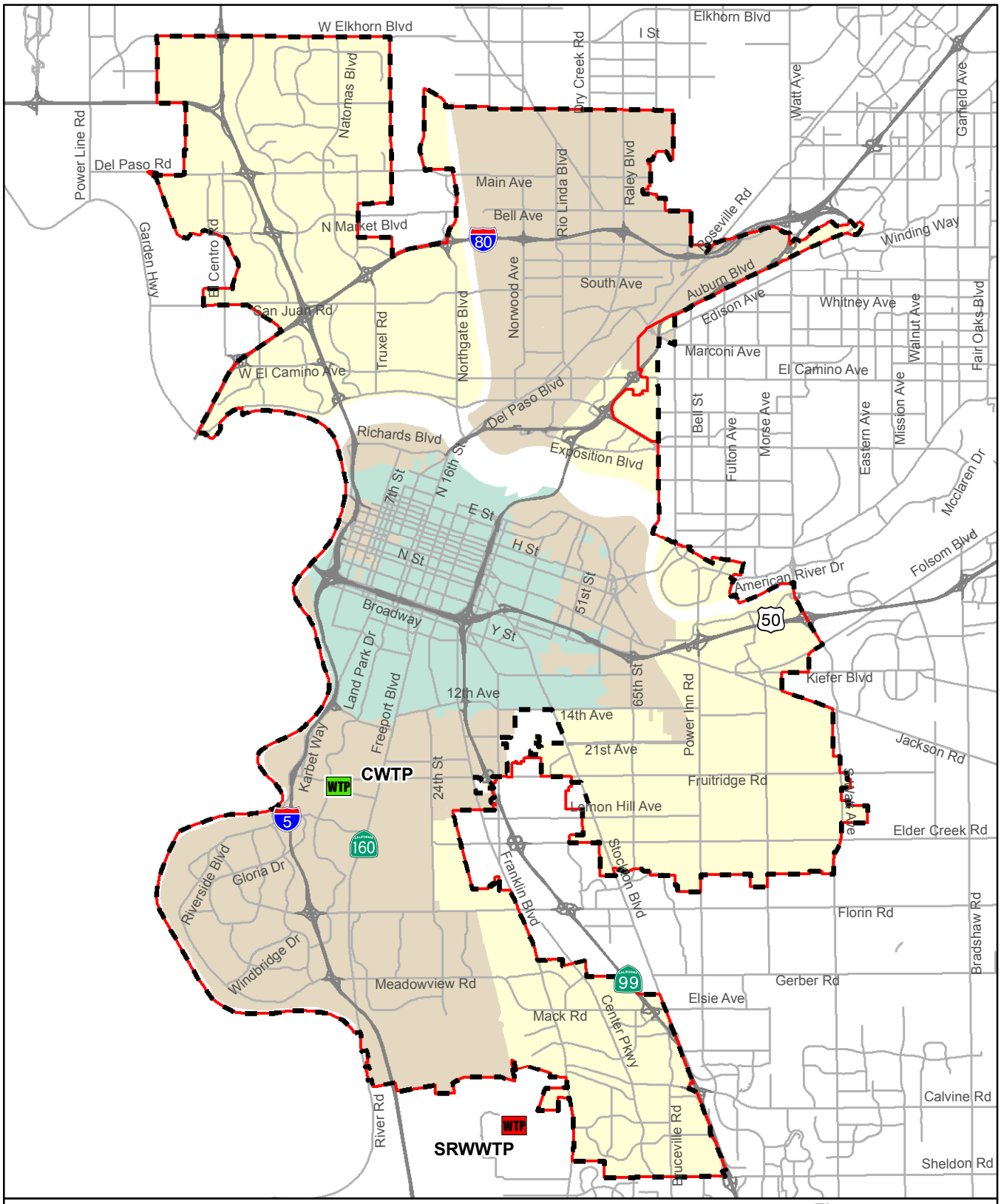

Figure 7
Combined and Separated Sewer Systems
2010 Urban Water Management Plan
City of Sacramento

4.6.2.2 Combined Wastewater Treatment Plant

The Combined Wastewater Treatment Plant (CWTP), as illustrated on Figure 7, was constructed in 1954, east of Interstate 5, near Fruitridge Road. The CWTP provides primary treatment (i.e., a mechanical settling process that removes oil and about 50 percent of the settleable solids) and disinfection.

Almost all of the flows from the CSS are treated by the SRWWTP; the City only uses the CWTP during large storm events. The City uses the basins at the CWTP to store wastewater until capacity becomes available at the SRWWTP, and then the stored volume is conveyed to the SRWWTP.

Any CSS effluent treated at the CWTP will not meet the quality standards for recycled water use, as the CWTP only consists of primary treatment. Additionally, the plant operates only very intermittently, as needed, during large storm events and therefore, does not provide a reliable supply to potential recycled water customers.

4.6.2.3 Separated Sewer System

In addition to the City's CSS, the City has a SSS that conveys wastewater into major trunk-sewer lines owned and operated by the Sacramento Area Sewer District (SASD), which then conveys the wastewater to the SRWWTP. In general, the City maintains sewer lines within the City limits that are 12 inches in diameter or smaller, while SASD maintains sewer lines that are larger than 12 inches in diameter, and all of the pump stations. All wastewater originating from the City and conveyed through either the SSS or the SASD system, is delivered to the SRWWTP. Figure 7 illustrates the area served by the SSS.

4.6.2.4 Description of the SRWWTP

The SRCSD owns and operates the SRWWTP, which treats wastewater generated by the cities of Sacramento, Citrus Heights, Elk Grove, Rancho Cordova, Folsom, West Sacramento, and urbanized areas of the County of Sacramento. The SRWWTP is located in Elk Grove, California, and is currently permitted to discharge an average dry weather flow (ADWF) of 181 mgd, and a daily peak wet weather flow of 392 mgd. Figure 7 illustrates the location of the SRWWTP. The SRWWTP provides secondary treatment consisting of mechanical bar screens, aerated grit removal, primary sedimentation, pure oxygen activated sludge aeration, secondary clarification, chlorine disinfection, and dechlorination. Tertiary treatment is provided to a portion of the secondary treated wastewater for recycled water use.

4.6.3 Wastewater Disposal

Except for water diverted for recycled use, treated wastewater from SRWWTP is discharged to the Sacramento River. Recycled water is delivered to the Elk Grove/Laguna area.

Because the City's wastewater is treated outside of the City's service area, Guidebook Tables 22 and 23 that list the amount of wastewater treated within the City service area and the recycled and non-recycled water portions produced are not included in this UWMP. Incorporation of these tables will be revisited in the 2015 UWMP update.

4.6.4 Current and Projected Recycled Water Use

Recycled water is currently being produced by SRCSD for the use in the Sacramento County Water Agency's (SCWA) service area, a water purveyor that is located to the south and east of the City. Recycled water was initially delivered to the Elk Grove/Laguna area in April 2003 to meet the irrigation needs of street medians, commercial landscaping, parks, and schools.

Efforts have been underway by SRCSD to expand the recycled water system from its current production rate of up to 5 mgd, to 10 mgd. The District has a goal of expanding water recycling use 40 mgd in the next 20 years. In February 2007, a report was prepared for the SRCSD titled "Water Recycling Opportunities Study" that identified a number of potential locations within the Sacramento region that recycled water could be utilized. One of those locations was the proposed Delta Shores development in the southern portion of the City. Another was the proposed Natomas Joint Vision area to the north of the City. Both of these areas are part of the City's planned future development.

SRCSD has defined two phases for their recycled water production facilities; Phase I was completed in 2003 and provides recycled water to the Elk Grove/Laguna area, and Phase II, consists of expanding the tertiary treatment facilities and providing recycled water to new areas of the Elk Grove/Laguna area. SRCSD wholesales the recycled water to SCWA and SCWA retails the recycled water to its customers. SCWA owns and maintains the distribution system.

There are currently no recycled water customers inside the City. The City's Water Master Plan (currently underway) will evaluate a number of options to provide recycled water to existing and future City customers in South Sacramento and Natomas. In addition, the Master Plan will examine the potential for providing recycled water in the new growth area of Delta Shores and the potential new growth area of the Natomas Joint Vision. South Sacramento has a number of large recycled water customers including the Cogeneration Plant, Bing Maloney Golf Course, and Land Park. Natomas has a large number of parks, and irrigated medians. Furthermore, both of these areas have undeveloped areas under the City's current general plan that could utilize recycled water when developed.

The City's Water Master Plan will examine several potential recycled water projects. While all of the options examined in the Water Master Plan are technically feasible, none of them are economically feasible when compared to delivering potable water. This could change if a recycled water project received grant funding or some other source of external funding.

The most promising of the options studied in the Water Master Plan is a project where SRCSD and the SMUD are exploring the potential use of recycled water at SMUD's electrical co-generation facility (co-gen) on 47th Avenue. This facility currently receives potable water from the City and SRCSD is trying to assemble funding (through grants and other funds) to construct the infrastructure to convey recycled water to the co-gen plant. This project could offset up to 900 AFY. The project is still in the development phase and no projected completion date is available, While the Co-Gen facility is currently a City customer, it is not within the City limits. The City will not be purchasing recycled water nor will it be selling it as part of this project.

Aside from the co-gen facility, recycled water will be considered as an alternative supply in the City's future planning.

Since the City did not use recycled water in 2005 or 2010, Guidebook Table 24 (2005 UWMP recycled water use projection compared to 2010 actual) has not been included in this UWMP.

4.6.5 Potential Uses of Recycled Water

As mentioned above, significant recycled water use within the City is not anticipated because it is not cost effective unless grant funding or other funding sources are obtained. Potential uses of recycled water within the City could include irrigation (parks, golf courses, schools, cemeteries, and medians) and other cogeneration facilities. Since recycled water is not economically feasible without grant or outside funding, specific quantities of potential recycled water use cannot be estimated. Therefore, Guidebook Table 23 (Potential Future Use) has not been included in this UWMP. Incorporation of this table will be revisited in the 2015 UWMP update.

4.6.6 Encouraging Recycled Water Use

The City is working with the SRCSD to explore potential future usage. For the purposes of this UWMP, no recycled water is projected to be used in the City in the near future. This may change in the future as studies progress and projects develop. Therefore, Guidebook Table 26 (Methods to encourage recycled water use from 2010 to 2035) has not been included in this UWMP. Incorporation of this table will be revisited in the 2015 UWMP update.

4.6.7 Recycled Water Use Optimization Plan

At the present time, a recycled water use optimization plan has not been developed. While all of the recycled water use options examined in the City's Water Master Plan were technically feasible, none were economically feasible compared to delivering potable water.

This could change if a recycled water project received grant funding or some other source of external funding. Additional work needs to be done on developing a recycled water program.

4.7 SUMMARY OF WATER SUPPLIES

Table 28 summarizes the current and projected water supply sources for the City. The table assumes the supplies will be available for likely wholesale and wheeling customers, described earlier. As described in Chapter 3, additional wheeling and wholesale customers may be served in the future. Table 29 presents the water supply that would be available to serve this additional wheeling and wholesale customer demand. The projected annual water supply available to the City takes into account the development of new wells and/or expansion of the surface water treatment system in the future as warranted by demand.

The total supplies in Tables 28 and 29 represent only the supplies required to meet anticipated demands (summarized in Tables 18 and 19 of this UWMP). As such, the "total" values in Tables 28 and 29 are equivalent to total projected demands. While groundwater supplies are estimated based on anticipated use, surface water supplies were determined as the difference between projected demands and available groundwater supply. The City does maintain entitlements to surface water that exceed the projected supplies described below. A comparison between the City's total supply entitlement volumes and anticipated demands is provided in Section 5.3 of this UWMP.

Table 28 Water Supplies – Current and Projected Likely Wholesale/Wheeling Customers (Guidebook Table 16)
2010 Urban Water Management Plan
City of Sacramento

Water Supply Sources	**Projected Supply (AFY)**					
Water purchased from:	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Supplier-Produced Groundwater(1)	18,377	22,300	22,300	22,300	22,300	22,300
Supplier-Produced Surface Water(2)	94,990	154,735	156,952	178,069	197,862	208,862
Transfers In	0	0	0	0	0	0
Exchanges In	0	0	0	0	0	0
Recycled Water	0	0	0	0	0	0
Desalinated Water	0	0	0	0	0	0
Other	0	0	0	0	0	0
Total	**113,367**	**177,035**	**179,252**	**200,369**	**220,162**	**231,162**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
1. Water supply estimates based on projected water demands.
2. Supplier-produced surface water includes supply diverted from the Sacramento River treated at the SRWTP and diverted from the American River treated at the FWTP. If supply is greater than treatment capacity it is assumed that the City would expand an existing WTP or construct a new WTP.

Table 29	Water Supplies – Current and Projected Maximum Wholesale/Wheeling Request (Guidebook Table 16) 2010 Urban Water Management Plan City of Sacramento					
Water Supply Sources	**Projected Supply (AFY)**					
Water purchased from:	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Supplier-Produced Groundwater(1)	18,377	22,300	22,300	22,300	22,300	22,300
Supplier-Produced Surface Water(2)	94,990	150,289	163,488	195,586	227,684	238,684
Transfers In	0	0	0	0	0	0
Exchanges In	0	0	0	0	0	0
Recycled Water	0	0	0	0	0	0
Desalinated Water	0	0	0	0	0	0
Other	0	0	0	0	0	0
Total	**113,367**	**172,589**	**185,788**	**217,886**	**249,984**	**260,984**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.

1. Water supply estimates based on projected water demands.
2. Supplier-produced surface water includes supply diverted from the Sacramento River treated at the SRWTP and diverted from the American River treated at the FWTP. If supply is greater than treatment capacity it is assumed that the City would expand an existing WTP or construct a new WTP.

4.8 FUTURE WATER PROJECTS

The City has sufficient water supply entitlements to meet projected water demands during various hydrologic conditions to the year 2035 and therefore, is not currently seeking additional surface water supply. However, as discussed previously, the City does not have sufficient diversion or treatment capacity to use 100 percent of its ultimate surface water entitlements during all hydrologic conditions.

The City has sufficient water production capacity to the year 2030 during below Hodge conditions assuming 1) plant rehabilitation improvements are constructed at the SRWTP and 2) no additional wholesale and wheeling customers are served. Table 30 presents these projected maximum day demands.

Table 30	Maximum Day Demand – Future City Retail Demand and Existing Wholesale and Wheeling Customers 2010 Urban Water Management Plan					
Customer	**Demand, Million Gallons Per Day**					
	2010	**2015**	**2020**	**2025**	**2030**	**2035**
City of Sacramento Retail Demand	169	240	234	246	259	281
Sacramento International Airport and Metro Air Park	2.8	2.8	2.8	2.8	2.8	2.8
California American Water Company	1.1	2.3	2.3	2.3	2.3	2.3
Sacramento County Water Agency Zone 40 Wheeling	11	11	11	11	11	11
Fruitridge Vista Water Company	3.2	3.2	3.2	3.2	3.2	3.2
Total	**187**	**259**	**253**	**266**	**278**	**300**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare of 2010 Urban Water Management Plan" by DWR.
Source: 2005 data from the City annual Report. 2010 data from spreadsheet titled WaterFlow2010.xlxs provided by the City.

As previously discussed, a number of water agencies have expressed wanting to obtain wholesale water from the City, or have planned on the City supplying water in their Water Master Plans or Urban Water Management Plans. These maximum day demands are presented in the Table 31. Additionally, it is assumed that the demand builds linearly from 2010 to 2030. This is a conservative assumption since given the downturn in the economy and the local real estate market, but it does illustrate that new water production infrastructure would need to be constructed in order to serve these additional wholesale demands.

Table 32 summarizes the potential future water projects. Each project is discussed below.

Table 31 Maximum Day Demand – Future City Retail Demand and Likely Wholesale and Wheeling Customers 2010 Urban Water Management Plan

Customer	Demand, Million Gallons Per Day					
	2010	2015	2020	2025	2030	2035
City of Sacramento Retail Demand	169	240	234	246	259	281
Sacramento International Airport and Metro Air Park	2.4	4.1	5.9	7.6	9.3	9.3
Sacramento Suburban Water District - Town and Country System(1)	20	20	20	20	30	30
California American Water Company - Arden	0	0.8	1.6	2.4	3.2	3.2
California American Water Company - Rosemont	0	5.3	10.6	15.9	21.2	21.2
California American Water Company - Parkway	1.2	4.8	8.4	12.1	15.7	15.7
Sacramento County Water Agency Zone 40 Wholesale	0	4.8	9.5	14.3	19	19.0
Sacramento County Water Agency Zone 40 Wheeling	11	11	11	11	11	11
Fruitridge Vista Water Company	3.2	4.8	6.4	8.0	9.6	9.6
Total	**207**	**295**	**307**	**337**	**378**	**400**

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare of 2010 Urban Water Management Plan" by DWR.
Source: 2005 data from the City annual Report. 2010 data from spreadsheet titled WaterFlow2010.xlxs provided by the City.

1. This is the maximum that Sacramento Suburban Water District would take if American River Water was available throughout the year, and if SSWD elected to purchase it from the City. See chapter 4 regarding diversion limitations.

Table 32	Future Water Supply Projects (Guidebook Table 26) 2010 Urban Water Management Plan City of Sacramento							
Project Name	**Projected Start Date**	**Projected Completion Date**	**Potential Project Constraints**	**Normal-year Supply**	**Single Dry-year Supply**	**Multiple Dry-year First Year Supply**	**Multiple Dry-year Second Year Supply**	**Multiple Dry-year Third Year Supply**
New WTP (North Natomas) SRWTP Expansion Raw Water Line to FWTP	2023 (Sooner if more Wholesale and Wheeling Customers are served)	2028 (Sooner if more Wholesale and Wheeling Customers are served)	Funding, Permitting, Environmental Work	60,600 AFY				
Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.								

4.8.1 Increase in Surface Water Treatment Capacity and Groundwater Production

The City could expand the existing SRWTP design capacity to treat raw water diverted from the Sacramento River using the City's existing entitlements. Using the additional treatment capacity to treat Sacramento River water will allow the City to optimize usage of both the Sacramento River and American River entitlements at the SRWTP. Diversion of both of these entitlements at the SRWTP is available under all hydrologic conditions. Alternatively, the City could construct new groundwater production capacity and employ a conjunctive use program to meet future demands. The Water Master Plan process is evaluating these options and will be making a recommendation for future City infrastructure.

Alternatively, a new WTP to treat Sacramento River water would allow the existing SRWTP to treat water diverted under the City's American River entitlements that would not be diverted at the FWTP during periods when the City's current PSA Limitations apply. Using the new WTP for this purpose would allow the City to divert and treat additional water at the SRWTP under the City's American River entitlements to improve the City's surface water supply reliability.

For planning purposes in this UWMP, it was assumed that a new WTP or expansion of the SRWTP would be completed by the year 2028.

Chapter 5

WATER SUPPLY RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) address the reliability of the agency's water supplies. This includes supplies that are vulnerable to seasonal or climatic variations. In addition, an analysis must be included to address supply availability in a single dry year and in multiple dry years; see excerpt below.

> *10631 (f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions."*
>
> *10631 (c) (2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.*

5.1 WATER SUPPLY RELIABILITY

There are two aspects of supply reliability that can be considered. The first relates to immediate service needs and is primarily a function of the availability and adequacy of the supply facilities. The second aspect is climate-related, and involves the availability of water during mild or severe drought periods.

The City of Sacramento (City) water sources include surface water from the Sacramento River, American River, and groundwater from the Sacramento Valley Groundwater Basin North American and South American Subbasins. The combination of surface water and groundwater results in a high reliability water source for the City.

The City's surface water entitlements include five appropriative water rights permits issued by the State Water Resources Control Board (SWRCB), pre-1914 rights, and a water rights settlement contract with the Bureau of Reclamation (BuRec).

The BuRec and the City entered into a water rights settlement contract pertaining to the use of water from the Sacramento and American Rivers. In addition to other provisions of the Settlement Contract, in exchange for the Bureau's agreement to operate so as to assure the City a reliable supply of surface water under the City's appropriative water right permits, the City agreed to limitations on the City's rate and amount of diversions under the permits. These limitations are summarized below for each river. Refer to Chapter 4 System Supplies for more information on the contract, requirements, and limitations.

- Sacramento River
  - Permit 992
    - 225 cubic feet per second (cfs) maximum flow rate during all hydrologic conditions
    - Maximum annual diversion 81,800 acre-feet per year (AFY)
- American River
  - 675 cfs maximum diversion rate, rate changes depending on hydrologic conditions
  - Diversions can be limited by Conference Years and Hodge Flow Criteria as part of the Purveyor Specific Agreement with the Water Forum
  - Maximum annual diversion 245,000 AFY, depending on hydrologic conditions

It is important to note that although the Sacramento River Water Treatment Plant (SRWTP) design capacity is 160 mgd, the reliable capacity currently is 135 mgd (209 cfs), and although the E.A. Fairbairn Water Treatment Plant (FWTP) design capacity is 200 mgd, the current permitted capacity is 160 mgd (248 cfs), and the City is further restricted from using a portion of the FWTP permitted capacity during certain hydrologic conditions specified in the City's WFA PSA, as discussed previously. Design currently is underway to rehabilitate the SRWTP to treat 160 mgd by the fall of 2016. These capacities limit the amount of water the City can treat from each river, until new treatment facilities are constructed or the existing WTPs are expanded.

Table 33 contains a summary of factors affecting water supply reliability.

Table 33 Factors Resulting in Inconsistency of Supply (Guidebook Table 29)
2010 Urban Water Management Plan
City of Sacramento

Water Supply Sources (1)	Specific Source Name	Limitation Quantification	Legal	Environmental	Water Quality	Climatic	Additional Information
Sacramento River	Sacramento Rivers	Yes	Yes	Yes	Yes	Yes	-
American River	American River	Yes	Yes	Yes	Yes	Yes	-
Groundwater	Sacramento Valley Basin North and South American Subbasins	-	-	-	Yes	-	-

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
1. Water supply sources from Guidebook Table 16 (Table 29 in this report).

Limitation quantification and legal factors include the surface water permits and the BuRec settlement contract, environmental factors include downstream health of the rivers and the Delta, water quality factors include contamination of surface water and groundwater quality, and climatic factors include drought. Other factors that could affect the ability to deliver

water from the rivers or groundwater basin include vandalism of the water pumping stations or another emergency condition as well as a catastrophic interruption of water supply.

Existing regulations do not directly limit the use or expansion of groundwater pumping activities. The combination of surface water and groundwater results in a high reliability water source for the City. If needed, there are several ways that the City could increase water supply and reliability. These include:

- Rehabilitate and/or expand existing water treatment plants
- Construct a new water treatment plant
- Obtain additional water supply through contracts
- Increase water conservation measures
- Utilize additional groundwater
- Utilize recycled water to offset potable water use

5.1.1 Water Quality

The UWMPA requires that the UWMP include a discussion of water quality impacts on the reliability of an agency's water supplies; see excerpt below.

> *10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631 and the manner in which water quality affects management strategies and supply reliability.*

The purpose of this section is to discuss the quality of the City's surface water and groundwater supplies, and the potential impacts water quality may have on supply reliability.

5.1.1.1 <u>Surface Water Quality</u>

The City has two independent surface water sources. Assessments of potential contaminating activities for the City's Sacramento River and American River water sources were completed in December 2010. These reports indicated that both rivers are most vulnerable to contaminants from recreational activities and that the Sacramento River is also susceptible to agricultural contaminants. Other factors that could influence water quality in the rivers include high turbidity during storm events, livestock, urban runoff, and contamination due to other point sources.

During the spring and fall, irrigation return flows are discharged to drainage canals that flow directly into the river; during the winter, local runoff also flows over agricultural lands, increasing the turbidity in the water, and introducing herbicides and pesticides into the river. Intensive agriculture in the Sacramento Valley, especially pesticide-dependent rice farming, increases the concentration of compounds such as Molinate and Thiobencarb. The California Department of Food and Agriculture, in cooperation with the SWRCB, has implemented a tailwater management program for Sacramento Valley rice growers to

reduce discharges of Molinate and Thiobencarb into the Sacramento River. The City, in partnership with the City of West Sacramento, the County of Sacramento, and the East Bay Municipal Utility District participates in the Rice Pesticide Workgroup, which monitors and reports rice pesticide discharge to the Regional Water Quality Control Board (RWQCB). The City also participates in many other programs to keep the river clean including the Keep the Waters Clean Campaign in partnership with the City of West Sacramento, the County of Sacramento, and East Bay Municipal Utility District; and the Sanitary Survey of the Sacramento River Watershed in partnership with the City of West Sacramento, City of Roseville, and East Bay Municipal Utility District.

Raw water quality is routinely monitored by the City, and the water treatment plants are designed to treat a wide range of parameters. The City's drinking water meets all applicable water quality regulations (2010 Consumer Confidence Report).

In general, water quality in the Rivers has a limited effect on the City's ability to provide its service area with a reliable source of high quality drinking water. Due to the nature of the potential water quality impacts described above, no future unaddressed impacts have been identified and the potential quantitative impacts prior to 2035 cannot be established.

5.1.1.2 Groundwater Quality

Groundwater from the North American and South American Subbasins underlying the City's service area generally meets primary and secondary drinking water standards for municipal use, and is described as being calcium-magnesium-bicarbonate type water, with minor fractions of sodium-magnesium-bicarbonate and sodium-calcium-bicarbonate (California's Groundwater Bulletin 118).

Many areas of good quality groundwater exist in the subbasins. In some portions of the subbasins, groundwater quality is marginal. Levels of total dissolved solids/specific conductance, chloride, sodium, bicarbonate, fluoride, nitrate, iron, manganese, and arsenic may be of concern in some locations within the subbasin (California's Groundwater Bulletin 118). The groundwater quality results detailed in the City's 2010 Consumer Confidence Report showed that the groundwater did not exceed the EPA maximum contaminant levels for any of the primary or secondary regulated drinking water constituents. The City's groundwater supply may be subject to future regulations regarding arsenic or other chemicals of concern could potentially require further treatment in the future.

There are three sites within the North American subbasin with significant groundwater contamination issues: the former McClellan AFB, Union Pacific Railroad Rail Yard in Roseville, and the Aerojet Superfund Site. Although the Aerojet site lies south of the North American subbasin, a contaminant plume (including trichloroethylene and tetrachloroethylene) extends north from Aerojet, under the American River and into the North American subbasin (California's Groundwater Bulletin 118). Other localized areas of contamination exist throughout the basin and are generally smaller in scope and extent of contamination. The sites in the South American Subbasin with significant groundwater contamination include Aerojet, Mather Field, and the Sacramento Army Depot. Other sites,

which presently do not present any significant groundwater contamination, are the Kiefer Boulevard Landfill, an abandoned Pacific Gas and Electric (PG&E) site on Jiboom Street near Old Sacramento, and the Southern Pacific and Union Pacific Rail Yards in downtown Sacramento.

The Sacramento Groundwater Authority (SGA) has recently received a particle tracking model that examines contamination from Aerojet and its potential migration in the aquifer north of the American River. It appears from the results that significant contamination will not occur in the next century.

From the information available, it is assumed that there will not be any changes to groundwater supply prior to 2035 due to water quality.

5.2 WATER SHORTAGE CONTINGENCY PLANNING

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses specified issues; see excerpt below.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply and an outline of specific water supply conditions which are applicable to each stage.*

This Water Shortage Contingency Plan, if implemented, would be enforced within the City's service area. Preparation of the plan was coordinated with other local water purveyors that have interties with the City. In addition, a copy of this plan was submitted to the City and County Offices of Emergency Planning.

The Water Shortage Contingency Planning includes actions to be taken during droughts and catastrophic reductions in water supplies and conservation measures and actions (prohibitions, restrictions, and penalties).

5.2.1 Emergency/Disaster Response Plan

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses a catastrophic interruption of water supplies; see excerpt below.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.*

The stages of action to be undertaken during a catastrophic interruption of water supply or at the City's water treatment facilities that could include flooding, major fire emergencies, regional power outage, an earthquake, water contamination, and acts of sabotage are outlined below.

5.2.1.1 Flooding

The City is potentially at risk of flooding as a result of severe storms, large quantities of runoff from the Sierra Nevada, and/or failure of levees, which protect the City from major flooding events. The Sacramento Area Flood Control Agency (SAFCA) was created in 1989 to address the Sacramento's area vulnerability to catastrophic flooding. Members of SAFCA include the City of Sacramento, the County of Sacramento, the County of Sutter, the American River Flood Control District, and Reclamation District 1000. SAFCA's mission is to provide the Sacramento region with increased flood protection along the American and Sacramento Rivers, with at least a 100-year level of flood protection as quickly as possible, while seeking a 200-year or greater level of protection over time. SAFCA's activities are funded from development fees and annual assessments imposed on benefiting properties in three separate districts in Sacramento and Sutter Counties. A number of flood protection projects have already been completed, including construction of new levees, repairs to existing levees, and bank protection and stabilization.

Even though the City's water system is vulnerable to the risk of flooding, the redundancy it has with two separate water treatment plants and two different surface water supply sources (the Sacramento and American Rivers) helps alleviate some of this risk. If the SRWTP is out of service due to flooding, the FWTP may be available to meet City demands, and vice versa. It is possible that a single flooding event could affect both of the City's water treatment plants and other water system facilities; however, in such an instance, the City will respond as quickly as possible to restore water service for the City's residents.

5.2.1.2 Major Fire Emergencies

The redundancy the City has in multiple system storage tanks, two separate water treatment plants, and two different surface water supply sources allows the City to react to a major fire emergency. Additionally, the City could reduce water service to wholesale customers that receive non-firm supplies if needed for a major fire emergency within the City service area.

The City Fire Department maintains direct contact with the WTPs via phone. In the event of a fire, the system pressure can be increased by the Plant Operators through the WTP System Control and Data Acquisition systems. The WTP is staffed twenty-four hours per day, seven days per week.

5.2.1.3 Regional Power Outage

In the event of a regional power outage, the City is prepared to meet water demands through the use of backup generators located at both of the water treatment plants and

pump stations. None of the City's groundwater wells currently have backup power; however, some of the wells have plugs for generators.

5.2.1.4 Earthquake

Water system infrastructure, including treatment plants, pump stations, storage tanks, and pipelines, can be damaged during a strong earthquake. Although the City is not located within a high activity seismic zone, some facilities could be damaged as the result of a strong earthquake. The City has planned for this potential by constructing system redundancy into its water system. The City has two existing water treatment plants, multiple storage facilities, and looped distribution pipelines, to allow potentially damaged portions of the City's system to be isolated and repaired.

5.2.1.5 Water Contamination or Acts of Sabotage

A catastrophic interruption in water supply could occur if the American or the Sacramento River supplies became contaminated (e.g., due to a chemical spill, act of sabotage, or other environmental incident) or either of the water treatment plants are shutdown (e.g., due to a treatment process or mechanical failure or an act of sabotage). In such a case, the City would need to rely on the unaffected river and water treatment plant as well as the groundwater supply and emergency storage to meet demands.

If water contamination or an act of sabotage occurred during the summer months, when demands are high, the City could implement one or more stages of the Water Shortage Contingency Plan to notify customers of the need to reduce water use. Additionally, the City could reduce water service to wholesale customers that receive non-firm supplies.

5.2.2 Water Shortage Contingency Resolution and Ordinance

The California Water Code requires that the City develop mandatory provisions and a draft water shortage contingency resolution as part of the UWMP to reduce water use, including prohibitions against specific wasteful practices, such as gutter flooding. The City Water Shortage Contingency Plan Resolution containing water restrictions and enforcement measures during a water shortage is included in Appendix F. The City Council would need to act on this resolution when a water shortage emergency is declared. The City code (Chapter 13.04) includes the following language regarding the resolution.

"In response to any condition necessitating increased water conservation, such as a water shortage due to drought, natural disaster or other reduction of water supply availability, or as may otherwise be required to protect the public health, safety and welfare, the city council may by resolution declare the existence of a water shortage and impose revised and/or additional limitations and time restrictions on outdoor water use while the water shortage remains in effect, and no person shall use, or cause to be used, city water in violation of such limitations or restrictions while the water shortage remains in effect. Unless the resolution specifies an ending date, the declaration of water shortage shall remain in effect until rescinded or otherwise modified by subsequent resolution of the city council."

5.2.3 Water Shortage Conservation Plan

The City has developed a four-stage conservation plan. Each stage includes specific water conservation actions and use restrictions designed to reduce water use. Implementation of the stages is cumulative; meaning that implementation of a higher stage shall also include implementation of all previous stages. Shortage conditions for each stage are based on a percent reduction of water supply.

During natural disasters or if the health and safety of persons within the City service area is jeopardized, the City may need to skip stages to address the emergency water shortage. The water shortage plan and resolution are designed to be flexible so that the City can respond to the specific situation occurring at a particular time. The stages of action in response to water supply shortages, including up to a 50 percent reduction in water supply are summarized in Table 34.

Table 34 Water Shortage Contingency – Rationing Stages to Address Water Supply Shortages (Guidebook Table 35)
2010 Urban Water Management Plan
City of Sacramento

Stage No.	Water Supply Conditions	% Shortage
1	Diversion reductions	20
2	Diversion reductions during summer months	30
3	Diversion reductions and higher demands during the summer	40
4	Severe diversion reductions or a catastrophic interruption in water supply	50

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Water Suppliers in the Preparation of a 2010 Urban Water Management Plan" by DWR.

Supply shortages will trigger the different water rationing stages. Triggers may include surface water diversion reductions mandated by the Water Forum Agreement, drought, and catastrophic events.

5.2.3.1 Stages of Action

The City's four-stage rationing plan, including voluntary and mandatory stages, is described below:

Stage 1 - All customers would be requested to reduce consumption by 10 to 20 percent. Customers would be requested to implement Stage 1 water conservation measures and adhere to the City's Outdoor Water Conservation Provisions.

Actions: Continue existing conservation programs, and:

1. Implement Water Shortage Contingency Plan Ordinance.
2. Initiate a public information campaign to inform customers the need for water conservation and explain the water conservation measures.
3. Request that customers reduce water use by 10 to 20 percent.
4. Provide information to customers on ways to reduce their water use.
5. Increase water waste patrols to enforce the City's outdoor water conservation provisions in the City code (Chapter 13.04, Article XI).
6. Enforce the City's public fire hydrant use regulations (Chapter 13.04, Article II).
7. Reduce irrigation of parks and cemeteries.
8. Require shut-off valves on all hoses used for irrigation purposes, car washing, and other uses.
9. Enforce irrigation schedule as detailed in the City's outdoor water conservation provisions in the City code (Chapter 13.04, Article XI).

Stage 2 - All customers would be required to reduce consumption by 20 to 30 percent. Customers would be requested to implement Stage 1 and 2 water conservation measures and adhere to the City's Outdoor Water Conservation Provisions.

Actions: Continue existing conservation programs, Stage 1 provisions above, and:

1. Intensify the public information campaign to inform customers the need for water conservation and explain the water conservation measures.
2. Further increase water waste patrols to enforce the City's outdoor water conservation provisions in the City code.
3. Limit outdoor irrigation to two days per week.
4. Limit irrigation hours.
5. Further, reduce irrigation of parks and cemeteries.
6. Allow car washing with the use of a bucket only.
7. Prohibit all public water uses not required for health and safety.
8. Allow main flushing only for emergency purposes.

Stage 3 - All customers would be required to reduce consumption by 30 to 40 percent. Customers would be requested to implement Stage 1, 2, and 3 water conservation measures and adhere to the City's Outdoor Water Conservation Provisions.

Actions: Continue existing conservation programs, Stage 1 and 2 provisions above, and:

1. Continue the public information campaign to inform customers the need for water conservation and explain the water conservation measures.

2. Intensify the City's leak detection program.
3. Limit outdoor irrigation to one day per week using manual application only.
4. Prohibit automatic sprinklers.
5. Limit irrigation hours.
6. Further, reduce irrigation of parks and cemeteries.
7. Prohibit car washing.

Stage 4 - All customers would be required to reduce consumption by 40 to 50 percent. Customers would be requested to implement Stage 1, 2, 3, and 4 water conservation measures and adhere to the City's Outdoor Water Conservation Provisions.

Actions: Continue existing conservation programs, Stage 1, 2, and 3 provisions above, and:

1. Continue the public information campaign to inform customers the need for water conservation and explain the water conservation measures.
2. Prohibit outdoor irrigation of residential turf.
3. Prohibit irrigation of median strips.
4. Further, reduce irrigation of parks and cemeteries.

Table 35 summarizes the key mandatory prohibitions for each stage.

Table 35 Water Shortage Contingency – Mandatory Prohibitions (Guidebook Table 36) 2010 Urban Water Management Plan City of Sacramento

Examples of Prohibitions	Stage When
No outdoor irrigation on Monday, three day/week irrigation schedule	1
Two day/week irrigation schedule	2
Car washing with use of bucket only	2
Prohibit public water uses not required for health and safety	2
One day/week irrigation, manual only	3
Prohibit automatic sprinklers	3
Prohibit car washing	3
Prohibit outdoor irrigation of residential turf	4
Prohibit irrigation of median strips	4

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.

5.2.3.2 Prohibitions and Restrictions under Normal Water Supply Conditions

In addition to the conservation measures discussed above, the City Code outlines prohibitions for normal water supply conditions (Chapter 13.04, Article XI). Appendix G contains the water conservation portion of the City code. These measures include:

- No person shall allow water to be wasted due to leaky or faulty fixtures. (§13.04.850)
- No person shall allow water applied to landscaping or other irrigation purposes to flow away as water waste runoff. (§13.04.860)
- No person shall use water for the purpose of washing down sidewalks, driveways, or parking areas except to alleviate immediate fire, health or sanitation hazards, or to implement an integrated pest management program. (§13.04.870)
- No person shall wash vehicles through a hose unless it is equipped with a shut-off nozzle attachment and the washing is conducted on a day of the week when outdoor irrigation is permitted. (§13.04.870)
- Landscape irrigation shall be prohibited between the hours of 10:00 a.m. and 7:00 p.m. from the day daylight savings begins and extending to the day before daylight savings ends. (§13.04.870)
- Residential and commercial locations bearing a street address ending in an odd number shall be permitted to irrigate on Tuesday, Thursday, and Saturday and locations bearing a street address ending in an even number shall be permitted to irrigate only on Wednesday, Friday, and Sunday. There shall be no water irrigation on Mondays. (§13.04.870)
- Beginning on the day that daylight savings ends and extending to the day before daylight savings begins, landscape irrigation shall be permitted on Saturday and Sunday only. Landscape irrigation is prohibited on any other days of the week. (§13.04.870)

5.2.3.3 Consumption Reduction Methods

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses methods to reduce consumption; see except below.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.*
>
> *10632 (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may 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.*
>
> *10632 (f) Penalties or charges for excessive use, where applicable.*

A summary of the reduction methods is shown below in Table 36. In the event of a 50 percent reduction for a single year, the City will continue with Normal and Stage 1 through 3 rationing measures, mandate adherence to Stage 4 measures, intensify the public information campaign with regular updates on the emergency, and monitor and enforce compliance.

Table 36 Water Shortage Contingency – Consumption Reduction Methods (Guidebook Table 37)
2010 Urban Water Management Plan
City of Sacramento

Consumption	Stage When Initiated	% Water Use Reduction Projected[1]
Voluntary Rationing	1	10% - 20%
Mandatory Rationing	2	20% - 50%
Use Prohibitions	2	20% - 50%
Public Information Campaign	1	10% - 50%

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.

1. Percent water use reduction projected for Stages reflects the cumulative water use reduction projected from previous Stages implemented. For example the Mandatory rationing begins in Stage 2 but is carried forward through Stage 4, hence the inclusion of a projected 50 percent reduction.

5.2.3.4 Penalties and Charges

Chapter 13.04 of the City Code contains enforcement measures that for violation of any of the normal water supply prohibitions and restrictions as well as at each rationing stage once the City Council declares an emergency water shortage. Penalties and charges will be enforced on water wasters. The penalties for excessive use are summarized in Table 37. No penalty is imposed for the first violation; the person who committed the violation is issued a written notice describing the violation and the penalties imposed for subsequent violations. Any violation occurring on separate calendar days is considered a separate violation. The violations above are cumulative and subject to other provisions of the City code. Violations constitute a public nuisance, subject to abatement and further penalties.

Table 37 Water Shortage Contingency – Penalties and Charges (Guidebook Table 38) 2010 Urban Water Management Plan City of Sacramento	
Penalties or Charges	**Stage When Penalty Takes Effect**
Second Violation - written notice and a penalty of twenty-five dollars ($25)[1]	Normal water supply
Third Violation - written notice and a penalty of one hundred dollars ($100)	Normal water supply
Fourth Violation - written notice and a penalty of five hundred dollars ($500)	Normal water supply
Second Violation - written notice and a penalty of fifty dollars ($50)[1]	Stage 1
Third Violation - written notice and a penalty of two hundred dollars ($200)	Stage 1
Fourth Violation - written notice and a penalty of one thousand dollars ($1,000)	Stage 1

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.

1. Penalty shall be waived if the owner or occupant, attends a water conservation seminar offered by the department within 60 days; only one such waiver shall be allowed within any twenty-four (24) month period.

5.2.3.5 Residential Users and Unmetered Commercial/Industrial Uses

With the enactment of AB 2572 in 2004, the City adopted an ordinance amending the City code (Chapter 13.04, Article III) to implement installation of meters on all service connections located within its service area on or before January 1, 2025. In order to comply, the City developed a phased program to accomplish, by January 1, 2025, the installation of water meters on all connections that existed without meters as of January 1, 2005. In 2005, 0.3 percent of residential connections and 76 percent of commercial connections were metered and received metered billing (2005 UWMP). Estimated connections metered as of 2010 included 48.3 percent of residential connections and 77 percent of non-residential connections (i.e., commercial, institutional, irrigation, and other) although not all of these metered residential connections are receiving metered billing yet.

Customers retrofitted with meters are provided a year of comparative billing while they are paying the flat rate. After the customer has received a year of comparative billing and they have been imported into the City billing system (CIS) they are charged on a metered rate.

Although meters are being installed, many of the City's customers still pay for water use based on a flat rate. Consumption limits that would apply in the most restrictive stages of water shortage cannot be based solely on measured water use. Consequently, the proposed consumption limits for residential users are based on restrictions of a specific use, namely outdoor landscape irrigation.

As the City becomes fully metered, monthly meter readings can be used to track compliance with applicable water use reduction requirements. In the event of a severe water shortage, meters could be read more frequently.

5.2.3.6 Mechanism for Determining Actual Reductions in Water Use

The UWMPA requires that the UWMP include a means to determine the actual water use reduction in the event of a water shortage; see excerpt below.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.*

For metered accounts, reductions in water use for each user can be determined based on meter readings. For unmetered accounts and the Service Area as a whole, reductions in water use must be determined by measuring daily and monthly surface water and groundwater production. The City's water supply and system demands are accurately monitored and tracked at the City's two water treatment plants. Once the City is fully metered and all customers have transitioned to metered billing, water reductions can be determined based on meter readings.

Under normal water supply conditions, water production figures are recorded daily by the City. Once a water shortage is declared, the water production will be tracked to determine if the goals for each stage are being achieved.

5.2.3.7 Analysis of Revenue Impacts of Reduced Sales during Shortages

According to the UWMPA, the UWMP is required to include an urban water shortage contingency analysis that addresses the financial impacts from reduced water sales and proposed measures to overcome deficits (e.g., development of a reserve account or special rate adjustments); see except below.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.*
>
> *10632 (g) An analysis of the impacts of each of the proposed measures to overcome those revenue and expenditure impacts, such as the development of reserves and rate adjustments.*

The City does not currently have an emergency fund for loss of revenue during a water shortage. The City will be examining potential conservation pricing structures in the near future, and the necessary methods to stabilize revenue during a drought. Using this analysis, the City could determine if establishment of a special reserve account, increased operating reserves, or a special rate adjustment would be appropriate in the future. Additional costs associated with a shortage include increased monitoring of customer water use. However, a decrease in expenses related to power costs, raw water costs and chemicals to treat the water would also occur with a decrease in demand for water.

Based on an analysis of the dependability of the City's existing water supply sources, the City does not anticipate a water supply shortage that would impact City revenues and expenditures significantly.

5.3 DROUGHT PLANNING

This section considers the City's water supply reliability during three water scenarios: average year, single-dry year, and multiple-dry year period. These scenarios are defined as follows:

- **Average year**: a year in the historical sequence that most closely represents median runoff levels and patterns. It is defined as the median runoff over the previous 30 years or more. This median is recalculated every 10 years.
- **Single-dry year**: generally considered to be the lowest annual runoff for a watershed since the water-year beginning in 1903. Suppliers should determine this for each watershed from which they receive supplies.
- **Multiple-dry year period**: generally considered to be the lowest average runoff for a consecutive multiple year period (three years or more) for a watershed since 1903.

Since the City's water supply in future years will come from the Sacramento and American River, seasonal and climatic changes may affect the availability of water. The groundwater supply is not expected to be significantly impacted by drought conditions, except possibly in the case of very long-term drought).

In order to calculate the basis of hydrologic years, presented in Table 38, data was used from the Department of Water Resources (DWR) WSIHIST for the Sacramento Valley from1901 through 2009 and Lower American River Flow Management System (CALSIMII) Hodge Criteria from 1922 through 1994.

Table 38 Basis of Water Year Data (Guidebook Table 27)
2010 Urban Water Management Plan
City of Sacramento

Water Year Type	Base Year(s)
Average Water Year (1)	2005
Single-Dry Water Year (2)	1977
Multiple-Dry Water Years (3)	1990-1992

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Water Suppliers in the Preparation of a 2010 Urban Water Management Plan" by DWR.
Source: DWR WSIHIST for the Sacramento Valley (1901-2009) and Lower American River Flow Management System Hodge Criteria (1922-1994).

1. Average water years on the Sacramento River would include Hodge flow diversion limitations on the American River.
2. A single dry year on the Sacramento River is assumed to be equivalent to a extremely dry year (Conference Year) on the American River.
3. Multiple dry years may result in American River flow rates less than Hodge Criteria. American River flow rates under the Hodge Criteria from January 1990 to June 19991, and from August 1991 to December 1992.

Table 39 presents the calculations showing the percentage of supply available for the hydrologic years shown in Table 38 for the Sacramento River based on runoff listed in the DWR WSIHIST for the Sacramento Valley. Although the surface water supplies for the SRWTP are obtained from the Sacramento River, the Sacramento Valley watershed is assumed to be representative of drought conditions in the area.

Table 39 Historical Runoff Sacramento Valley
2010 Urban Water Management Plan
City of Sacramento

Average Water Year Runoff (MAF)	Single Dry Water Year Runoff (MAF)	Multiple Dry Water Years Runoff (MAF)		
		Year 1	Year 2	Year 3
18.55	5.12	9.26	8.44	8.87
Percent of Average Year:	28%	50%	46%	48%

Notes: MAF = Million Acre-Feet
"Guidebook Table X" refers to a specific table in the "Guidebook to Assist Water Suppliers in the Preparation of a 2010 Urban Water Management Plan" by DWR.
Source: DWR WSIHIST for the Sacramento Valley from 1901 through 2009

Table 40 presents the calculations showing the percentage of supply available for the hydrologic years shown in Table 38 for the Sacramento River based on the runoff percentages shown in Table 39. The single and multiple dry water year values listed in Table 40 represent theoretical reductions in supply based on reduced runoff typically seen in drought conditions. However, actual supply reductions during drought conditions will likely be much less than indicated in Table 40 due to the City's priority in receiving surface water diversions and protection of reliable supply under its U.S. Bureau of Reclamation contract.

Table 40 Supply Reliability – Sacramento River Historical Conditions (Guidebook Table 28)
2010 Urban Water Management Plan
City of Sacramento

Average Water Year (AFY)	Single Dry Water Year (AYF)	Multiple Dry Water Years (AFY)		
		Year 1	Year 2	Year 3
81,800	22,904	40,900	37,628	39,264
Percent of Average Year:	28%	50%	46%	48%

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Water Suppliers in the Preparation of a 2010 Urban Water Management Plan" by DWR.
Data based on runoff percentages determined from DWR WSIHIST.

Table 41 presents the calculations showing the percentage of supply available for the hydrologic years shown in Table 38 for the American River. The supply reliability for the American River is based upon Conference Year restrictions and Hodge Flow Criteria.

During the period of drought from 1990 to 1992, the American River experienced a river flow rate below the Hodge Flow Criteria for every month except July 1991. For the purposes of this UWMP, it is assumed that the Hodge Flow Criteria is occurring during the entire three-year drought period.

A worst-case drought scenario that would not allow the City to withdraw water from the American River has been included in addition to the single-dry and multiple-dry year scenarios. Although, the American River Unavailable scenario is unlikely, it is presented to consider worst-case conditions for water shortage contingency planning.

Table 41 Supply Reliability – American River Historical Conditions (Guidebook Table 28)
2010 Urban Water Management Plan
City of Sacramento

Average Water Year (AFY)	Single Dry Water Year (AFY)	Multiple Dry Water Years (AFY)			American River Unavailable (AFY)
		Year 1	Year 2	Year 3	
245,000	50,000(1)	89,517(2)	89,517(2)	89,517(2)	0
Percent of Average Year:	20%	44%	44%	44%	0%

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Water Suppliers in the Preparation of a 2010 Urban Water Management Plan" by DWR.
Source: Lower American River Flow Management System (CALSIMII) Hodge Criteria from 1922 through 1994.
1. Diversion limited to not greater than 155 cfs and not greater that 50,000 AFY. Remainder of the American River Entitlement may be diverted at the Sacramento River Water Treatment Plant.
2. Remainder of the American River Entitlement may be diverted at the Sacramento River Water Treatment Plant.

Table 42 contains the actual water supply by source for the average water year and multiple-dry water years.

Table 42 Supply Reliability – Current Water Sources (Guidebook Table 31) 2010 Urban Water Management Plan City of Sacramento				
Water Supply Sources[1]	Average Water Supply Year	Multiple Dry Water Years		
		Year 1	Year 2	Year 3
Sacramento River	81,800	81,800	81,800	81,800
American River	Varies	174,500	178,000	181,500
Groundwater	20,000	20,000	20,000	22,000
Total (AFY):	Varies	276,300	279,800	283,300
Percent of Average Year:		100%	100%	100%

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Water Suppliers in the Preparation of a 2010 Urban Water Management Plan" by DWR.
1. From Guidebook Table 16 (Table 28).

5.3.1 Minimum Supply Available for the Next Three Years

The California Water Code requires that the City estimate the minimum water supply available at the end of the 12, 24, and 36 months, assuming the driest three-year historic supply shortage. The City has three sources of supply, American River, Sacramento River, and groundwater. As previously described, the American River supply is subject to diversion limitations (Conference Years and Hodge Flow). The three-year minimum water supply was assumed to be 1990 through 1992. Table 43 presents the estimated minimum water supply for the next three years.

Table 43 Estimated Minimum Water Supply for Next Three Years 2010 Urban Water Management Plan City of Sacramento			
Water Supply Sources	Projected Minimum Water Supply, AFY		
	2011	2012	2013
Sacramento River	81,800	81,800	81,800
American River	174,500	178,000	181,500
Groundwater	20,000	20,000	20,000
Total (AFY):	276,300	279,800	283,300

Notes: American River projected minimum water supply based on Fairbairn Water Treatment Plant diversion limitations due to extremely dry year and Hodge Flow conditions. Sacramento River projected minimum water supply based on City's Sacramento River permit.

5.3.2 Supplies and Demands for Normal Water Year

The water demands through 2035 are estimated based on the historical daily use criteria, water use targets, and population projections. The projected normal water year supply and demands are summarized in Table 44. Supply totals represent the City's total surface and groundwater entitlements, while demand totals represent the City's maximum projected demands (including retail, wholesale, and wheeling deliveries).

Table 44 Supply and Demand Comparison – Average Year (Guidebook Table 32) 2010 Urban Water Management Plan City of Sacramento					
	2015	**2020**	**2025**	**2030**	**2035**
Supply Totals	290,800	310,300	329,800	346,800	346,800
Demand Totals(1)	**172,589**	**185,788**	**217,886**	**249,984**	**260,984**
Difference	118,211	124,512	111,914	96,816	85,816
Difference as % of Supply	41%	40%	34%	28%	25%
Difference as % of Demand	68%	67%	51%	39%	33%

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
1. Includes Retail and Maximum Wholesale/Wheeling Deliveries.

5.3.3 Supplies and Demands for a Single-Dry Water Year

The single-dry year minimum water supply was assumed to be 1977. Any demand reductions due to future water conservation measures are not included in the single-dry year demand estimates. The projected single-dry year supply and demands are summarized in Table 45. Supply totals represent the City's total surface and groundwater entitlements, while demand totals represent the City's maximum projected demands (including retail, wholesale, and wheeling deliveries).The single-dry year assumptions are as follows:

- Sacramento River, 81,800 AFY available.
- American River under extremely dry year, 50,000 AFY available at the FWTP diversion, the remainder of the American River entitlements may be diverted at the SRWTP. The total entitlement varies depending on the buildup schedule in the Settlement Contract. American River entitlements are:
  - Year 2015: 189,000 AFY
  - Year 2020: 208,500 AFY
  - Year 2025: 228,000 AFY
  - Year 2030 and thereafter: 245,000 AFY
- Groundwater: 20,000 AFY available.

Table 45 Supply and Demand Comparison - Single-Dry Year (Guidebook Table 33) 2010 Urban Water Management Plan City of Sacramento					
	2015	**2020**	**2025**	**2030**	**2035**
Supply Totals	290,800	310,300	329,800	346,800	346,800
Demand Totals[1]	**172,589**	**185,788**	**217,886**	**249,984**	**260,984**
Difference	118,211	124,512	111,914	96,816	85,816
Difference as % of Supply	41%	40%	34%	28%	25%
Difference as % of Demand	68%	67%	51%	39%	33%

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
1. Includes Retail and Maximum Wholesale/Wheeling Deliveries

As shown in Table 45, the City's water supply entitlements exceed demand during the single-dry years through 2035.

5.3.4 Supply and Demand for Multiple-Dry Water Year Periods

This section projects the impact of a multiple-dry year period. Any demand reductions due to future water conservation measures are not included in the multiple-dry year demand estimates. Table 46 provides estimates of the projected multiple-dry year water demand condition. Supply totals represent the City's total surface and groundwater entitlements, while demand totals represent the City's maximum projected demands (including retail, wholesale, and wheeling deliveries).The multiple-dry-year water supply was assumed to be 1990 through 1992. The multiple-dry year assumptions are as follows:

- First Year
  - Sacramento River, 81,800 AFY available
  - American River, 245,000 AFY available
  - Groundwater, 20,000 AFY available
- Second Year
  - Sacramento River, 81,800 AFY available
  - American River, 245,000 AFY available
  - Groundwater, 20,000 AFY available
- Third Year
  - Sacramento River, 81,800 AFY available
  - American River, 245,000 AFY available
  - Groundwater, 20,000 AFY available

Table 46	Supply and Demand Comparison- Multiple-Dry Year (Guidebook Table 34) 2010 Urban Water Management Plan City of Sacramento					
		2015	**2020**	**2025**	**2030**	**2035**
Multiple-Dry Year First Year Supply	Supply Totals	290,800	310,300	329,800	346,800	346,800
	Demand Totals[1]	**172,589**	**185,788**	**217,886**	**249,984**	**260,984**
	Difference	118,211	124,512	111,914	96,816	85,816
	Difference as % of Supply	41%	40%	34%	28%	25%
	Difference as % of Demand	68%	67%	51%	39%	33%
Multiple-Dry Year Second Year Supply	Supply Totals	290,800	310,300	329,800	346,800	346,800
	Demand Totals[1]	**172,589**	**185,788**	**217,886**	**249,984**	**260,984**
	Difference	118,211	124,512	111,914	96,816	85,816
	Difference as % of Supply	41%	40%	34%	28%	25%
	Difference as % of Demand	68%	67%	51%	39%	33%
Multiple-Dry Year Third Year Supply	Supply Totals	290,800	310,300	329,800	346,800	346,800
	Demand Totals[1]	**172,589**	**185,788**	**217,886**	**249,984**	**260,984**
	Difference	118,211	124,512	111,914	96,816	85,816
	Difference as % of Supply	41%	40%	34%	28%	25%
	Difference as % of Demand	68%	67%	51%	39%	33%

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.
1. Includes Retail and Maximum Wholesale/Wheeling Deliveries

As shown in Table 46, the City's water supply entitlements exceed demand during the multiple-dry years through 2035.

5.3.5 Extremely Severe Drought

An extremely severe drought would be an event in excess of the Urban Water Management Plan guidance and of course would be have a very low probability, but perhaps not impossible. For the purposes of this UWMP, an extremely severe drought is a drought that would prohibit the City from diverting off the American River.

This type of drought would result in the City relying on the Sacramento River Water Treatment Plant and groundwater solely, and the combined production capacity of the two would be 180 mgd. As discussed previously in this UWMP, the projected maximum day demand for the years 2015 and 2020 are expected to be 259 mgd and 253 mgd

respectively, if the City does not bring on additional wholesale and wheeling customers. Demands would have to be reduced by about 30 percent to safely serve demands.

5.3.6 Drought Planning Summary

In summary, on an annual basis, under all drought conditions the City possesses sufficient water supply entitlements to meet the demands of its customers up to the year 2035. It is important to note that this assumes that wells and surface water treatment capacity will be rehabilitated and expanded as needed.

DEMAND MANAGEMENT MEASURES

This chapter presents a detailed analysis of the Demand Management Measures (DMMs) contained in the Urban Water Management Planning Act (UWMPA), as well as the City of Sacramento's (City) existing efforts to further develop their water conservation program and Best Management Practices (BMPs). The description, effectiveness, implementation schedule, costs, and methods of improvement for each of the BMPs/DMMs have been included; see excerpt below.

> *10631 (f)(1) and (2) Describe and provide a schedule of implementation for each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:*
>
> *(A) Water survey programs for single-family residential and multifamily residential customers.; (B) Residential plumbing retrofit.; (C) System water audits, leak detection, and repair.; (D) Metering with commodity rates for all new connections and retrofit of existing connections.; (E) Large landscape conservation programs and incentives.; (F) High-efficiency washing machine rebate programs.; (G) Public information programs.; (H) School education programs.; (I) Conservation programs for commercial, industrial, and institutional accounts.; (J) Wholesale agency programs.; (K) Conservation pricing.; (L) Water conservation coordinator.; (M) Water waste prohibitions.; and (N) Residential ultra-low-flush toilet replacement programs.*
>
> *10631 (f)(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.*
>
> *10631 (f)(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.*
>
> *10631 (g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:*
>
> *(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors; (2) Include a cost-benefit analysis, identifying total benefits and total costs; (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost; and (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.*

6.1 INTRODUCTION

The California Urban Water Conservation Council (CUWCC) was created to increase efficient water use statewide. CUWCC's goal is to integrate urban water conservation BMPs into the planning and management of California's water resources. A Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) was developed and has been signed by over 150 water suppliers and other concerned parties. The City became a signatory to the MOU in 1991 and is therefore a member of the CUWCC. The

purpose of the MOU was to expedite implementation of reasonable water conservation measures in urban areas and to establish appropriate assumptions for use in calculating estimates of reliable future water conservation savings. The MOU includes definitions, implementation, requirements, and water savings assumptions for each BMP (another term for DMM).

In accordance with the MOU, the City files annual reports to the CUWCC outlining progress towards implementing the BMPs. Council members can submit their most recent BMP Report with their Urban Water Management Plan (UWMP) to address the urban water conservation issues in the UWMPA. The City's CUWCC Annual Reports for 2009 and 2010 are contained in Appendix H.

The City is a member of the Sacramento Water Forum, which is comprised of water utilities, environmental and other groups interested in long-term management of Sacramento County's water resources. In April 2000, the members of the Sacramento Water Forum approved the Water Forum Agreement (WFA), which contains seven elements which all signatories to the WFA agreed to endorse and, where appropriate, participate in. The seven elements are:

- Increased surface water diversions
- Actions to meet customers' needs while reducing diversion impacts in drier years
- Support for an improved pattern of fishery flow releases from Folsom Reservoir
- Lower American River habitat management element
- Water conservation element
- Groundwater management element
- Water Forum successor element

The Water Conservation Element of the WFA was negotiated among all stakeholders and published in August 1997, and was updated and approved by the Water Forum membership in 2009. The Water Conservation Element requires the development and implementation of a water conservation plan which includes 14 BMPs. These 14 BMPs are similar to the DMMs listed in the UWMPA and the BMP Categories listed in the CUWCC MOU. The 2009 City's adoption resolution of the Water Conservation Element and a copy of the Water Conservation Element are included in Appendix H.

Table 47 shows the relationship of the WFA BMPs to the CUWCC's BMPs and the UWMPA DMMs.

Table 47 Relationship of UWMPA DMMs, CUWCC BMP's and WFA BMPs 2010 Urban Water Management Plan City of Sacramento				
UWMPA - DMM		**CUWCC – Category and BMP**	**WFA BMP**	
A	Water Survey Programs for Single Family and Multi-Family Residential Customers	Programmatic: Residential BMP 3.1 Residential Assistance Program BMP 3.2 Landscape Water Survey	1	Interior and exterior water audits and incentive programs for single family and multi-family residential and institutional customers
B	Residential Plumbing Retrofit	Programmatic: Residential BMP 3.1 Residential Assistance Program	2	Plumbing retrofit of existing residential accounts
C	System Water Audits, Leak Detection and Repair	Foundational: Utility Operations – Water Loss Control BMP 1.2 Water Loss Control	3	Distribution system water audits, leak detection and repair
D	Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections	Foundational: Utility Operations – Metering BMP 1.3 Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections	4	Non-residential meter retrofit Residential meter retrofit
E	Large Landscape Conservation Programs and Incentives	Programmatic: Landscape BMP 5 Landscape	5 6 12	Large landscape water audits and incentives for commercial, industrial, institutional (CII) and irrigation accounts Landscape water conservation requirements for new and existing commercial, industrial, institutional and multi-family developments Landscape water conservation for new/existing single family homes
F	High Efficiency - Washing Machine Rebate Program	Programmatic: Residential BMP 3.3 High Efficiency - Washing Machine Financial Incentive Program	No corresponding WFA BMP	
G	Public Information Programs	Foundational: Education – Public Information Programs BMP 2.1 Public Information Programs	7	Public information
H	School Education Programs	Foundational: Education – School Education Programs BMP 2.2 School Education Programs	8	School education
I	Conservation Programs for Commercial, Industrial, and Institutional Accounts	Programmatic: Commercial, Industrial, and Institutional BMP 4 Commercial, Industrial, and Institutional	9 16	Commercial and industrial (CI) water conservation Ultra-low flush toilet replacement program for non-residential customers

J	Wholesale Agency Programs	Foundational: Utility Operations – Operations BMP 1.1.3 Wholesale Agency Assistance Programs	No corresponding WFA BMP	
K	Conservation Pricing	Foundational: Utility Operations – Pricing BMP 1.4 Retail Conservation Pricing	11	Conservation pricing for metered accounts
L	Water Conservation Coordinator	Foundational: Utility Operations – Operations BMP 1.1.1 Conservation Coordinator	14	Water conservation coordinator
M	Water Waste Prohibition	Foundational: Utility Operations – Operations BMP 1.1.2 Water Waste Prevention	13	Water waste prohibition
N	Residential Ultra-Low Flush Toilet Replacement Program	Programmatic: Residential BMP 3.4 WaterSense Specification (WSS) Toilets	16	Ultra-low flush toilet replacement program for residential customers

The City is also a member of the Regional Water Authority's (RWA), which is a joint powers authority that serves and represents the interests of 22 water-related entities in El Dorado, Placer, Sacramento, and Yolo counties. The RWA was formed to serve and represent regional water supply interests and to assist its members in protecting and enhancing the reliability, availability, affordability, and quality of water resources.

The RWA Water Efficiency Program (RWEP) is a large-scale effort designed to help participating agencies fulfill commitments to implement Water Forum water conservation plans. The RWEP supports members with conservation requirements related to the Water Forum, CUWCC, U.S. Bureau of Reclamation (BuRec), Assembly Bill 1420, and Senate Bill x7-7. As an agency that represents the interests of several water suppliers, the RWA has been able to obtain several grants for its members to use for water conservation programs.

The RWEP provides region-wide water efficiency activities such as school education and public outreach and other water conservation DMMs/BMPs utilizing widespread marketing to benefit the members. Additionally, RWEP offers other water efficiency services. These services have been incorporated with the City's current water conservation efforts to enhance their DMM/BMP programs.

6.1.1 City Commitment to Water Conservation

The City is committed to reducing the demand for potable water through conservation. This is primarily done through implementation of DMMs/BMPs, the City's Water Conservation Plan, City's Water Conservation Coordinator, participation in the Sacramento Water Forum, which includes conformance with the WFA and implementation of the CUWCC BMPs, and participation in the RWA, which includes participation in the RWEP.

The City realizes the importance of water conservation to ensure a reliable future water supply. Even though the City possesses a reliable water supply, the City is committed to reducing the demand for potable water through conservation and conjunctive use to maximize sustainability.

Water conservation in the City has multiple benefits – it can make more water available to improve American River flow conditions, it can improve water quality in the American and Sacramento Rivers and the Delta, it can improve the long-term reliability of the region's water supply, and it can lower the cost of water service to the City's customers. The City's 2010 Interim Water Conservation Plan is included in Appendix I. The City's Interim Water Conservation Plan is a living document that communicates the City's approach to implementing water conservation thereby fulfilling the commitments the City has made to its customers, the WFA, and the CUWCC.

The Water Conservation Plan is considered interim because future infrastructure cost information, that is required to determine the monetary benefits of conservation, is unavailable at this time. However, this information is being developed through the City's water master planning effort. The 2015 UWMP update will reflect this analysis.

The City is committed to implement the CUWCC Foundational BMPs (refer to Table 47). In addition, the City is required to implement programmatic BMPs if they are locally cost-effective. However, as discussed above, a cost-effective analysis has not yet been conducted; therefore, all programmatic BMPs shown in Table 47 have been implemented. Although the cost-effective analysis was not completed, the cost per AF of savings could be used to prioritize program efforts. This approach suggested that the City focus on outdoor water savings (DMM A and DMM E) first, followed by commercial, industrial, and institutional (CII) (DMM I), and then rebates for WaterSense toilets (DMM N) and High-efficiency clothes washers (DMM F).

Table 48 provides an overview of the City's current implementation status for the 14 DMMs contained in the UWMPA. Descriptions of the City's activities with respect to each DMM are provided below. All DMMs are either being implemented or are scheduled for implementation. Appendix H contains copies of 2009 and 2010 CUWCC Annual Reports, 2011 Assembly Bill (AB) 1420 Self Certification Statement, and the 2009 WFA Water Conservation Element.

Specific data was obtained from the City's Water Conservation Coordinator, the City's CUWCC Annual Reports, AB 1420 Self Certification Statement, and the City's 2010 Interim Water Conservation Plan.

Table 48 Demand Management Measure Implementation Status Summary 2010 Urban Water Management Plan City of Sacramento		
DMM	**DMM Description**	**Implementation Status**
A	Water Survey Programs for Single Family and Multi-Family Residential Customers	Program in Place
B	Residential Plumbing Retrofit	Program in Place
C	System Water Audits, Leak Detection and Repair	Program in Place
D	Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections	Exemption Claimed from CUWCC
E	Large Landscape Conservation Programs and Incentives	Program in Place
F	High Efficiency - Washing Machine Rebate Program	Program in Plan
G	Public Information Programs	Program in Place
H	School Education Programs	Program in Place
I	Conservation Programs for Commercial, Industrial, and Institutional Accounts	Program in Place
J	Wholesale Agency Programs	Program in Place
K	Conservation Pricing	Planned
L	Water Conservation Coordinator	Program in Place
M	Water Waste Prohibition	Program in Place
N	Residential Ultra-Low Flush Toilet Replacement Program	Program in Place

6.2 DMM A: WATER SURVEY PROGRAMS FOR SINGLE-FAMILY AND MULTI-FAMILY RESIDENTIAL CUSTOMERS

The purpose of this DMM is to provide site-specific leak detection assistance that may include, but is not limited to, the following: a water conservation survey, water efficiency suggestions, and inspections. Showerheads and faucet-aerators that meet current water efficiency standards are provided as needed. The water conservation survey and inspections can include reviewing water usage history with the customer, and identifying leaks inside and outside the home.

The City's landscape water survey portion for this DMM provides, but is not limited to, the following: check irrigation system and timers for maintenance and repairs needed, estimate or measure landscape area, develop customer irrigation schedule, provide information packet to customer, and provide customer with evaluation results and water savings recommendations. Refer to BMP 3.1 and 3.2 in the City's 2009 and 2010 CUWCC Annual Reports (Appendix H) for further information.

Implementation Schedule:

- Program Start: January 2002.
- Program Status: On-going. Offers made annually to single-family and multi-family residential customers. Program advertised using bill inserts and water conservation newsletter, “Water Spots.”

Annual Budget:

- FY 2011: Budgeted: $341,700 (includes budget for DMM B).

Methods to Evaluate Effectiveness:

- The best way to evaluate the effectiveness of implemented water surveys is periodic review of water use for customers that have received surveys.

Conservation Savings:

- Because it is up to the individual customer to implement survey recommendations, savings are difficult to quantify at this time. The City’s 2010 Interim Water Conservation Plan contains estimated savings from each BMP.

Methods to Improve Effectiveness:

As water meters are installed on residential customer connections, customers will be able to review usage and potentially try to conserve water. It is anticipated that as customers review metered billing in the following years, water surveys will be requested more frequently. The effectiveness of this DMM could be improved through continued advertising for water surveys.

6.3 DMM B: RESIDENTIAL PLUMBING RETROFIT

This DMM involves enforcement of plumbing fixture efficiency standards and encourages programs to retrofit existing inefficient fixtures with newer reduced flow fixtures. This retrofit program focuses on plumbing installed prior to 1992, in part due to the passage of the Federal Energy Policy Act of 1992, which restricted all newly manufactured faucets and showerheads to a flow of 2.5 gallons per minute (DWR, August 1994).

Under this program, water-conserving devices such as high-quality low-flow showerheads, toilet-displacement devices, toilet flappers, and faucet aerators are distributed to customers. Although the City’s residential plumbing retrofit program is offered to all customers, the City’s program targets neighborhoods built before 1991 and low or moderately low income areas.

Refer to BMP 3.1 in the City’s 2009 and 2010 CUWCC Annual Reports (Appendix H) for further information.

Implementation Schedule:

- Program Start: 2001.
- Program Status: Distribution of plumbing retrofit kits on-going.

Annual Budget:

- FY 2011: Budgeted: $341,700 (includes budget for DMM A).

Methods to Evaluate Effectiveness:

- The effectiveness of this DMM is based upon the percentage of customers that install low-flow fixtures.

Conservation Savings:

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

Methods to Improve Effectiveness:

The City should continue to target areas with older homes and advertise availability of plumbing retrofit fixtures. Targeting maximizes the potential conservation benefits from these retrofits. As the City becomes metered with commodity rates, residents of older homes that did not utilize the water conservation fixtures may request and install low-flow fixtures.

6.4 DMM C: SYSTEM WATER AUDITS, LEAK DETECTION, AND REPAIR

This DMM focuses on the water distribution system itself, and includes water audits, leak detection, and repair. The City has two approaches for auditing system losses, one for areas that are fully metered, and one for unmetered areas. The City's infrastructure that delivers water to retail customers is the same as the infrastructure that delivers water to wholesale customers.

For unmetered connections, the City's program includes the following:

- An annually updated system map of type, size, and age of pipes, pressures, and leak history.
- Installation of devices or use of other methods designed to identify areas with greater than 10 percent losses.
- An on-going meter calibration and replacement program for all production and distribution meters.

- An on-going leak detection and repair program focused on high probability leak areas identified by the system map.
- A complete system-wide leak detection program repeated no less often than every ten years, unless there are special circumstances, such as age of system or planned main replacement.

For metered connections, the City's program includes the following:

- An annual system water audit, determining the difference between production and sales.
- An annually updated system map of type, size, and age of pipes, pressures and record of leaks and other historic data.
- An on-going meter calibration and replacement program.
- An on-going leak detection/repair program focused on high probability leak areas identified by the system map.
- A complete system-wide leak detection program, repeated when the system water audit determines losses to be greater than 10 percent, or when the losses are less than 10 percent if the program is determined to be cost effective.

The City also encourages customers to report leaks. Refer to BMP 1.2 in the City's 2009 and 2010 CUWCC Annual Reports (Appendix H) for further information.

Implementation Schedule:

- Water System Audit: Conducted annually for areas with metered connections.
- Leak Detection and Repair Program: On-going for both unmetered and metered connections.
- System-wide Leak Detection/Repair Program: When water system audit determines losses to be greater than 10 percent, or when determined to be cost effective.

Annual Budget:

- FY 2010: Expenditures: $860,000.
- FY 2011: Budgeted: $100,000.

Methods to Evaluate Effectiveness:

The best way to evaluate the effectiveness of this program is to compare water production data at the water treatment plant with water consumption from the City's customers once the City is fully metered.

Conservation Savings:

Conservation savings cannot be determined at this time. In 2009, the City began the system-wide deployment of Automated Meter Infrastructure (AMI). This system generates

short interval consumption data to enhance water conservation measures, improve leak detection, reduce lost water, and manage rate structures that encourage conservation. Information on the AMI water conservation plan is included in Appendix J. When the City is fully metered, the AMI system will allow conservation savings to be determined.

Methods to Improve Effectiveness:

The effectiveness of this DMM will be improved once the City is fully metered and as the AMI system is expanded to more customers.

6.5 DMM D: METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS

This DMM has two parts. The first part includes the metering of all new connections and meter retrofitting of existing connections. The second includes the development of commodity water rates, which amounts to billing by volume of water usage and not decreasing the water price for increased use.

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

Between 2001 and 2004, the City had a voluntary residential meter retrofit program. This program was voluntary because Section 11 of the City Charter prohibited the installation of water meters on residential water service pipes, and did not allow the City to require residential meter retrofits. Between 2001 and 2004, 295 non-residential accounts and 149 residential accounts voluntarily installed meters. The voluntary meter retrofit program was discontinued on December 31, 2004.

Section 11 of the City Charter has now been superseded by State law, specifically the passage of Assembly Bill (AB) 2572. AB 2572 requires the installation and use of water meters on all water service connections by 2025, and requires that metered rates be charged to customers with water meters beginning in 2010 (provided that metered billing may be delayed for one annual seasonal cycle of water use for services being converted from flat rate to metered billing). AB 2572 became effective January 1, 2005.

In November 2005, the City adopted an ordinance (Ordinance No. 2005-090) amending the Sacramento Municipal Code (Chapter 13.04, Article III) to implement AB 2572. Ordinance No. 2005-090 became effective on December 1, 2005.

The City is currently on schedule to the meet the state-mandated deadline to install water meters on all water service connections by 2025. In order to meet the deadline, the City will have to install 4,680 meters per year on unmetered single-family residential services.

Wholesale water deliveries are metered and wholesale customers pay for water based on the amount they receive.

As shown in Table 49, 39 percent of the City's total accounts are already metered. Refer to BMP 1.3 in the City's 2009 and 2010 CUWCC Annual Reports (Appendix H) for further information.

Table 49 Summary of 2010 Metered Accounts
2010 Urban Water Management Plan
City of Sacramento

Customer Type	Total Connections	Metered	Percent of Total Connections Metered
Single-Family(1)	116,375	43,148	37.1%
Multi-Family	9,865	2,113	21.4%
Landscape Irrigation	1,377	1,320	95.9%
Institutional	962	642	66.7%
Commercial	8,024	5,975	74.5%
Other	110	98	89.1%
Total	**136,713**	**53,296**	**39.0%**

Notes: Source: City 2010 records.
1. There were 43,148 meters installed on single-family residential homes at the end to 2010. The number of connections that are being billed on a metered rate is less since many of the meters were recently installed and not yet within the City's billing system.

The City implemented a metered rate structure in 2008 that recovered 60 percent of its revenues by volumetric pricing as a prudent incremental step to determine customer behavior and obtain data. From this, the City was able to construct a revenue-neutral rate model that complies with CUWCC BMP 1.40. Although the City's current metered rate structure recovers a portion of its cost by volumetric pricing, the City needs to establish a rate with sufficient data to determine an appropriate pricing structure that reduces water demand, is revenue neutral, politically sustainable, is fair to ratepayers, and complies with the requirements of Proposition 218.

The CUWCC MOU allows for a phase-in period of four years. The City is committed to meeting the requirements and set volumetric rates that recover 70 percent of the cost through volume sold and will complete a rate analysis in fiscal year 2012-2013. In addition, a component of the rate study will include the feasibility of the implementation of a tiered water rate structure within the next five years. While moving metered customers from flat rates to metered rates provides a financial incentive for water conservation in the City, tiered rates may provide further incentive. Upon the completion of the FY13 volumetric water rate study, the Department of Utilities will seek direction from the Utilities Rate Advisory Commission (URAC) and updates to the City Council on possible tiered rate strategies and timelines. As additional metering is achieved, the City will monitor water

usage characteristics of residential customers to ensure any new water rate structure is fair to customers and adequately recovers costs.

Implementation Schedule:

- Non-Residential Water Meter Retrofit Program: On-going.
- Billing at Commodity Rates: On-going for metered customers (subject to one-year delay after meter retrofit per AB 2572). Update of the volumetric water rate study will occur in the fiscal year 2012/2013.
- Phased Meter Installation Program for All Service Connections that existed without Meters as of January 1, 2005: Scheduled for completion no later than January 1, 2025, in compliance with AB 2572.
- Metered Billing Rate Structure for All Service Connections with Meters: On-going in compliance with AB 2572.

Annual Budget:

- FY 2011: Proposed: $8 million.

Methods to Evaluate Effectiveness:

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

Conservation Savings:

It is estimated that metered accounts may result in a 20 percent reduction in demand compared to non-metered accounts. The AMI plan mentioned previously will help to manage rate structures that encourage conservation. When the City is fully metered, conservation savings can be determined more accurately.

Methods to Improve Effectiveness:

The City should collect meter data for the existing metered connections to establish a baseline of water use for later comparison.

6.6 DMM E: LARGE LANDSCAPE CONSERVATION PROGRAMS AND INCENTIVES

Water demand by large landscape water users can be managed by providing water audits and incentives for water conservation. The first consideration of this measure begins with identifying large irrigators and their water use, followed by development of a program for regular auditing, with provisions that include water conservation training and information, with financial incentives.

In 2003, the City started a large landscape conservation program. The City's program for large landscape conservation included: conducting landscape surveys for customers with large landscapes (primarily parks, schools, and golf courses), including irrigation system checks and review and development of irrigation schedules; providing landscape irrigation training; offering financial incentives to improve landscape water use efficiency; and providing information to customers regarding watering guidelines and regulations, and tips on landscape design, plant selection, and other free programs.

Pursuant to State law (Government Code §§ 65591 et seq.), the City adopted (December 15, 2009) water conserving landscape requirements, which are specified in the City Municipal Code (Title 15 Building and Construction, Chapter 15.92 Landscaping Requirements for Water Conservation). These requirements define standards and procedures for the design, installation, and management of landscapes in order to utilize available plant, water, land, and human resources to the greatest benefit of the people of the City. A copy of the Water Efficient Landscape Ordinance is provided in Appendix K.

These requirements are applicable to new and rehabilitated landscaping for industrial, commercial, office, and institutional developments; to parks and other public recreational areas; to multi-family (four or more units) residential and public utilities district common areas; to model home complexes with three or more model homes; and to City road medians and corridors.

Refer to BMP 5 in the City's 2009 and 2010 CUWCC Annual Reports (Appendix H) for further information.

Implementation Schedule:

- Landscape Surveys: On-going.
- Financial Incentives to Improve Landscape Water Use Efficiency: On-going.
- Water Conserving Landscape Requirements: On-going.

Annual Budget:

- FY 2011: Budgeted: $63,657.

Methods to Evaluate Effectiveness:

The City can monitor changes in water use for customers and areas of the City where the Water Efficient Landscape Ordinance applies to evaluate effectiveness.

Conservation Savings:

Implementation of this DMM is assumed to result in a 15 to 20 percent reduction in demand.

Methods to Improve Effectiveness:

Continue to advertise surveys, requirements, and incentives to large landscape customers.

6.7 DMM F: HIGH-EFFICIENCY WASHING MACHINE REBATE PROGRAMS

The purpose of this DMM is to provide incentives or institute ordinances requiring the purchase of high efficiency clothes washing machines that meet an average water factor value of 5.0.

In the past, the City has participated in CUWCC's LightWash Program, which offered washing machine rebates of up to $400 for qualifying washing machines for multi-family or institutional common area laundry facilities, businesses with on-premise laundries or coin laundry stores. California energy utility ratepayers under the auspices of the California Public Utilities Commission primarily funded the program. The City provided partial funding. In fiscal year 2004, 20 commercial washing machine rebates were issued. In fiscal year 2005, 65 rebates were issued. Participation in this program ended in December 2005.

In 2009, the City joined the local energy utility, Sacramento Municipal Utility District (SMUD), through a Memorandum of Understanding (MOU) to jointly implement a regional clothes washer rebate program. The program is administered by SMUD, and co-funded by the City and through the Project Agreement with the Regional Water Authority (RWA) for funding awarded by DWR for the Proposition 50 Urban Drought Assistance Grant Agreement Water Efficiency Acceleration Program. Since 2009, the rebate program has distributed 517 rebates to City customers.

The total combined customer rebate amount is currently $100 per qualified clothes washer between electric and water district funds for customers that have electric water heating and are SMUD customers. In 2008, RWEP received Proposition 50 Drought Assistance Grant funds in the amount of $342,500 to expand on the clothes washer rebate program.

The regional High Efficiency Washer Rebate Program has a single water utility application and is widely promoted through SMUD and the City outreach efforts. Applications are posted on the SMUD and water district websites in addition to information provided in mailings with the water and energy bills. Articles have been published in local newspapers, and informational booths have been set up at local public events.

Tracking and implementation is supported by SMUD as the administrator for the program with the following steps:

- SMUD receives customer rebate application and reviews for eligibility.
- SMUD sends Excel spreadsheets to all participating water districts for confirmation of their customer's information.
- Upon water district approval, SMUD issues rebate check.
- SMUD sends annual year-end report on all rebates issued on behalf of each participating agency.
- Annual program review and update of MOU between each water district and SMUD.

In fiscal years 2008 through 2010, 470 rebates were issued for High Efficiency Clothes Washers in the City service area.

The City plans to continue participating in the regional High Efficiency Clothes Washer Program as administered by SMUD and supported through RWA with Proposition 50 funds.

The current High Efficiency Washer Website can be found at the following links:

- SMUD's website: www.smud.org/en/rebates/Pages/index.aspx
- RWA's website: www.bewatersmart.info/residential-customers/rebates/
- City of Sacramento's website: Sparesacwater.org

Refer to BMP 3.3 in the City's 2009 and 2010 CUWCC Annual Reports (Appendix H) for further information.

Implementation Schedule:

- High-efficiency clothes washer rebate program: On-going.

Annual Budget:

- FY 2011: Budgeted: $143,320.

Methods to Evaluate Effectiveness:

Participation levels by customers have continued to increase over the past 5 years. With the added Proposition 50 funding support, the regional program is planned to continue at the same or greater participation levels. The effectiveness of this DMM could be evaluated by monitoring water usage of customers that have requested rebates.

Conservation Savings:

Historical water savings has not been estimated as the data on the new machine and its projected use and the type of machine replaced was not available. An assumption must be made as to the output of the replaced models. An evaluation of water use before and after rebate could possibly provide an estimate. Another way to evaluate water savings is to compare water use ratings of the new high-efficiency washer's (HEWs) with the ratings of the replaced washers. Estimated water saving is assumed to be 6,500 gallons per year per washer.

Methods to Improve Effectiveness:

Continuing to notify customers of the rebate program as a method of increasing the number of water efficient washing machines could improve water conservation within the City.

6.8 DMM G: PUBLIC INFORMATION PROGRAMS

The City fully participates in the RWEP Public Information Campaign. The RWEP has a regional outreach program coordinated with support from a Public Outreach and School

Education Committee comprised of RWEP member conservation coordinators and Public Information Officers. The overall goal of the RWEP is to maximize customer participation in water conservation programs.

In 2005, the RWEP developed a new logo and theme for the “Be Water Smart” public information campaign. To kick off the campaign, RWA undertook a host of outreach activities including a region-wide “Ultimate Garden Makeover Contest” in 2008 and 2009. Overall, goals of the Be Water Smart program are to:

- Increase the number of Water-Wise House Call requests
- Increase visibility for RWA’s water conservation messages in the local media
- Drive traffic to the RWA website and Be Water Smart hotline

In 2010, the RWA and 19 local water providers announced a new public outreach and advertising campaign called “Blue Thumb.” The campaign is designed to help residents use less water outdoors. With the Sacramento region's hot, dry climate and long summer season, more than 65 percent of a household's yearly water consumption typically goes toward landscape irrigation. Of that, 30 percent is lost due to overwatering or evaporation, and is the target of the campaign messaging with the call for customer behavioral changes in watering practices.

Goals for the Regional Public Information Campaign

- Raise awareness about the need to use water efficiently outdoors
- Motivate target audience to undertake key behaviors that are most likely to reduce outdoor water use

Target Audience for the Regional Public Information Campaign

- Residential water customers within the RWEP participant area
- In particular, RWA and ACWA surveys show women over age 50 are most willing to adopt water-efficient behaviors

The ongoing regional campaign shows residents how to use water efficiently outdoors through every-day tasks such as adjusting their irrigation system according to the season or using a shut-off nozzle on their hose. It stars well-known community influencers, including Sacramento Mayor Kevin Johnson, Meteorologist Elissa Lynn, and Dinger of the Sacramento River Cats, plus six local residents showing off their “Blue Thumb” and demonstrating how they made a personal commitment to use water wisely.

The Blue Thumb Campaign has a web site (BeWaterSmart.info) where visitors can take the pledge to use water wisely and view video clips from spokespersons, such as Sacramento Mayor Kevin Johnson, and campaign participants explaining how they earned their Blue Thumb. The website has been expanded to be a more comprehensive water conservation related site.

Steps to Implement the Regional Public Information Campaign

RWA provides avenues and tools for program participants to carry the Blue Thumb campaign in their own outreach efforts.

Tools include key messages, website/newsletter text, bill insert template, Blue Thumb pledge, and collateral materials. Outreach avenues include the opportunity to nominate customers to star in the outreach campaign, participation in the Home Depot partnership by featuring their logo on the in-store banners and connecting with customers at events. One water provider whose customer was selected to star in television advertising posted the customer's Blue Thumb interview to YouTube with a link to their website. Others included campaign information on their websites, newsletters, billing envelopes and "on-hold" phone messages, as well as collected pledges via the form or pledge banner at community events.

The following marketing strategies were used as tactics to meet the goals of the Public Information Campaign. Specifically for the program, tactics used in the period of 2005-2009 included:

- Planned and executed the 2008 and 2009 Ultimate Water Smart Garden Makeover Contest as a regional media event which included a full remake of the winner's front yard landscape with donated time and materials worth $40,000.
- Public service announcements (hundreds of airings on radio and TV).
- Paid advertisements (print ad, television segments).
- Manage Be Water Smart hotline, 1-888-WTR-TIPS.
- 5 Be Water Smart e-blasts to 40,000 people.
- Participation at public events.
- Bill inserts, brochures (e.g. River-Friendly Landscaping and Rules of Thumb for Water Wise Gardening).
- Demonstration garden support to the Fair Oaks Horticulture Center managed by the Sacramento County University of California Cooperative Extension (UCCE).
- Develop partnerships for co-promotion of programs including the following agencies:
  - SMUD
  - Sacramento Regional County Sanitation District (SRCSD)
  - Sacramento Area Water Forum
  - Sacramento Bee
  - Sacramento Stormwater Quality Partnership
  - University of California Cooperative Extension

In addition, the tactics to meet the 2011 and future goals of the revised Public Information campaign include:

- Campaign website (BeWaterSmart.info) where visitors can take the pledge to use water wisely and view video clips from campaign participants explaining how they earned their Blue Thumb.
- A statistically valid telephone survey completed in 2009 of 604 adults to provide insight into attitudes, behaviors, messages, and methods of communication. The survey will be repeated in September 2011 to evaluate the campaign.
- A unique and eye-catching campaign graphic identity.
- Media outreach to announce the campaign and promote the opportunity for residents to star in advertising, as well as a campaign launch press event.
- Television and radio advertising (paid) on KOVR (CBS TV), Comcast Cable, Capitol Public Radio and Clear Channel radio stations.
- Public Service Announcements (PSAs) (no-cost placement) distributed to television and radio stations throughout the Sacramento region.
- Promotional partnership with WaterSense and 16 Home Depots throughout the Sacramento region for Water Awareness Month in May. This included training by RWA on water efficient topics for Home Depot associates, promoting RWA's "Top 10 List" of water efficient products either via end-cap displays or table displays, in-store banners promoting Water Awareness Month and events where water providers connected with customers at Home Depot stores.
- Partnership with the Sacramento River Cats (Sacramento's popular minor league baseball team) and Save Our Water that included placing water efficiency advertisements in 110 bathroom stalls at Raley Field, a blast e-mail by the Sacramento River Cats to 1,700 fans promoting the Blue Thumb website pledge and inclusion of a promotional flyer in 1,000 Save Our Water totes distributed at the California State Fair.
- Collateral materials such as garden gloves, lawn signs, pledge banner, and T-shirts with the Blue Thumb logo as an incentive for taking the Blue Thumb pledge online or at events.

RWA also hosts a Speakers Bureau. For example in 2009-11, speaking engagements included the following by RWA staff and by RWEP participants from the Cites of Folsom and Roseville:

- Northern California Ace Hardware stores on regional water efficiency programs, Home Depot associates on water efficient products, rebates, and Water Awareness Month, LOWE's stores throughout the region on water efficient products, rebates, and Water Awareness Month promotion, Rainbird Training Academy on local efforts ofAB1881, UC Davis WaterWise Symposium on Blue Thumb campaign and local efforts of AB1881, Association of Professional Landscape Architects on local landscape programs, Association of Professional Landscape Designers on local efforts of AB1881 and River Friendly Turf Management Workshop on local agency

landscape efficiency rebate program.

- California Green Summit on future green jobs in the water industry, River Friendly Landscaping Homeowner Workshop Series on irrigation efficiency, irrigation controller scheduling, water efficiency in the landscape, Raley Field Turf Management Workshop on RWA programs.
- Department of Water Resources training on local agency implementation of AB1881, California Association of Public Information Officials state conference about Blue Thumb Neighbors.

In the future, RWA will continue to work with participating agencies on a regional outreach message appropriate for the current year's water outlook. RWA will continue to provide key messages and update water provider tools as necessary, track the number of media stories (or hits), interviews conducted, and number of impressions of audience viewings.

Tracking of participation and results of participation for the Regional Campaign

After the first year of the "Blue Thumb" program, results were tracked for 2010 and include the following outcomes:

- Nearly 30 earned media hits covering topics such as the campaign announcement/search for residents to participate, campaign launch, Home Depot events/Water Awareness Month and Blue Thumb Web site pledge.
- Interviews on multiple public service radio programs, including Clear Channel (where the host even took the Blue Thumb pledge on the air!) which broadcast on five local stations and Family radio, which aired on two local stations.
- Nearly 3.9 million impressions via paid television advertising and 6.3 million impressions via paid radio advertising.
- More than 1.2 million impressions for the (no-cost) television PSA (worth an estimated $24,500) and over 3 million impressions for the radio PSA (worth an estimated $96,264).

In addition to other activities, there is a number of water conserving demonstration gardens in and around the City's service area. These gardens, sponsored by the City and other local water suppliers, demonstrate the use of water conserving plants and landscaping practices. The water conserving gardens include the following:

- William Land Park Rock Garden, sponsored by the City of Sacramento Parks and Recreation Department.
- American River Water Education Center, sponsored by the U.S. Bureau of Reclamation.
- Water Efficient Landscape Garden, sponsored by San Juan Water District.
- Donna M. Dean Water Conservation Garden, sponsored by Sacramento County Water Agency and Southgate Recreation and Park District.

- Antelope Gardens, sponsored by Sacramento Suburban Water District.

Refer to BMP 2.1 in the City's 2009 and 2010 CUWCC Annual Reports (Appendix H) for further information.

Implementation Schedule:

- Advertising: On-going.
- Public Information Campaign: On-going.
- "Blue Thumb" Program: On-going.
- Speaker's Bureau: On-going.
- Demonstration gardens: On-going.

The general schedule for the regional public information campaign follows the annual calendar with the following seasonal activities:

- Winter – planning for upcoming year's activities, continue to promote participation in City programs, such as high efficiency toilet and clothes washer rebates.
- Spring – ramping up messaging and strong focus in soliciting media coverage and paid advertising in support of May as Water Awareness Month. Messaging surrounds the traditional spring planting season and checking of irrigation systems as they are turned on and taking the "Blue Thumb Pledge" to lower outdoor water use this season.
- Summer – key messaging hits on the issues of efficient irrigation techniques, avoiding water waste, and lowering peak demands on hot summer days.
- Fall – participating in local Harvest day events and providing efficient landscape irrigation trainings for professionals that focus on selecting more water efficient plants and irrigation equipment, and when the weather cools and rains return, then messaging calls for shutting down irrigation systems for the winter months.

The implementation schedule for 2011-2015 includes plans to continue to promote water conservation through the RWEP's outreach program supplemented by the City's own outreach efforts. In addition, the City will continue to support community events similar to those conducted in the past as described above.

Annual Budget:

- FY 2011: Budgeted: $37,500.

Methods to Evaluate Effectiveness:

RWA will conduct an evaluation on a minimum of a bi-annual basis to determine the campaign's effectiveness using the following means:

- Statistically valid post-campaign telephone survey (results compared to 2009 pre-campaign survey responses).
- Tracking of pledges secured both online and by individual RWEP member utility efforts.
- Website analytics analysis.
- Tracking water provider materials that carry Blue Thumb messages.
- Media and online mentions and content analysis of hits.
- Impressions for television and radio advertising and public service announcements.
- Impressions for partner activities (such as the Sacramento River Cats).
- For the Community Based Social Marketing (CBSM) program: Internet/written surveys (and potentially informal phone interviews) and water use data tracking.

In the future, RWA will conduct another random survey of Sacramento area residents, which will seek to measure if the following goals for the campaign are being achieved:

- Increase the number of residents willing to utilize various yard design and maintenance practices promoted by the campaign.
- Increase the number of residents who say they have adopted yard design and maintenance practices promoted by the campaign.
- Increase the number of residents that have seen, read, or heard news stories, public information, advertisement, or other messages regarding water efficiency in the past six months.
- Increase the number of residents naming key messages promoted by the campaign in verbatim responses about the advertising or messages they heard.

Based on the results of the post-campaign survey, RWA is expecting to measure the success of this DMM based on the metrics listed above. If the campaign is not proving effective based on these metrics, then RWA will update or revise the campaign, or if necessary begin a new campaign, to garner more customer participation.

Conservation Savings:

There is no current method in the industry to evaluate water savings for this program.

Methods to Improve Effectiveness:

Public information can be one of the best tools to conserve water. A citizens' advisory committee could assist in developing new ways to communicate with the public and the media about water conservation and other resource issues. The City Water Conservation Coordinator could optimize the program by coordinating additional opportunities for community speakers and special events.

6.9 DMM H: SCHOOL EDUCATION PROGRAMS

The City maintains a program to educate students. The City participates in school outreach and works with its regional and statewide partners supporting and implementing the objectives of the Water Forum.

Since 1995, the City has supported two school education programs. One is the Newspaper in Education (NIE) program, which involves the Sacramento Bee newspaper and local teachers. The goal of the NIE program is to provide teachers, students, and parents with innovative tools to teach and motivate students to learn while having fun with real life activities. The second program involves the Sacramento Theater Company, which performs skits at school assemblies regarding water conservation and stormwater issues.

In 2002, the City's Water Conservation staff launched a school outreach program designed to teach children in second through sixth grades about the importance of water conservation. The hour-long program includes a water conservation video, various interactive activities and free materials such as activity booklets, stickers, pencils, and water bottles.

The City fully participates in the RWEP School Education Program. The RWEP has a regional outreach program coordinated with support from a Public Outreach and School Education Committee comprised of RWEP member conservation coordinators and Public Information Officers. The overall goal of the RWEP is to maximize customer participation in water conservation programs.

The RWEP program has focused mainly on K-8 programs. RWEP has continued to use the legacy Sacramento Bee NIE, now called Media in Education (MIE) program that originated back in the mid-1990s as part of the Sacramento Area Water Works Association (SAWWA) program in order to meet the baseline requirements for school education outreach. It includes an annual Water Conservation Pledge and Quiz Contest. It is estimated that a total of 33,932 students have been educated since inception.

Historically between 2004 and 2008, RWEP also sponsored the Great Water Mystery School Assembly program that was co-funded with the Sacramento Stormwater Quality Partnership. Over the years, a total of 60,208 students in Grades 3-6 were educated about benefits of better water management practices at home to save water resources and reduced polluted stormwater runoff.

In fiscal year 2011, RWEP embarked on a new program, in partnership with the BuRec's American River Water Education Center, and the Water Education Foundation to include sponsorship of Project WET schoolteacher workshops. A total of 25 teachers attended the first workshop in April 2011.

Steps to Implement Regional School Education Program

The RWEP is in the process of evaluating whether a more effective school program that will reach more students is warranted. Working with the RWEP members and local educators,

RWA plans to: (1) evaluate the existing program; (2) evaluate the success of other programs in the region and around the state; (3) develop objectives and a target audience (e.g., grade level); (4) materials; and (5) an implementation strategy for the school education program into the future.

The current marketing strategy for the Sacramento Bee MIE program is both email to teachers that have participated in the past and direct mail campaign to local schools for the whole series of topics throughout the year. Each teacher decides on which week's topics to participate in that cover a wide range of education topics including RWEP's sponsored week of "Be Water Smart News, Water the Never Ending Story."

The Project WET workshops are marketed to teachers and environmental educators by the local California Regional Environmental Education Community (CREEC) Network representatives, to water educators through Project WET newsletters, and by RWA through direct mail and contacts with local school administrations and teachers.

RWA continues to track by a variety of means participation in the regional school education program. For the Sacramento Bee MIE Program, the metrics tracked annually include:

- Number of teacher guides downloaded
- Number of schools
- Number of classrooms
- Number of students reached
- Number of students participating in the pledge (Grades K-3) or contest (Grades 4-8) entries received by the Sacramento Bee
- Comments back from teachers

For the Project WET teacher training program, the following metrics are also tracked annually:

- Number of teachers attending workshops
- Which school districts
- Number of schools
- Estimated number of students reached
- Teacher workshop evaluations

Refer to BMP 2.2 in the City's 2009 and 2010 CUWCC Annual Reports (Appendix H) for further information.

Implementation Schedule:

- School Outreach Program: On-going.
- Support of MIE Program: On-going.

- Support of Sacramento Theater Company assemblies: On-going.

RWEP plans to continue with regional school education program activities along with distribution of school-age educational materials and Project WET Workshops. The school schedule dictates when participation in the RWEP school education program occurs and follows the months that schools are in session from August to the following May.

Annual Budget:

- FY 2011: Budgeted: $37,500.

Methods to Evaluate Effectiveness:

The effectiveness of this program is determined by the number of students and schools that participate. Based on the annual results of the participation levels tracked, RWA is expecting to measure the success of this DMM based on the metrics listed above. As described above, RWA is currently conducting an evaluation process of the existing regional school education program, which includes interviews of local school teachers at a variety of grade levels. The program will continue as currently planned until the evaluation process is complete and the program's content and/or implementation strategy may be revised in the future.

Conservation Savings:

It is unknown what changes in water using behavior may arise from student and educators participation in the regional school education programs. Considering the difficulty of placing a numerical value for water savings, an intangible method of effectiveness and resulting water savings, can be determined by the amount of voluntary classroom and school participation with available K-12 water conservation programs.

Methods to Improve Effectiveness:

Similar to a public information program, a school education program can also be one of the best tools to conserve water. The Water Conservation Coordinator could enhance the program by meeting with school principals and educators to promote classroom presentations and field trips to the treatment plants.

6.10 DMM I: CONSERVATION PROGRAMS FOR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL ACCOUNTS

Implementation of water conservation for CII customers includes identifying the largest water users among CII customers; offering audits and incentives sufficient to conserve water; and providing follow-up audits as needed.

Since 2003, the City has offered and performed water use surveys for its CII customers. The surveys include a site visit, evaluation of all water-using apparatuses and processes and a report identifying recommended efficiency measures.

The City has also participated in RWA's "Rinse and Save" program. Under this program, high-velocity, high-performance pre-rinse nozzles are installed free of charge in restaurants. Use of these nozzles reduces the amount of hot water needed to pre-rinse dishes for the dishwasher. According to RWA, participating Sacramento-area restaurants have saved an average of $400 per year in water and energy costs.

Refer to BMP 4 in the City's 2009 and 2010 CUWCC Annual Reports (Appendix H) for further information.

Implementation Schedule:

- CII Water Use Surveys: On-going.
- Regulations for Air Conditioning and Swimming Pools: On-going.
- City Participation in RWA's Rinse and Save Program: On-going.

Annual Budget:

- FY 2011: Budgeted: $281,309.

Methods to Evaluate Effectiveness:

The best way to determine the effectiveness of this DMM is to monitor the actual water use of metered CII customers that have received surveys. Historic data can be compared to current average annual water use for each account type to assess demand characteristics and water use patterns.

Conservation Savings:

The actual savings for this DMM will vary. The CUWCC MOU contains estimates of conservation savings based on measures implemented by the customer.

Methods to Improve Effectiveness:

The City should gather additional information about coordinating and cost-sharing with the sanitation department and/or local energy utilities to provide surveys for CII customers.

6.11 DMM J: WHOLESALE AGENCY PROGRAMS

Currently, the City has four wholesale agreements with other purveyors within the American River place of use. The City provides these purveyors with assistance in meeting their BMPs/DMMs, serving as a liaison with the Water Forum Successor Effort, helping customers accept BMP/DMM assistance, and improving awareness in water conservation.

The City's wholesale water service agreements have a built-in conservation incentive through a volume-of-use payment structure, where wholesale water charges are based on metered actual deliveries (i.e., the more the wholesale customer uses, the more the wholesale customer will proportionally pay). In addition, the City's wholesale customers administer their own retail water conservation programs. The City provides conservation

assistance to its wholesale customers via participation in the RWA's Regional Water Efficiency Program (Program). The City pays annual dues to the RWA; a portion of the dues goes to funding the Program. The City actively participates in the Program, and the City's water conservation coordinator is the Chairperson of the Program Advisory Committee. The Program leverages resources (communications, financial, technical, and staff) of all purveyors to reach customers with repeated and consistent marketing messages and incentives that will motivate the customers to participate in BMP services. The Program provides products and services that:

- Assist water suppliers in meeting BMPs of the Water Forum, U.S. Bureau of Reclamation CVPIA, and DWR UWMP commitments;
- Provide liaison with Water Forum Successor Effort compliance coordination and potential BMP updates;
- Attract residential, business, and government customers to accept BMP services;
- Improve awareness of the need for water use efficiency in the region.

Refer to BMP 1.1.3 in the City's 2009 and 2010 CUWCC Annual Reports (Appendix H) for further information.

Implementation Schedule:

- Wholesale Agency Programs: On-going.

Annual Budget:

- FY 2011: Budgeted: $34,909.

Methods to Evaluate Effectiveness:

The best way to determine the effectiveness of this DMM is to monitor the actual water use of wholesale customers and ask them to share the effectiveness of measures they have taken.

Conservation Savings:

The actual savings for this DMM will vary by wholesale agency.

Methods to Improve Effectiveness:

Continue to aid wholesale agencies in water conservation efforts.

6.12 DMM K: CONSERVATION PRICING

Implementation of this measure includes, at a minimum, eliminating "non-conserving" pricing and adopting "conserving" pricing. Water conservation is encouraged through a pricing system that rewards customers who use less water with financial incentives, while high water users are charged a higher rate. Often this is implemented through a two or three-tiered pricing system.

The City anticipates developing some form of tiered water rate structure within the next five years. While moving metered customers from flat rates to metered rates provides a financial incentive for water conservation, tiered rates may provide further incentive.

As more meters are installed, the City will monitor water usage characteristics of residential customers to ensure any new water rate structure is fair to customers and adequately recovers costs.

Customers with meters installed prior to January 1, 2009, were switched to meter billing in 2010. Those with meters installed after January 1, 2009, will receive one calendar year of comparative billing before being switched to a metered rate.

Refer to BMP 1.4 in the City's 2009 and 2010 CUWCC Annual Reports (Appendix H) for further information.

Implementation Schedule:

- Meter installation: On-going.
- Implementation of metered billing rate: On-going.
- Tiered water rate structure: Planned for development in the next five years.

Annual Budget:

- FY 2011: Budgeted: Included in DMM C.

Methods to Evaluate Effectiveness:

Conservation pricing is often cited as a means to have market mechanisms provide incentives for conservation. Water consumption, however, has a relatively inelastic demand relative to price. Only a portion of water use for a residence can be considered discretionary, generally a portion of landscaping use and excess showering periods and the like. The effectiveness of this DMM can be better determined once the City if fully metered.

Conservation Savings:

Water savings due to conservation pricing cannot be quantified at this time.

Methods to Improve Effectiveness:

Public outreach to inform customers of water conservation measures that can potentially reduce billing costs may improve the effectiveness of this DMM.

6.13 DMM L: WATER CONSERVATION COORDINATOR

This DMM entails designating a water conservation coordinator responsible for managing water conservation efforts and evaluating the results.

When the City signed the CUWCC MOU in 1991, the position of Utility Services Inspector was created to fulfill the duties of a Water Conservation position for the City's Department of Utilities. In 2000, the City recruited a Water Conservation Administrator. This full-time position was filled in March 2001. The Water Conservation Administrator manages the City's water conservation program and supervises a water conservation program staff. The City has three water waste inspectors (two seasonal and one full-time), three water conservation specialists, and a clerk.

The City provides conservation assistance to its wholesale customers via participation in the RWA RWEP Advisory Committee. The City actively participates in the Program.

Refer to BMP 1.1.1 in the City's 2009 and 2010 CUWCC Annual Reports (Appendix H) for further information.

Implementation Schedule:

- Water Conservation Coordinator: On-going.

Annual Budget:

- FY 2011: Budgeted: $116,542.

Methods to Evaluate Effectiveness:

The effectiveness of this DMM is determined by the work performed by the Water Conservation Coordinator.

Conservation Savings:

Water savings cannot be quantified.

Methods to Improve Effectiveness:

The RWA can provide assistance to the Water Conservation Coordinator as necessary to improve the City's water conservation programs.

6.14 DMM M: WATER WASTE PROHIBITIONS

This DMM involves adoption of an ordinance prohibiting water waste. Specific suggested prohibitions include the following: gutter flooding, single-pass cooling systems in new connections, non re-circulating systems in all new conveyer car wash and commercial laundry systems, and non re-circulating decorative water fountains.

The City Code (Title 13 Public Services, Chapter 13.04 Water Service System, Water Conservation) prohibits the waste or runoff of water, establishes various limits on outdoor water use, and specifies applicable penalties. A copy of the pertinent sections of the Municipal Code is provided in Appendix L. The current water waste ordinance went into effect in December 2009. A copy of the ordinance is available at www.sparesacwater.org.

The City also has Waste Water reporting method through customer service 3-1-1 or (916) 264-5011, and responded to 1,460 waste water calls in 2009 and 2,584 calls in 2010. Refer to BMP 1.1.2 in the City's 2009 and 2010 CUWCC Annual Reports (Appendix H) for further information.

Implementation Schedule:

- Water waste prohibitions: On-going.
- Additional drought restrictions: Would be enacted by the City if water supply conditions required additional conservation measures (see Water Shortage Contingency Plan).

Annual Budget:

- FY 2011: Budgeted: $184,797.

Methods to Evaluate Effectiveness:

The effectiveness of this DMM can be determined by a decrease in violators. The number of citations and violations should be reported annually.

Conservation Savings:

The CUWCC has not determined any methods to quantify the savings of this DMM but the City believes that this program is necessary to curtail flagrant water waste situations.

Methods to Improve Effectiveness:

The City should continue to monitor the effectiveness of this DMM. If an area is determined to have excessive violations, the City should implement a targeted public outreach program informing the public about the specific ordinance.

6.15 DMM N: RESIDENTIAL ULTRA-LOW FLUSH TOILET REPLACEMENT PROGRAMS

An effective retrofit program can be achieved through voluntary replacement with financial incentives, or ordinances requiring the replacement of existing toilets using 3.5 or more gallons per flush with a toilet meeting the WaterSense specification (http://www.epa.gov/WaterSense/partners/toilets_final.html).

In 2003, the City started a residential ultra-low flush toilet replacement program in coordination with RWA. This program encourages the installation of ultra-low flush toilets in older homes by offering a rebate for each replaced toilet. Up to $125 rebate is available, $75 from the City and $50 from the Sanitation District. The program requires a pre-inspection and post-inspection.

From 2008 to 2010, the City has provided rebates for 3,900 ultra-low flush toilets and high-efficiency toilet replacements. 74 high-efficiency urinals were also replaced through

the rebate program. Refer to BMP 3.4 in the City's 2009 and 2010 CUWCC Annual Reports (Appendix H) for further information.

Implementation Schedule:

- Residential Ultra-Low Flush Toilet Retrofit Program: On-going.

Annual Budget:

- FY 2011: Budgeted: $726,775.

Methods to Evaluate Effectiveness:

A database can be maintained on the number ultra-low flush toilets installed, new residential units constructed requiring ultra-low flush toilets, and the average number of toilets per household. This database can be used to determine the percentage of single and multi-family residential units that have ultra-low flush toilets.

Conservation Savings:

The water savings as a result of the toilet replacement program is shown in Table 50.

Table 50 DMM N Water Savings
2010 Urban Water Management Plan
City of Sacramento

Water Savings[1]	2003	2004	2005	2006	2007	2008
AF	2.72	10.54	39.70	112.45	221.97	334.92

Notes:
1. Water savings listed are net of the plumbing code. Savings are cumulative, not annual.

Methods to Improve Effectiveness:

To increase the number of retrofits for existing homes in the future, the City should advertise the replacement program.

Chapter 7

CLIMATE CHANGE

The City of Sacramento's Community Development Department is currently managing preparation of a Climate Action Plan (CAP) that will outline strategies to both reduce greenhouse gas (GHG) emissions and adapt to the effects of climate change, both communitywide and for the City's internal operations. The City's Sustainability Master Plan (adopted in 2007) and the 2030 General Plan (adopted in 2009) both contained goals, policies, and targets for reducing GHG emissions consistent with AB 32 and other statewide policy initiatives. Generally, the City's Climate Action Planning process is following a 5-step process, with status of each step noted in italics:

1. Establish a Baseline GHG Emissions Inventory (already completed for baseline year of 2005).
2. Prepare forecasts under business-as-usual/no action scenarios for 2020, 2030 and 2050, and determine preliminary GHG reduction targets (already completed, and minimum GHG reduction target set at 15% below 2005 levels by 2020, or 29% below 2020 No Action/BAU scenario).
3. Prepare an action plan that includes feasible strategies to reduce GHG emission, along with adaptation strategies, in order to meet GHG reduction targets and other sustainability goals (admin draft preparation underway, estimated public review draft in mid-2011).
4. Implement action strategies.
5. Monitor and adjust CAP to ensure targets are being met.

7.1 GLOBAL CLIMATE CHANGE AND POTENTIAL THREATS TO SACRAMENTO

Preliminary information gathered by staff from various sources, including the State of California's Climate Change Adaptation Strategy, shows that the effects of global climate change may result in significant adverse impacts in the Sacramento region. Some examples include:

- More frequent, intense and longer-duration of heat waves, which could cause a significant rise in heat-related mortality (see Figure 8 below)
- More frequent, intense or persistent periods of drought due to decreasing snow pack in the Sierra Nevada mountains (see Figure 9 below)
- Potentially higher risk of catastrophic flooding from major rivers and streams due to less winter snow pack and more runoff in rivers and streams during the winter season
- Higher sea levels and associated changes in the Sacramento-San Joaquin Delta region and potential increases in saltwater intrusion in the Sacramento River

- Significant increases in sustained peak electrical power demand and greater stress placed on local utilities and emergency responders

While the level of severity or types of impacts are still not fully understood, there is growing consensus that the impacts will be adverse and impose significant costs to our economy and public services and operations. A study conducted in 2008 by UC Berkeley and Next10, estimated that potential statewide direct costs due to climate change-induced damage, if no action is taken, could exceed tens of billions of dollars annually, with even higher direct economic costs and the placement of trillions of dollars of real estate at risk.[2] If even a fraction of these impacts were to occur in the Sacramento region, inaction could deliver a price tag of dozens to hundreds of millions of dollars in new costs annually in Sacramento to deal with the direct impacts of climate change.

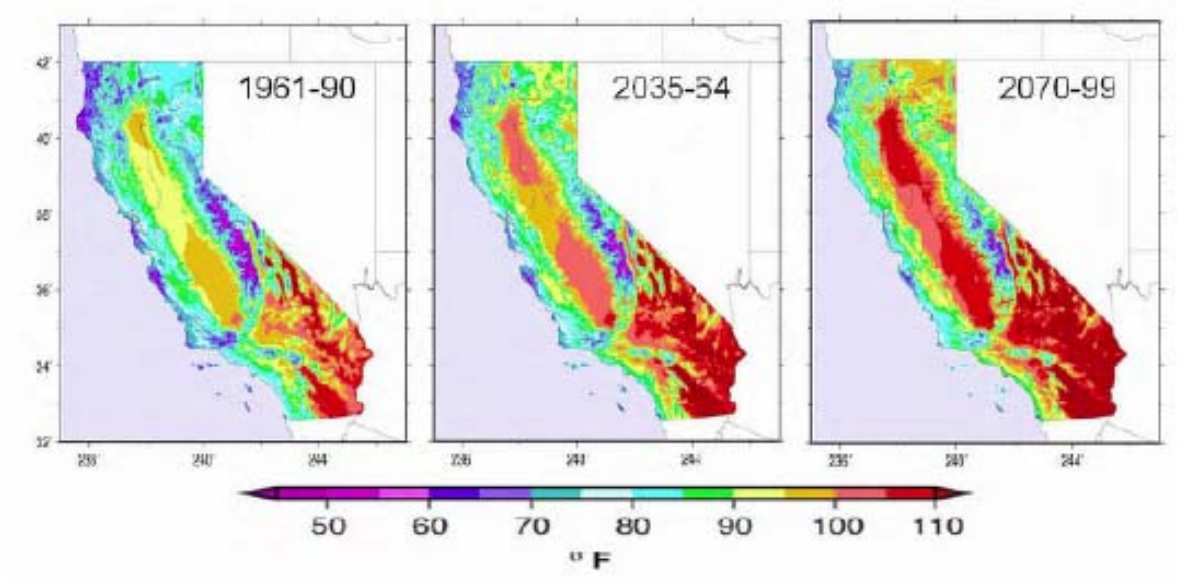

Figure 8 CA Historical and Projected July Temperature Increase (1961-2099)[3]

[2] David Roland-Holst and Fredrich Kahrl, **"California Climate Risk and Response,"** UC Berkeley, November 2008 http://www.next10.org/next10/publications/research_ccrr.html

[3] CA Natural Resources Agency, "2009 California Climate Adaptation Strategy," Introduction (http://www.climatechange.ca.gov/adaptation/)

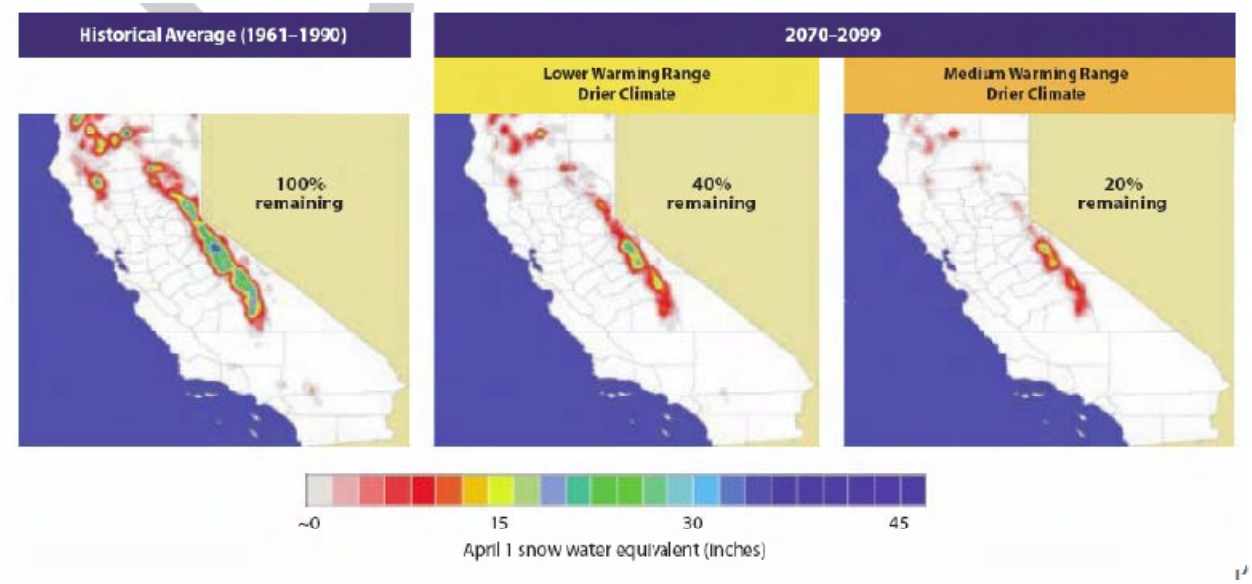

Figure 9 CA Historical and Projected Decrease in Sierra Nevada Snowpack, (1961-2099)[4]

7.2 GHG EMISSION INVENTORY, INCLUDING WATER-RELATED ENERGY AND GHG EMISSIONS

The City's 2005 baseline GHG emissions inventory documented both total GHG emissions for community-wide emissions, as well as a specific estimate for the City's internal operations. The internal operations are assumed to be a subset of community-wide.
Community-wide GHG Inventory

The community-wide GHG inventory was conducted based on all emission sources within the city limits (private and public). Table 51 below summarizes the overall findings, along with future business-as-usual (no action) scenario forecasts for 2020, 2030, and 2050.

[4] *Ibid*, p. 80.

Table 51	City of Sacramento Baseline Communitywide Greenhouse Gas Emissions Inventory and Future-Year Projections under Business-As-Usual (BAU)/No Action 2010 Urban Water Management Plan City of Sacramento			
Emissions Sector	**MT of CO_2e**			
	2005 (baseline)	**2020 (BAU)**	**2030 (BAU)**	**2050 (BAU)**
Residential Energy	748,792	993,900	1,157,307	1,484,125
Commercial/Industrial Energy	979,777	1,243,593	1,419,470	1,771,224
Industrial-Specific	28,656	32,789	35,544	41,054
Transportation (On-Road Mobile)	2,013,962	2,255,833	2,399,280	2,739,574
Solid Waste	241,862	285,143	313,248	378,605
Wastewater Treatment	57,380	70,579	80,306	97,307
Water Consumption	12,810	15,757	17,928	21,724
High GWP	165,916	204,083	232,207	281,366
Agriculture	2,054	2,087	2,198	2,596
Off-Road Equipment	192,768	244,673	279,276	348,483
Total	**4,443,977**	**5,348,437**	**5,936,764**	**7,166,058**

Notes:
CO_2e = carbon dioxide equivalent; GWP=global warming potential, MT= metric tons.
Source: ICF International 2011

7.2.1 Internal Operations GHG Inventory

The City's internal operations emissions are essentially a subset of the communitywide totals. The City's internal operations inventory was based on standard emissions reporting protocol, and includes both energy usage, as well as waste-in-place emissions. Since the majority of the City's GHG emissions come from electricity, natural gas, and vehicle fuels, it is helpful to understand specifically how energy usage and GHG emissions are generated across City Departments and by type of energy used. Table 52 summarizes GHG emissions for the major City internal operation sources.

Table 52	2005 City of Sacramento Internal Operations GHG Inventory – By Sector 2010 Urban Water Management Plan City of Sacramento		
Sector	**Description**	**$MTCO_2e$**	**Percent**
Buildings and Facilities	Electricity and Natural Gas used by City buildings and facilities (including water pumping)	35,773	45.5%
Vehicle Fleet	Gasoline, diesel, LNG, and other fuels used in City vehicles and other motorized equipment	21,927	27.9%
Landfill Waste-in-Place	Methane generated from waste disposed in prior years in the 28th Street City landfill at Sutter's Landing (closed in 1997).	14,012	17.8%
Traffic Signals and Streetlights	Electricity used by streetlights and signals in public right of way or adjacent to City facilities	6,872	8.7%
2005 Total		**78,584**	**100%**

Figure 10 below depicts energy use for all City Departments, by type of energy used, in 2005. The labels within the chart indicate the major operational activities that generate demand for a specific energy commodity (e.g., the Convention Center utilizes the majority of electricity in all facilities operated by the Convention Culture and Leisure Dept).

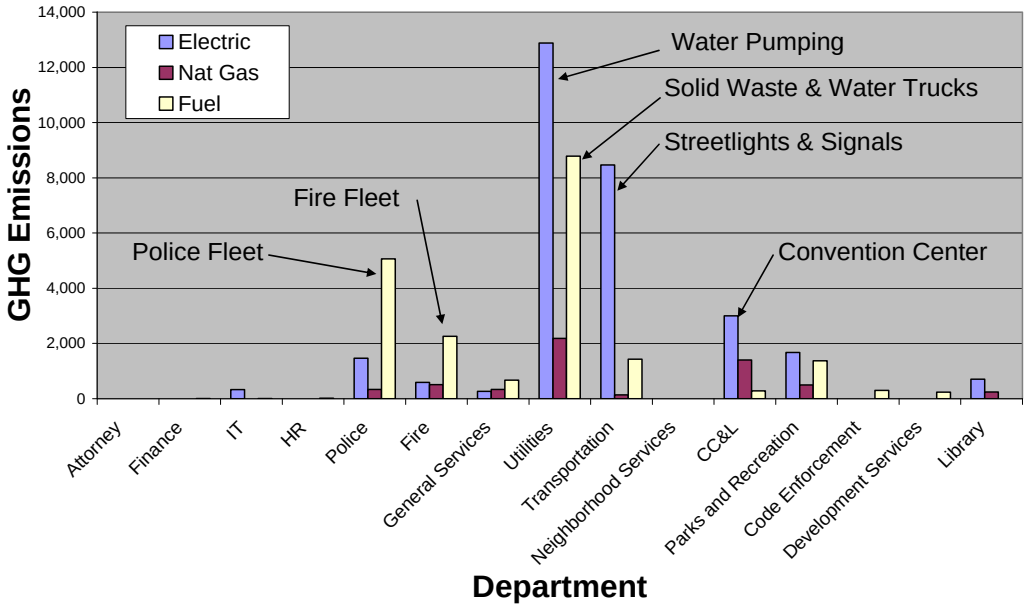

Figure 10 GHG Emissions from City Internal Ops (by Department and Commodity)

The Department with the most GHG emissions is Utilities (44%), with water & wastewater pumping making its electricity use the highest source of GHG emissions in the City's operations, as well as the largest amount of fuel used by heavy trucks in the DOU's Solid Waste and Water divisions. The Department of Transportation (DOT) uses a significant amount of electricity for streetlights and signals, much more than any of the other departments but still far less than that used for water pumping. DOT represented about 18% of the total GHG emissions in 2005. The City's public safety departments (Police and Fire) use significant amounts of fuel for their share of the fleet category. The Sacramento Convention Center (managed by the Convention Culture and Leisure Dept) is the largest single user of electricity among the 450+ buildings in the City's operations.

7.3 GHG EMISSION REDUCTION AND CLIMATE ADAPTATION STRATEGIES

As part of creating a draft action plan, City staff and consultants are putting together a list of draft strategies that will reduce GHG emissions, along with specific adaptation strategies. In some cases, GHG reduction strategies will also have the co-benefit of helping the City to adapt to the effects of climate change. Water conservation is one such area where some GHG reduction benefits may be achieved, but the longer-term adaptation benefits are equally if not more important for ensuring ongoing water supply availability and mitigating impacts of potential climate change impacts.

Phase 1 of the CAP was completed for the City's internal operations. The following measures specifically addressed water efficiency and conservation, primarily due to physical changes in systems to improve efficiency:

- Water pumping efficiency measures & system optimization
- Low-maintenance/drought-tolerant landscaping at City facilities
- Centralized, weather-sensitive irrigation systems at golf courses and other City facilities
- Watering reductions in City parks

A more complete description of these measures and estimated GHG reduction benefits are included in the full document, which can be reviewed at http://www.sacgp.org/documents/Phase-1-CAP_2-11-10.pdf.

As City Planning staff considers Phase 2 communitywide GHG reduction and adaptation strategies related to water supply management and conservation, the following items will be included for consideration in the Draft Climate Action Plan:

- Implementation of the City's existing water conservation BMP's per the Water Forum Agreement (WFA) and the CA Urban Water Conservation Council (CUWCC), including:
    - Water metering, automated infrastructure, & pricing
    - Water conservation ordinance enforcement

- Incentive and rebate programs (toilet rebates, water wise house calls, etc)
- Public education and informational campaigns
- Other conservation items as appropriate

- New CalGreen construction requirements for 20% water efficiency in the building code, which became effective January 1, 2011.
- Conjunctive use program to utilize more groundwater to supply demand in drier years and more surface water in wetter years.

Chapter 8

COMPLETED UWMP CHECKLIST

A completed Urban Water Management Plan (UWMP) checklist is attached.

Table I-2 Urban Water Management Plan checklist, organized by subject

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
PLAN PREPARATION				
4	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.	10620(d)(2)		Chapter 1 Section 1.3
6	Notify, at least 60 days prior to the public hearing on the plan required by Section 10642, 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. Any city or county receiving the notice may be consulted and provide comments.	10621(b)		Chapter 1 Section 1.3 Appendix A
7	Provide supporting documentation that the UWMP or any amendments to, or changes in, have been adopted as described in Section 10640 et seq.	10621(c)		Appendix B
54	Provide supporting documentation that the urban water management plan has been or will be provided to any city or county within which it provides water, no later than 60 days after the submission of this urban water management plan.	10635(b)		Chapter 1 Section 1.3 Appendix A
55	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.	10642		Chapter 1 Section 1.3 Appendix A
56	Provide supporting documentation that the urban water supplier made the plan available for public inspection and held a public hearing about the plan. For public agencies, the hearing notice is to be provided pursuant to Section 6066 of the Government Code. The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water. Privately-owned water suppliers shall provide an equivalent notice within its service area.	10642		Appendix A
57	Provide supporting documentation that the plan has been adopted as prepared or modified.	10642		Appendix B
58	Provide supporting documentation as to how the water supplier plans to implement its plan.	10643		Chapter 1, Section 1.3 Chapter 3, Section 3.5 Chapter 6

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to the California State Library and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. This also includes amendments or changes.	10644(a)		Chapter 1 Section 1.3 Appendix A
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645		Chapter 1 Section 1.3 Appendix A
SYSTEM DESCRIPTION				
8	Describe the water supplier service area.	10631(a)		Chapter 2 Section 2.1 Figures 1, 2, and 3
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)		Chapter 2 Section 2.1 and 2.2
10	Indicate the current population of the service area	10631(a)	Provide the most recent population data possible. Use the method described in “Baseline Daily Per Capita Water Use.” See Section M.	Chapter 2 Section 2.2 Table 3
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional, or local service area population projections.	10631(a)	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Chapter 2 Section 2.2 Table 3
12	Describe other demographic factors affecting the supplier’s water management planning.	10631(a)		Chapter 2 Section 2.2

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
SYSTEM DEMANDS				
1	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.	10608.20(e)		Chapter 3 Sections 3.1 and 3.2
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	Retailers and wholesalers have slightly different requirements	Chapter 3 Section 3.3
3	Report progress in meeting urban water use targets using the standardized form.	10608.40		Not Applicable Until 2015
25	Quantify past, current, and projected water use, identifying the uses among water use sectors, for the following: (A) single-family residential, (B) multifamily, (C) commercial, (D) industrial, (E) institutional and governmental, (F) landscape, (G) sales to other agencies, (H) saline water intrusion barriers, groundwater recharge, conjunctive use, and (I) agriculture.	10631(e)(1)	Consider 'past' to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Chapter 3 Section 3.3
33	Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types	10631(k)	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030. Guidebook table 12 is not included in this UWMP. Explanation provided in Section 3.4.	Chapter 3 Section 3.3
34	Include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)	Guidebook table 8 is not included in this UWMP. Explanation provided in Section 3.3.	Chapter 3 Section 3.3

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
SYSTEM SUPPLIES				
13	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, and 2030.	10631(b)	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided. Guidebook table 17 is not included in this UWMP. Explanation provided in Section 4.3.	Chapter 4 Section 4.1
14	Indicate whether groundwater is an existing or planned source of water available to the supplier. If yes, then complete 15 through 21 of the UWMP Checklist. If no, then indicate "not applicable" in lines 15 through 21 under the UWMP location column.	10631(b)	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Chapter 4 Section 4.2
15	Indicate whether a groundwater management plan been adopted 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)(1)		Chapter 4 Section 4.2 Appendix E
16	Describe the groundwater basin.	10631(b)(2)		Chapter 4 Section 4.2 Appendix D
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631(b)(2)		Chapter 4 Section 4.2
18	Describe the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. If the basin is not adjudicated, indicate "not applicable" in the UWMP location column.	10631(b)(2)		Not Applicable

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
19	For groundwater basins that are not adjudicated, provide information as to whether DWR has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition. If the basin is adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		Chapter 4 Section 4.2 Appendix D and E
20	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	10631(b)(3)		Chapter 4 Section 4.2
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631(b)(4)	Provide projections for 2015, 2020, 2025, and 2030.	Chapter 4 Section 4.2
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		Chapter 4 Section 4.4
30	Include a detailed description of all 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, excluding demand management programs addressed in (f)(1). Include specific projects, describe water supply impacts, and provide a timeline for each project.	10631(h)		Chapter 4 Section 4.8
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and groundwater.	10631(i)		Chapter 4 Section 4.5
44	Provide information on recycled water and its potential for use as a water source in the service area of the urban water supplier. Coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	10633		Chapter 4 Section 4.6
45	Describe the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)	Described in the text, in Section 4.6. Guidebook table 22 is not included in this UWMP. Explanation provided in Section 4.6.2.	Chapter 4 Section 4.6

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
46	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.	10633(b)	Guidebook table 21 is not included in this UWMP. Explanation provided in Section 4.6.2.	Chapter 4 Section 4.6
47	Describe the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)		Chapter 4 Section 4.6
48	Describe and quantify the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)	Guidebook table 23 is not included in this UWMP. Explanation provided in Section 4.6.5.	Chapter 4 Section 4.6
49	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.	10633(e)	Guidebook table 24 is not included in this UWMP. Explanation provided in Section 4.6.4.	Chapter 4 Section 4.6
50	Describe the actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)	Guidebook table 25 is not included in this UWMP. Explanation provided in Section 4.6.6.	Chapter 4 Section 4.6
51	Provide a plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)		Chapter 4 Section 4.6
WATER SHORTAGE RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING [b]				
5	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	10620(f)		Chapter 5 Sections 5.2 & 5.3 Chapter 6
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage and provide data for (A) an average water year, (B) a single dry water year, and (C) multiple dry water years.	10631(c)(1)		Chapter 5 Section 5.1
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)		Chapter 5 Section 5.1

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
35	Provide an urban water shortage contingency analysis that specifies stages of action, including up to a 50-percent water supply reduction, and an outline of specific water supply conditions at each stage	10632(a)		Chapter 5 Section 5.2
36	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's water supply.	10632(b)		Chapter 5 Section 5.3
37	Identify actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)		Chapter 5 Section 5.2
38	Identify additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)		Chapter 5 Section 5.2
39	Specify consumption reduction methods in the most restrictive stages. Each urban water supplier may 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.	10632(e)		Chapter 5 Section 5.2
40	Indicated penalties or charges for excessive use, where applicable.	10632(f)		Chapter 5 Section 5.2
41	Provide an analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)		Chapter 5 Section 5.2
42	Provide a draft water shortage contingency resolution or ordinance.	10632(h)		Chapter 5 Section 5.2 Appendix G
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)		Chapter 5 Section 5.2
52	Provide information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments, and the manner in which water quality affects water management strategies and supply reliability	10634		Chapter 5 Section 5.1

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
53	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, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. Base the assessment on the information compiled under Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)		Chapter 5 Section 5.3
DEMAND MANAGEMENT MEASURES				
26	Describe how each water demand management measures is being implemented or scheduled for implementation. Use the list provided.	10631(f)(1)	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Chapter 6
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)		Chapter 6
28	Provide an estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the ability to further reduce demand.	10631(f)(4)		Chapter 6
29	Evaluate each water demand management measure that is not currently being implemented or scheduled for implementation. The evaluation should include economic and non-economic factors, cost-benefit analysis, available funding, and the water suppliers' legal authority to implement the work.	10631(g)	See 10631(g) for additional wording.	Chapter 6
32	Include the annual reports submitted to meet the Section 6.2 requirements, if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Appendix I

a The UWMP Requirement descriptions are general summaries of what is provided in the legislation. Urban water suppliers should review the exact legislative wording prior to submitting its UWMP.

b The Subject classification is provided for clarification only. It is aligned with the organization presented in Part I of this guidebook. A water supplier is free to address the UWMP Requirement anywhere with its UWMP, but is urged to provide clarification to DWR to facilitate review.

Appendix A

OUTREACH DOCUMENTS

DEPARTMENT
OF UTILITIES

ENGINEERING
SERVICES DIVISION

CITY OF SACRAMENTO
CALIFORNIA

1395 35th AVENUE
SACRAMENTO, CA
95822-2911

PH 916-808-1400
FAX 916-808-1497/1498

March 23, 2011
JP:jp

Mr. Steven C. Szalay, Interim County Executive
County of Sacramento
700 H Street, Room 7650
Sacramento, CA 95814

SUBJECT: NOTICE OF PREPERATION OF THE URBAN WATER MANAGEMENT PLAN

Dear Mr. Szalay,

Pursuant to the requirements of the California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.

This letter is intended to notify your agency that the City of Sacramento (City) is in process of preparing the 2010 UWMP. Based on the City's current schedule, we expect to have a public review draft of the 2010 UWMP available for review in June 2011, at which point your agency will receive a notification letter that the draft UWMP is available for public review.

If your agency would like to submit comments or provide input to the City in anticipation of the development of the 2010 UWMP, please submit written copies to:

Jim Peifer
City of Sacramento, Department of Utilities
1395 35th Avenue, Sacramento, CA 95822

Sincerely,

Jim Peifer, Senior Engineer

Copy to: Herb Niederbeger, Interim Director, Sacramento County Water Agency
Tommy Greci, Carollo Engineers, Inc.

DEPARTMENT
OF UTILITIES

ENGINEERING
SERVICES DIVISION

CITY OF SACRAMENTO
CALIFORNIA

1395 35th AVENUE
SACRAMENTO, CA
95822-2911

PH 916-808-1400
FAX 916-808-1497/1498

March 23, 2011
JP:jp

Mr. Warren Jung, Manager Engineering Services
Sacramento Suburban Water District
3701 Marconi Avenue, Suite 100
Sacramento, CA 95821

SUBJECT: NOTICE OF PREPERATION OF THE URBAN WATER MANAGEMENT PLAN

Dear Mr. Jung,

The Urban Water Management Act requires the City of Sacramento (City) to update its Urban Water Management Plan (Plan) by July 1, 2011. The City's current Plan was last updated in 2006 and is under review and will be revised as required. The City will make proposed revisions to the Plan available for public review and will hold a public hearing later this year.

If your agency would like to submit comments or provide input to the City in anticipation of the development of the Plan, please submit written copies to:

Jim Peifer
City of Sacramento, Department of Utilities
1395 35th Avenue
Sacramento, CA 95822

Please call me at (916) 808-1416 if you have any questions.

Sincerely,

Jim Peifer, Senior Engineer

Copy to: Tommy Greci, Carollo Engineers, Inc.

DEPARTMENT
OF UTILITIES

ENGINEERING
SERVICES DIVISION

CITY OF SACRAMENTO
CALIFORNIA

1395 35th AVENUE
SACRAMENTO, CA
95822-2911

PH 916-808-1400
FAX 916-808-1497/1498

March 23, 2011
JP:jp

Mr. Prabhakar Somavarapu, Director of Policy and Planning
Sacramento Regional County Sanitation District
10060 Goethe Road
Sacramento, CA 95827

SUBJECT: NOTICE OF PREPERATION OF THE URBAN WATER MANAGEMENT PLAN

Dear Mr. Somavarapu,

The Urban Water Management Act requires the City of Sacramento (City) to update its Urban Water Management Plan (Plan) by July 1, 2011. The City's current Plan was last updated in 2006 and is under review and will be revised as required. The City will make proposed revisions to the Plan available for public review and will hold a public hearing later this year.

If your agency would like to submit comments or provide input to the City in anticipation of the development of the Plan, please submit written copies to:

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Sincerely,

Jim Peifer, Senior Engineer

Copy to: Tommy Greci, Carollo Engineers, Inc.

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ENGINEERING
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CITY OF SACRAMENTO
CALIFORNIA

1395 35th AVENUE
SACRAMENTO, CA
95822-2911

PH 916-808-1400
FAX 916-808-1497/1498

March 23, 2011
JP:jp

Mr. Robert Cook Jr., General Manager
Fruitridge Vista Water Company
1108 Second Street, Suite 204
Sacramento, CA 95814

SUBJECT: NOTICE OF PREPERATION OF THE URBAN WATER MANAGEMENT PLAN

Dear Mr. Cook,

The Urban Water Management Act requires the City of Sacramento (City) to update its Urban Water Management Plan (Plan) by July 1, 2011. The City's current Plan was last updated in 2006 and is under review and will be revised as required. The City will make proposed revisions to the Plan available for public review and will hold a public hearing later this year.

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Sacramento, CA 95822

Please call me at (916) 808-1416 if you have any questions.

Sincerely,

Jim Peifer, Senior Engineer

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DEPARTMENT
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CITY OF SACRAMENTO
CALIFORNIA

1395 35th AVENUE
SACRAMENTO, CA
95822-2911

PH 916-808-1400
FAX 916-808-1497/1498

March 23, 2011
JP:jp

Mr. Andy Soule, General Manager
California American Water
4701 Beloit Drive
Sacramento, CA 95838

SUBJECT: NOTICE OF PREPERATION OF THE URBAN WATER MANAGEMENT PLAN

Dear Mr. Soule,

The Urban Water Management Act requires the City of Sacramento (City) to update its Urban Water Management Plan (Plan) by July 1, 2011. The City's current Plan was last updated in 2006 and is under review and will be revised as required. The City will make proposed revisions to the Plan available for public review and will hold a public hearing later this year.

If your agency would like to submit comments or provide input to the City in anticipation of the development of the Plan, please submit written copies to:

Jim Peifer
City of Sacramento, Department of Utilities
1395 35th Avenue
Sacramento, CA 95822

Please call me at (916) 808-1416 if you have any questions.

Sincerely,

Jim Peifer, Senior Engineer

Copy to: Tommy Greci, Carollo Engineers, Inc.

Appendix B

ADOPTION RESOLUTION

(To be included in Final UWMP)

Appendix C

WATER CONTRACTS AND AGREEMENTS

APPENDIX C

Water Contracts and Agreements

CITY OF SACRAMENTO

A. INTRODUCTION

The City of Sacramento (City) purveys water within the City limits and a small area outside the City limits in the Fruitridge area. The City serves approximately 121,000 connections of which about 110,000 are residential customers.

The City of Sacramento has surface water entitlements on both the American and Sacramento Rivers and also uses groundwater. The City has a permanent agreement with the United States Bureau of Reclamation guaranteeing the accessibility of their entitlements. The authorized place of use under the City's water rights do not encompass the entire metropolitan area. The Sacramento River rights apply to the City limits; the American River rights cover an area of approximately 96,000 acres within and adjacent to the City.

The City has existing diversion, treatment, storage and pumping facilities on both of the rivers. The Sacramento River plant is located just downstream of the confluence with the American River. The American River plant known as the E. A. Fairbairn Water Treatment Plant (FWTP) is located near Howe Avenue approximately 16 miles downstream from Nimbus Dam.

B. SEVEN ELEMENTS OF THE *WATER FORUM AGREEMENT*: INTEGRATED PACKAGE

In order to achieve the Water Forum's two coequal objectives, providing a safe reliable water supply and preserving the values of the Lower American River, all signatories to the *Water Forum Agreement* need to endorse and, where appropriate, participate in each of seven complementary actions.

- Increased Surface Water Diversions
- Actions to Meet Customers' Needs While Reducing Diversion Impacts in Drier Years
- Support for an Improved Pattern of Fishery Flow Releases from Folsom Reservoir
- Lower American River Habitat Management Element
- Water Conservation Element
- Groundwater Management Element
- Water Forum Successor Effort

For each interest to get its needs met, it has to endorse all seven elements. Based on this linkage, signatories agree to endorse and, where appropriate, participate in all seven of these elements.

C. BASELINE DIVERSIONS

Baseline diversions represent the historic maximum amount of water diverted annually from the American River through the year 1995.

Although the City has the physical capacity to divert up to 112,000 AF, the baseline for the City's American River diversion is 50,000 AF. The rest of the City's surface water demand is met by Sacramento River diversion.

D. AGREEMENT FOR MEETING THE CITY OF SACRAMENTO'S WATER SUPPLY NEEDS TO THE YEAR 2030

TEXT OF CITY AGREEMENT:

1. Use of E. A. Fairbairn Water Treatment Plant (FWTP) Diversion Capacity

a. In extremely dry years (i.e., years in which the State of California Department of Water Resources [DWR] annual projected unimpaired inflow into Folsom Reservoir would be 550,000 Acre-Feet Annually (AFA) or less, also referenced as the March through November projected unimpaired flow into Folsom Reservoir being less than 400,000 acre feet) the City would limit its diversions of City Water[12] at the FWTP to not greater than 155 cubic feet per second (cfs) and not greater than 50,000 AFA. Any additional water needs would be met by diversions at other locations and/or other sources.

City water diverted at the FWTP in extremely dry years in accordance with the foregoing limitations could be used anywhere within the City's authorized Place of Use (POU) as it exists now and in the future[13].

b. In all other years, (i.e. when the DWR annual projected unimpaired runoff into Folsom Reservoir is greater than 550,000 AF, or the March through November projected unimpaired inflow into Folsom Reservoir is greater than 400,000 AF) the City may divert City Water at the FWTP in accordance with the following criteria.

(1) Diversion up to 310 cfs (200 mgd) so long as the flow bypassing the diversion at the FWTP is greater than the Hodge Flow Criteria[14].

(2) Whenever flow bypassing the diversion at the FWTP is less than the Hodge Flow Criteria, City diversions may not be greater than the following:

January through May	120 cfs
June through August	155 cfs
September	120 cfs
October through December	100 cfs

c. **Retail Water Service**. City Water diverted at FWTP in accordance with Article (b) of this section may be delivered anywhere: (1) within the City limits as they exist now

[12]The term "City Water" refers to water diverted pursuant to the City's water rights and entitlements.
[13]The City's POU, as it existed on January 1, 1997, is shown on Attachment I.
[14] The "Hodge Flow Criteria" is defined in Appendix C.

and in the future, and (2) within the City Retail Service Area[15] as it exists now and in the future but not including the area designated on Attachment II expected to be served by agencies other than the City.

d. **Wholesale Water Service - Above Hodge**. Whenever the flow bypassing the diversion at the FWTP is greater than the Hodge Flow Criteria the City may deliver City Water diverted or treated at the FWTP to public or private water purveyors on a wholesale basis, pursuant to wholesale agreements, anywhere within the POU as it existed on January 1, 1997. If it is proposed in the future to expand the POU this provision will be revisited by the Water Forum Successor Effort.

e. **Wholesale and Wheeling Water Service - Below Hodge.** Whenever flow bypassing the diversion at the FWTP is less than the Hodge Flow Criteria, any water diverted or treated at the FWTP may be delivered on a wholesale (City Water) or wheeling (non-City water) basis to any public or private water purveyors provided the rate of pumpback[16] is equal to or exceeds the rate of delivery for these purposes on a daily basis.

f. **Wholesale Delivery to Arcade and Citizens Utilities - Interim Period.** During the interim period prior to expansion of the FWTP and construction of a pumpback facility, delivery of City water may be provided to Arcade Water District and Citizens Utilities service areas within the City's POU whenever the flow bypassing the diversion at the FWTP is greater than the Hodge Flow Criteria. Such wholesale deliveries may also be made if it can be demonstrated[17] that such delivery does not originate from diversion at the FWTP. Citizens Utilities Southgate Service Area is exempt from this specific restriction.

g. **Environmental Signatories Support.** Environmental signatories' support for wholesale water deliveries from the City under articles d, e, and f of this section is contingent on those purveyors signing and implementing the *Water Forum Agreement*. Citizens Utilities Southgate Service Area is exempt from this contingency.

---

[15] The "City Retail Service Area" refers to the area where the City provides retail water service.

[16] This Agreement uses the term "pumpback" which assumes the existence of a metered raw water conveyance facility delivering water from near the confluence of the Sacramento and American rivers to the FWTP.

[17] Demonstration would consist of either the FWTP being out of service and/or the water quality of the water delivered having characteristics (i.e. electrical conductivity, total dissolved solids, hardness, etc..) of Sacramento River water.

2. Divert and Treat an Additional 155 cubic feet per second at the Fairbairn Water Treatment Plant.

a. Currently the 310 cubic feet per second diversion capacity at the Fairbairn Water Treatment Plant is constrained to 155 cubic feet per second by the City's ability to treat the water.

The City may rehabilitate its FWTP diversion facility and expand its FWTP treatment capacity by another 100 million gallons per day. This will allow the City to divert and treat an additional 155 cubic feet per second consistent with the terms of Section 1 above.

b. Concurrent with the expansion of the FWTP the City will also construct other facilities such as expansion/rehabilitation of the Sacramento River Water Treatment Plant and river intake to assure that a reliable alternative supply (groundwater, pumpback and/or diversion from the Sacramento River) is available whenever it is needed.

3. Continuing studies of the Lower American River

a. Upon receipt by the City of all necessary regulatory approvals to construct the additional capacity referred to in Section 2(a), above, completion of the City's environmental review for the project, and construction of said additional capacity, the City will commence a study program to monitor and evaluate the impacts of using the additional diversion capacity, in accordance with the diversion limits described in Section 1, upon the public trust values of the American River below the FWTP.

b. Not later than five years after the study program has commenced the results will be evaluated as follows:

(1) If the City and the Water Forum Successor Effort agree that results show that use of the additional diversion capacity pursuant to Section 1 above would have a significant adverse impact not considered in the City's prior environmental review, the City will reduce its use of the additional diversion capacity to levels that will not have such significant adverse impact.

(2) If at some time in the future, the City determines that it needs additional capacity and the Water Forum Successor Effort agrees that results demonstrate that increased diversions will not have significant adverse impacts, the City will have the support of all signatories if it chooses to pursue regulatory approvals for appropriate higher diversion limits and for the construction of more diversion and treatment capacity at FWTP for use within the POU.

(3) If the City and the Water Forum Successor Effort cannot agree on the results of (1) above, the limits will remain as specified in Section 1, the studies will continue and the evaluation of results will be repeated, as above, at intervals not exceeding three years.

E. SPECIFIC AGREEMENTS FOR COMPLYING WITH THE SEVEN ELEMENTS

(Agreements in italics are common in all Specific Agreements.)

1. All signatories to the *Water Forum Agreement* will endorse all water entitlements needed for the diversions specified in each Purveyor Specific Agreement.

2. All signatories will endorse construction of facilities to divert, treat and distribute water consistent with this Purveyor Specific Agreement and the Water Forum Agreement including diversion structures, treatment plants, pumping stations, wells, storage facilities, and major transmission piping. Endorsement is also to be provided for necessary rights-of-ways, permits, and other endorsements which may be needed, in the context of the following five points:

a. All signatories agree that implementation of the Water Forum Agreement including an Improved Pattern of Fishery Flow Releases, the Updated Lower American River flow standard, the Lower American River Habitat Management Element, Actions to Meet Customers' Needs While Reducing Diversion Impacts in Drier Years, and the Water Conservation Element constitute reasonable and feasible mitigation for any cumulative impacts on the Lower American River caused by diversions included in the Water Forum Agreement.

b. *Environmental impacts of facilities to divert, treat and distribute water will be subject to site-specific environmental review. It is understood that signatories may provide comments on site specific impacts. All signatories will work in good faith to agree on reasonable and feasible mitigation for any site-specific impacts.*

c. To the extent that the water facilities are consistent with the Water Forum Agreement, signatories agree that they will not object to those water facilities based on the cumulative impacts to the Lower American River. Nor will signatories object to water facilities consistent with the Water Forum Agreement based on the planned growth to be served by those water facilities. (See Section Four IV, Relationship of Water Forum Agreement to Land Use Decision Making.)

d. In the planning for new water diversion, treatment, and distribution facilities identified in the Water Forum Agreement, water purveyors signatory to the Agreement will either provide for a public participation process, such as meeting with already established citizen advisory committees, or other appropriate means to help design and implement these projects.

e. All signatories retain their existing ability to provide input on specific details of facility design, financing, and construction.

3. Endorsement of the water entitlements and related facilities in the Water Forum Agreement means that signatories will expend reasonable efforts to:

a. Speak before stakeholder boards and regulatory bodies,

b. Provide letters of endorsement,

c. Provide supportive comments to the media,

d. Advocate the Water Forum Agreement to other organizations, including environmental that are not signatory to the Water Forum Agreement, and

e. Otherwise respond to requests from other signatories to make public their endorsement of the Water Forum Agreement.

4. *All signatories agree that participation in the Water Forum, and the Successor Effort is in the best interests of water consumers and the region as a whole. Participation in the Water Forum is the most economically feasible method of ensuring that water demands of the future will be met. Furthermore, provisions for groundwater management, conjunctive use, conservation programs, improved pattern of fishery flow releases from Folsom Reservoir, habitat management, and a reliable dry year supply are in the public interest, and represent reasonable and beneficial use of the water resource.*

5. All signatories will not oppose and will endorse where appropriate needed rates and fees applied equitably. This includes endorsement at the California Public Utilities Commission for investor owned utilities' ability to recover all costs of conservation programs, including residential meter retrofit, through rates.

6. All signatories will endorse an Improved Pattern of Fishery Flow Releases from Folsom Reservoir and reduced daily flow fluctuations for the Lower American River. (Reference Section Three, III.)

7. All signatories will endorse formal assurances that the diversions will be consistent with the conditions in the Water Forum Agreement and that an Improved Pattern of Fishery Flow Releases from Folsom Reservoir will be implemented.

8. All signatories will endorse and participate where appropriate in all provisions of the Water Forum Agreement, including all agreements pertaining to other signatories and executed as part of this Agreement.

9. All signatories will participate in education efforts and advocate the Water Forum Agreement to regulatory bodies and signatory stakeholder boards as appropriate.

10. All signatories will participate in the Water Forum Successor Effort to oversee, monitor and report on the implementation of the Water Forum Agreement. (Reference Section Three, VII., Water Forum Successor Effort). This includes participating with other signatories in carrying out procedural agreements as identified in the Water Forum Agreement. To the extent that conditions change in the future, all signatories will work together in good faith to identify ways to ensure that the two coequal goals of the Water Forum will still be met.

11. All signatories will endorse and, where appropriate, financially participate in the Lower American River Habitat Management Element (Reference Section Three, IV.,Lower American River Habitat Management Element).

12. All signatories will endorse and, where appropriate, implement the Water Conservation Element of the Agreement (Reference Section Three, V., Water Conservation Element). This purveyor's implementation of water conservation will be as specified in its Water Conservation Plan which is incorporated as Appendix J to the Water Forum Agreement.

13. All signatories will endorse and, where appropriate, participate in implementation of the Sacramento North Area Groundwater Management Authority to maintain a North Area estimated average annual sustainable yield of 131,000 acre feet.

14. All signatories will endorse development of a groundwater management arrangement for the South Area and where appropriate participate in its development, to maintain a South Area estimated average annual sustainable yield of 273,000 acre feet.

15. All signatories will endorse development of a groundwater management arrangement for the Galt Area and where appropriate participate in its development, to maintain a Galt Area estimated average annual sustainable yield of 115,000 acre feet.

16. Signatories authorizing individuals to represent them in matters included within the Water Forum Agreement will ensure that representations made by those individuals are consistent with the Water Forum Agreement and are upheld by the signatories.

17. This Agreement is in force and effect for all signatories for the term of the Memorandum of Understanding, December 31, 2030.

18. Any solution that provides for future needs will have costs. New diversion, treatment, and distribution facilities, wells, conservation programs, and required environmental mitigation will be needed. This Agreement identifies that these solutions must be equitable, fiscally responsible, and make the most efficient use of the public's money.

Water suppliers have both capital costs for facilities and operations and maintenance costs. This Agreement recommends that charges imposed to recover capital costs associated with water acquisition, treatment, or delivery be equitable. Any costs for facilities funded through bonds will be recovered as provided by law. In addition, signatories to the Water Forum Agreement agree that operational, maintenance and replacement costs should be recovered from beneficiaries of the system in accordance with California Government Code Sections 53720 to 53730 (Proposition 62) and California Constitution, Articles XIII, C and XIII, D (Proposition 218) and other laws to the extent they are applicable.

19. All signatories to the *Agreement* will endorse County/SCWA agreements with the City of Sacramento for wheeling and wholesaling of surface water prior to and after completion of the City's capacity expansion.

20. All signatories agree to endorse, and where appropriate, participate in Sacramento River Supply for North Sacramento County and Placer County (Reference Section Four, III).

21. All signatories will endorse, and where appropriate, participate in the section of the Water Forum Agreement entitled "Relationship of Water Forum Agreement to Land Use Decision Making" (Reference Four, IV).

22. All signatories will endorse, and where appropriate, participate in the Folsom Reservoir Recreation Program (Reference Section Four, V).

23. Purveyors signatory to the Water Forum Agreement will reference the Water Forum Agreement, including agreed upon estimated average annual sustainable yields of each of the three subareas of the groundwater basin in Sacramento County and limits to diversions from the American River in their water master plans and urban water management plans, which are used in providing information to cities and counties as required under Chapter 881 of the Statutes of 1995.

24. Any transfers of American River water by signatories will be delivered in a manner consistent with an Improved Pattern of Fishery Flow Releases as referenced in the Water Forum Agreement.

F. ASSURANCES AND CAVEATS

Because the *Water Forum Agreement* is a comprehensive set of linked elements, it is absolutely essential that adequate assurances be secured for every element. In an agreement that will extend over three decades, the timing of these assurances is critical. Full implementation of all seven elements cannot occur simultaneously. Therefore all signatories agree with the provisions in the Assurances and Caveats Section of this *Water Forum Agreement*.

Two particularly important assurances are the updated Lower American River Flow Standard and Upstream American River Diversion Agreements.

All signatories agree they will recommend to the State Water Resources Control Board an updated American River flow standard and updated Declaration of Full Appropriation to protect the fishery, wildlife, recreational and aesthetic values of the Lower American River. The recommendation will include requirements for U.S. Bureau of Reclamation releases to the Lower American River. In addition, the City of Sacramento's Fairbairn diversion will be required to comply with the diversion limitations of the City's Purveyor Specific Agreement. The *Water Forum Agreement* also includes agreed upon dry year reductions by purveyors upstream of Nimbus Dam. The recommendation for an updated Lower American River standard will be consistent with:

Water Forum Agreement provisions on water diversions including dry year diversions, and

Implementation of the Improved Pattern of Fishery Flow Releases which optimizes the release of water for the fisheries.

The recommendation will also address related issues such as principles to guide water management in the driest years, flexibility in the standard to allow adaptive management, and amending the existing "Declaration of Full Appropriation for the American River."

Purveyors signatory to the *Water Forum Agreement* who divert from upstream of Nimbus Dam agree they will enter into contract with the Bureau that will provide assurances that the upstream diverters will divert only the agreed upon amounts, which include provisions for reductions in dry year and/or other equivalent measures.

In order to have a durable agreement it is necessary to include the following caveats. These are statements describing actions or conditions that must exist for the *Agreement* to be operative.

1. As specified below, each purveyor's commitment to implementing all provisions of the *Water Forum Agreement* is contingent on it successfully obtaining its water supply entitlements and facilities.

a. If a purveyor receives support from the other signatories to the *Agreement* for all of its facilities and entitlements as shown on the chart in Section Three, I., of the *Water Forum Agreement*, "*Major Water Supply Projects that Will Receive Support Upon Signing the Water Forum Agreement*" and if it receives all necessary approvals for some or all of those facilities and entitlements, then the purveyor will fully support and participate in the following provisions of the *Water Forum Agreement*:

(1) Support for the Improved Pattern of Fishery Flow Releases
(2) Water Forum Successor Effort
(3) Water Conservation Element
(4) Lower American River Habitat Management Element
(5) Support for the Updated Lower American River flow standard
(6) Restriction of diversions or implementation of other actions to reduce diversion impacts in drier years as specified in its Purveyor Specific Agreement.

and

b. If a purveyor is not successful in obtaining all necessary approvals for all of its facilities and entitlements as shown on the chart in Section Three, I., of the *Water Forum Agreement*, "*Major Water Supply Projects that will Receive Support Upon Signing the Water Forum Agreement,*" that would constitute a changed condition that would be considered by the Water Forum Successor Effort.

2. All signatories agree that business, citizens, and environmental signatories' obligation to support, and where specified, implement all provisions of the *Water Forum Agreement* is contingent on implementation of those provisions of the *Agreement* that meet their interests.

3. A stakeholder's support for water supply entitlements and facilities is contingent on:

a. Project-specific compliance with the California Environmental Quality Act, and where applicable, the National Environmental Policy Act, federal Endangered Species Act and California Endangered Species Act.

b. Purveyors' commitment in their project-specific EIRs and CEQA findings to: all seven elements of the *Water Forum Agreement*; support for updating the Lower American River flow standard; commitment by those purveyors that divert from upstream of Nimbus Dam to entering into signed diversion agreements with the U.S. Bureau of Reclamation; commitment by the City of Sacramento to inclusion of the terms of the diversion provisions of its Purveyor Specific Agreement into its water rights.

c. Signed diversion agreements between purveyors that divert upstream of Nimbus Dam and the U.S. Bureau of Reclamation. Other signatories to the *Water Forum Agreement* shall be third party beneficiaries to the diversion agreements solely for the purpose of seeking specific performance of the diversion agreements relating to reductions in surface water deliveries and/or diversions if Reclamation fails to enforce any of those provisions. The status of a signatory to the *Water Forum Agreement* as a third party beneficiary to the diversion agreements is dependent on that signatory complying with all the terms of the *Water Forum Agreement*, including support for the purveyor specific agreement for the purveyor's project. This is not to intend to create any other third party beneficiaries to the diversion agreements, and expressly denies the creation of any third party beneficiary rights hereunder for any other person or entity.

d. Adequate progress on the updated Lower American River standard. The schedule for obtaining the updated standard is in Section Four, I., of the *Water Forum Agreement*.

e. Adequate progress in construction of the Temperature Control Device.

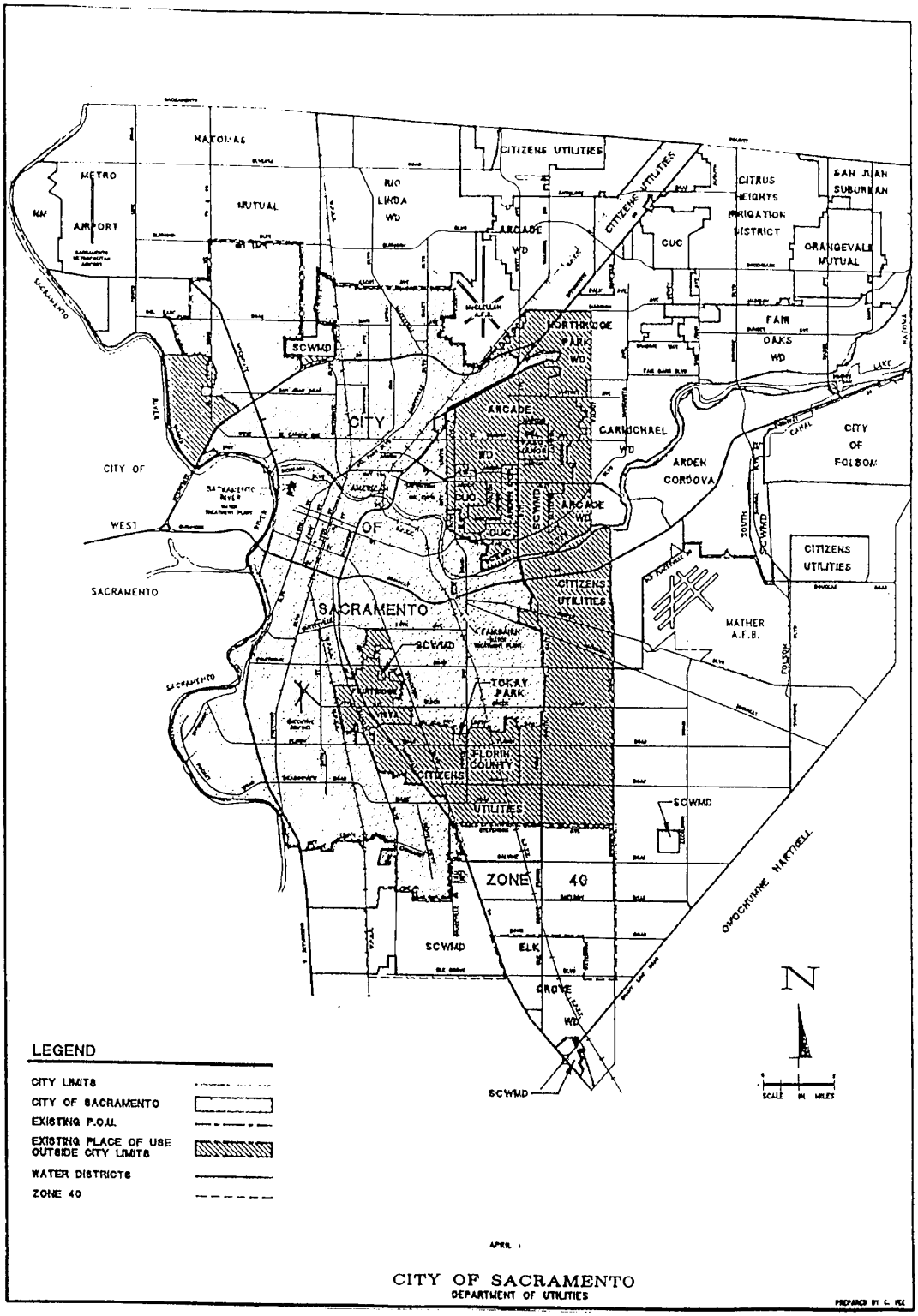
f. Adequate progress in addressing the Sacramento River and Bay-Delta conditions associated with implementation of the *Water Forum Agreement*.

4. Environmental stakeholders' support for facilities and entitlements is dependent upon the future environmental conditions in the Lower American River being substantially equivalent to or better than the conditions projected in the Water Forum EIR. If the future environmental conditions in Lower American River environment are significantly worse than the conditions projected in the EIR, this would constitute a changed condition that would be considered by the Water Forum Successor Effort. Significant new information on the needs of the Lower American River fisheries, which was not known at the time of execution of the *Water Forum Agreement*, would also constitute a changed condition that would be considered by the Water Forum Successor Effort.

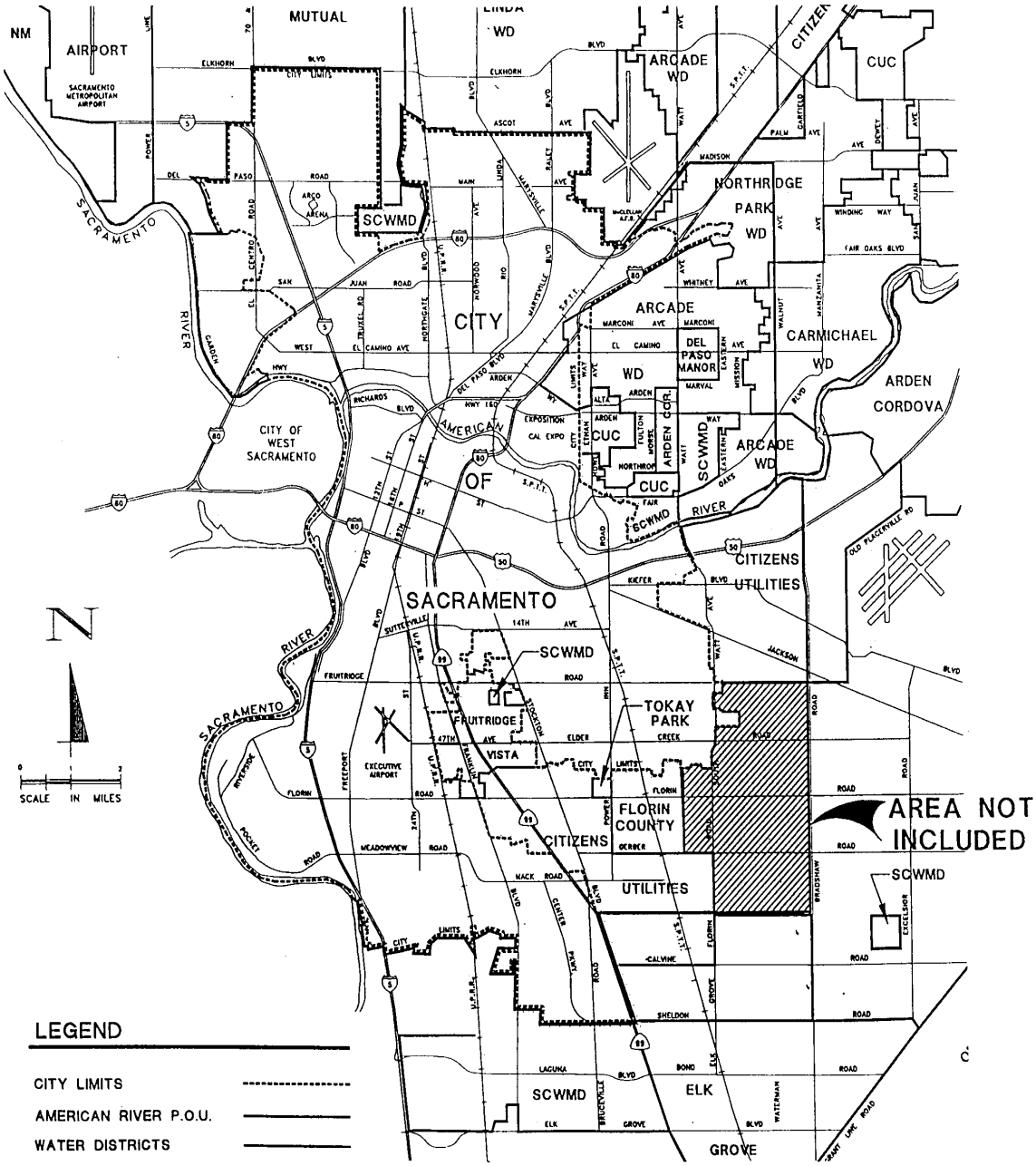
G. REMAINING ISSUES

Development of a groundwater management arrangement for the South Area.

Attachment I
Map of City POU as of 1/1/97



Attachment II
Retail Service Area Exception



Contract No.
14-06-200-6497

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL VALLEY PROJECT, CALIFORNIA

OPERATING CONTRACT RELATING TO FOLSOM AND NIMBUS DAMS AND THEIR RELATED WORKS AND TO DIVERSIONS OF WATER BY THE CITY OF SACRAMENTO

1. THIS CONTRACT, made this 28th day of June, 1957, in pursuance generally of the Act of Congress approved June 17, 1902 (32 Stat. 388), and all acts of Congress amendatory thereof or supplementary thereto, particularly Section 14 of the Reclamation Project Act of 1939 (53 Stat. 1187, 1197-1198), and the Act of Congress approved October 14, 1949 (Ch. 690, 63 Stat. 852), all of which are commonly known and referred to as the Federal Reclamation Laws, between THE UNITED STATES OF AMERICA, hereinafter referred to as the "United States", represented by its officer who executes this contract, his duly appointed successor, or his duly authorized representative, herein styled the "Contracting Officer", and THE CITY OF SACRAMENTO, CALIFORNIA, a municipal corporation, herein styled the "City", acting by and in pursuance of the authority contained in the Constitution and laws of the State of California and particularly Article XI, Sections 8 and 19 of said Constitution, and Sections 2 and 8 of the City's Charter approved by Stats. 1921, p. 1919, as amended.

W I T N E S S E T H:

2. WHEREAS, the United States has constructed a dam and reservoir in and across the American River at a point upstream from Folsom, Sacramento County, California, and will utilize said dam and

reservoir and their related works for the diversion and storage of waters of the American River for reasonable and beneficial uses and purposes, said dam being known as Folsom Dam and the reservoir created thereby being known as Folsom Lake; and

3. WHEREAS, in carrying out the provisions of said Federal Reclamation Laws the United States deems it advantageous upon the terms herein agreed upon to dispose of rights to stored water in its reservoirs heretofore constructed or that might be constructed by the United States under the provisions of the Reclamation Act, and

4. WHEREAS, the City has constructed and is operating certain diversion and distribution facilities for the diversion of water of the Sacramento River and has perfected certain rights to the use of water of the Sacramento River and its tributaries from natural flow and is in the process of perfecting additional rights to the use of water of the Sacramento and American Rivers, and the water it has historically diverted is deemed insufficient for the anticipated growth and water requirements of the City, and

5. WHEREAS, the City is desirous of perfecting its water supply by arranging with the United States for the use of a portion of the said storage waters, and

6. WHEREAS, the City desires and intends to construct water diversion and filtration facilities and related works on the American River below Nimbus Dam within or adjacent to the City for diversion and distribution of water supplies for a municipal use and desires to continue and develop the use of the waters of the Sacramento River through its existing facilities at a point one-quarter

mile below the confluence of the Sacramento and American Rivers, and through other facilities which may be constructed on the Sacramento River within or adjacent to the City, for diversion, filtration and distribution of water, and

7. WHEREAS, the United States and the City have filed applications for the appropriation of unappropriated water and have protested certain applications of each other for the appropriation of unappropriated water, and it is the desire of the parties to settle and adjust any and all differences that might exist between them so that definite assurances can be had as nearly as practicable for the continued enjoyment and use of their respective diversion facilities and operations and to provide amicable means for the necessary increase and expansion of the City's beneficial uses of water, and

8. WHEREAS, the construction and operation of Folsom Dam and its related works and the distribution and regulation of the water of the American River and its tributaries as provided for under this contract are deemed to be mutually beneficial and desirable:

NOW, THEREFORE, in consideration of the premises herein contained, it is hereby agreed by and between the parties hereto as follows:

9. On March 19, 1957, the United States and the Sacramento Municipal Utility District, a municipal corporation, executed a contract entitled "Contract Relating to Sacramento Municipal Utility District Upper American River Project Reservoirs", a copy of which is attached hereto and hereinafter referred to as the SMUD contract.

The following paragraph of this Article is a diversion schedule prepared to show the schedule of diversions by the City of

Sacramento with and without the development by SMUD referred to in the SMUD contract. The quantities are expressed in thousands of acre feet for the respective years. The requirements shown in Schedule A of the tabulation are derived from information given in City of Sacramento Exhibit No. 4, Table 8, of the records, files and proceedings of the California State Water Rights Board concerning Application 12140, and others, before that Board for the appropriation of unappropriated water. The quantities shown in Schedule B of the tabulation are 75% of the annual requirements given in Schedule A of the tabulation.

Diversion schedule by City of Sacramento with and without SMUD development, in 1,000 acre-feet

Year	Total requirement Schedule "A"	Requirement from American River Schedule "B"	Required from Folsom Reservoir: Without SMUD development Schedule "C"	Required from Folsom Reservoir: With SMUD development Schedule "D"
1963	64.0	48.0	8.0	8.0
64	66.0	49.5	8.5	8.5
1965	68.0	51.0	9.0	9.0
66	70.5	53.0	9.4	9.4
67	73.0	55.0	9.8	9.8
68	75.5	56.5	10.0	10.0
69	78.0	58.5	10.5	10.5
1970	80.7	60.5	11.0	11.0
71	83.0	62.5	11.5	11.5
72	86.0	64.5	12.0	12.0
73	88.5	66.5	12.5	12.5
74	91.5	68.5	13.0	13.0
1975	94.5	71.0	13.5	13.5
76	97.5	73.0	14.0	14.0
77	100.5	75.5	15.0	14.5
78	103.5	77.5	16.0	15.0
79	106.5	80.0	17.5	15.5
1980	110.0	82.5	19.0	16.0
81	113.0	85.0	21.0	16.5
82	116.0	87.0	23.0	17.0
83	119.5	89.5	25.0	17.5
[illegible]	123.0	92.0	27.5	18.0
[illegible]5	126.0	94.5	30.0	18.5

Year	Total requirement Schedule "A"	Requirement from American River Schedule "B"	Required from Folsom Reservoir: Without SMUD development Schedule "C"	Required from Folsom Reservoir: With SMUD development Schedule "D"
1986	129.5	97.0	32.0	19.5
87	133.0	99.5	35.0	20.0
88	136.5	102.0	37.5	20.5
89	140.0	105.0	40.0	21.0
1990	143.5	107.5	43.0	22.0
91	147.5	110.5	46.0	22.5
92	151.0	113.0	49.0	23.5
93	154.5	116.0	52.0	24.0
94	158.5	119.0	55.0	24.5
1995	162.5	122.0	58.0	25.5
96	166.5	125.0	61.0	26.0
97	171.0	128.0	64.5	27.0
98	175.0	131.0	67.5	28.0
99	179.0	134.0	71.0	29.0
2000	183.5	137.5	74.5	30.0
01	187.5	140.5	78.0	31.0
02	192.0	144.0	81.0	32.0
03	196.0	147.0	85.0	33.0
04	200.5	150.5	88.0	34.5
2005	205.0	154.0	91.5	36.0
06	209.5	157.0	95.0	37.5
07	214.0	160.5	98.5	39.0
08	218.5	164.0	102.0	40.5
09	223.0	167.5	105.5	42.5
2010	227.5	170.5	109.0	44.0
11	232.5	174.5	113.0	46.5
12	237.0	178.0	116.0	48.5
13	242.0	181.5	120.0	50.5
14	247.5	185.5	124.0	53.0
2015	252.0	189.0	127.5	55.5
16	257.5	193.0	131.0	58.0
17	262.5	197.0	135.0	60.0
18	268.0	201.0	138.5	62.5
19	273.0	205.0	142.5	64.5
2020	278.0	208.5	146.5	67.0
21	283.0	212.5	150.5	69.5
22	288.5	216.5	154.5	71.5
23	293.5	220.0	158.5	74.0
24	298.5	224.0	162.5	76.0
2025	304.0	228.0	166.5	78.5
26	308.5	231.5	171.0	81.0
27	313.5	235.0	175.0	83.0
28	318.0	238.5	179.0	85.5
29	322.5	242.0	183.5	88.0
2030 and subsequent years	326.8	245.0	187.5	90.0

The United States will make available for diversion by the City water from the American River up to the quantities specified in Schedule B, and the United States will so operate Shasta Dam and its related works so as not to interfere with the diversions by the City at its facilities on the Sacramento River referred to in Article No. 6 above or to prevent the City from enjoying the additional diversions represented by the difference between Schedules A and B.

The United States will impound and store water in the reservoirs back of Folsom and Nimbus Dams or elsewhere and does hereby agree to discharge and release into the river channel below Nimbus Dam for the use of the City an amount of water which will, with all of the water that the City is otherwise entitled to and all water not otherwise appropriated, aggregate a quantity of water as shown in Schedule B and will so operate Folsom and Nimbus Dams and their related works that water will be discharged and released into the river channel below Nimbus Dam for later downstream diversion by the City at its said American River diversion and filtration facilities at the times and in the quantities shown in Schedule B.

10. The City's rate of diversion from the Sacramento River shall not exceed 225 cubic feet of water per second and its rate of diversion from the American River shall not exceed 675 cubic feet of water per second; and the total quantity diverted by the City from the American River shall not exceed the quantities shown in Schedule B. Following April 1 of any water year in which the October 1 - Sept. 30 estimated natural inflow to Folsom Reservoir measured and as predicted the United States based, in part, upon the runoff estimates of the California Cooperative Snow Survey Program on April 1 is less than

1,275,000 acre-feet, City's diversions from the American River each month when requested by the Contracting Officer shall not exceed 75% of the aggregate taking from both the Sacramento and American Rivers until Folsom Reservoir would fill or reach flood-control limitation in the absence of additional storage facilities on the American River.

11. The City shall be entitled to reasonable flexibility in demands based on maximum daily requirements and maximum peaks during such days. The City will cooperate with the Contracting Officer to facilitate United States operations to make this possible.

12. City shall pay, at the rate of $9.00 per acre foot, beginning in 1963, for the number of acre feet shown in Schedule C: Provided, however, that if the Sacramento Municipal Utility District builds its Upper American River Project and operates that project in accordance with the SMUD contract the City shall pay, at the rate of $9.00 per acre foot, beginning in 1963, for the number of acre feet shown in Schedule D.

The City shall make payments to the United States each calendar year as hereinafter provided, at rates fixed as provided in this Article. The City shall pay one-half of the amount payable for the year on or before January 1, and shall pay the remainder of the amount payable for the year on July 1.

Upon every installment of money required to be paid by the City to the United States pursuant to this contract which shall remain unpaid after the same shall have become due and payable, there shall be imposed a charge of one-half (1/2) of one (1) percent per month of the amount of such delinquent installment from and after the date when the same becomes due until paid; and the City hereby agrees

o pay said charge: Provided, That no such charge shall be made to or be paid by the City unless such delinquency continues for more than thirty (30) days.

Payment shall be made at the office of the Regional Director of the Bureau of Reclamation, Town and Country Village in Sacramento County, or at any other place designated by the United States in a written notice to the City.

NOTE

13. The parties agree that in 1978 and again in 1988 the parties may renegotiate the terms of this contract as to quantities of water diverted and to be diverted by the City, so that the schedule of water diversions can be revised downward, and consequent payment for water shall be reduced proportionately thereafter in the ratio that the revised Schedule "B" bears to the original Schedule "B".

14. If prior to the year 2030, the City finds that because of accelerated growth its water requirements are greater than those indicated by Schedule A, the quantity of water to be furnished each year can be advanced in the schedule. In such case, the payment based upon Schedules C or D would be similarly advanced. This advancement of the schedule of diversions and of payments would not entitle the City to any water from the American River above the maximum of 245,000 acre feet annually as provided for in Schedule B above.

15. Should the City requirements exceed 245,000 acre feet annually from the American River it shall be the right of the City to secure the additional water it needs by means other than this contract. These other means may be, and are not restricted to, additional contracts with the United States if both the City and United States agree

such contracts, contracts with other parties, or the development by the City itself of additional water supplies, provided that the development of such supplies shall not involve the use of any facilities or water rights of the United States without its permission.

16. Should the Sacramento Municipal Utility District build and operate its project as provided in the SMUD contract during or after 1978 then payments being made by the City would change from Schedule C basis back to Schedule D basis when the SMUD project becomes so operational.

17. Should the Sacramento Municipal Utility District build and operate a project of lesser extent than that contemplated in the SMUD contract and which project might produce less water, and to the extent that SMUD releases are smaller, a new payment schedule shall be computed which will be intermediate between the basis of Schedules C and D and so computed to reflect payment for average computed demands on Folsom Reservoir.

18. The City will retain all its water rights and as between the United States and the City, the use of water by the City under the contract shall be treated by the United States as diligence of the City in perfecting by beneficial use the developing rights of the City in the Sacramento and American Rivers. Furthermore, by this contract the parties request the properly constituted agencies of the State of California to issue permits and licenses designated to sanction or permit the operations specified in this contract, but the parties agree that any necessary applications, permits and licenses, and rights of any and all sources and derivations owned by them may and shall be exercised as required to the end that the operational matters specified in this contract may and shall be performed, and the parties will use

due diligence to protect and defend their water rights and to acquire and keep in good standing any necessary applications, permits and licenses provided for by the laws of the State of California.

19. The City upon receiving the water discharged and released below Nimbus Dam and bypassed below Nimbus Dam as herein provided will at its own cost convey the same to the places of use and perform all actions necessary or required by law or custom in order to maintain its control over such water, and in order to secure its lawful and proper diversion from the said river through the head works of the City and the beneficial application of the same to use. All losses or diminution of such water by reason of seepage, evaporation, or other causes, after diversion by the City at the aforesaid point of diversion shall be bourne by the City.

20. Beneficial use shall be the basis, measure and limit of all rights hereunder.

21. The United States shall not be responsible for failure to supply water under this contract caused by insufficient supply of water, hostile diversion, unusual drouth, interruption of service made necessary by repairs, nor on account of any other distribution than that herein stipulated for, directed, or ordered to be made by any valid or subsisting order or decree of a court, nor for any damages caused by floods, acts of hostility, or unavoidable circumstances, nor for loss of crops or other damage caused by non-delivery of water.

22. The rights under this agreement shall be such as would permit the City to use the water in such manner as may be granted to it under State law.

23. This contract shall be permanent, but the quantity of water diverted from the American River by the City shall not exceed 245,000 acre-feet per year nor the rate of 675 cfs; also, the quantity diverted by the City from the Sacramento River shall not exceed 225 cfs. Provided, as a condition and not as a limitation or covenant, performance by the United States under the contract shall be in accord with the rights of the City as defined in any license or licenses granted under the law of California, and should such license or licenses provide for a lesser rate of diversions than those herein assumed, then the obligation of the United States for the discharge and releases of water from and by its storage works on the Sacramento and American Rivers shall be adjusted accordingly.

24. The execution of this contract shall constitute a withdrawal of any protest the United States has against any applications of the City for the appropriation of unappropriated water of the American and Sacramento Rivers.

25. The execution of this contract, also, shall constitute a withdrawal of any protests by the City against the applications of the United States for the appropriation of unappropriated water of the American and Sacramento Rivers.

26. By the execution of this agreement the parties hereto join in asking the Director of the Department of Water Resources of the State of California to execute a partial transfer to the City of Applications 5635, 5636, 5645, 7938, 7939 and 7940 for the appropriation of unappropriated water, insofar as they may now or hereafter be required for operations for the benefit of the City under this contract and to assign the rest and remainder of said applications to

the United States for use in the operation of the Central Valley Project.

27. Notwithstanding any permit or license issued to the United States for any diversion of the Sacramento and American Rivers below the points of diversion of the City of Sacramento, the uses of water under this contract shall carry all priorities accorded to or for municipal uses under the laws of the State of California and the United States will recognize such priorities. Within the limits of available water supply the City would not be required to accept any pro-rata of a deficiency in water of the American River.

28. No warranties, express or implied, by the United States shall be deemed to exist with regard to the potability of the water supplies diverted by the City, but to the contrary, the City self will take due measures on its own behalf to insure and protect the potability of its own water supplies.

29. The parties agree and consent that this contract can be referred to and adopted by any administrative or judicial body of the state or federal government that has a proper governmental function with respect to the operational matters referred to in this contract and it may adopt, if desired, this contract as a part of any relevant administrative or judicial act, order or decree.

30. In order to enable the United States to discharge and release the supply of water herein specified on the basis of payments as herein provided, the City hereby makes available to the United States for exercise, delivery and performance of this contract, with title, however, to remain in the City, all of its right, title, and terest to the waters of the Sacramento River and its tributaries over and above any amounts provided for in this contract, and limits

its claims to the amounts specified in this contract, and the City shall assist the United States in the defense of said claims by the furnishing of all evidence and other like matters in its power or knowledge, in consideration whereof, upon the failure of the United States, through drouth or otherwise to fulfill its obligations hereunder, the City's said claims and rights to water shall revert unburdened to the City until deliveries of water as provided by this contract shall be resumed. The City will not convey, encumber, or transfer its water rights in such manner as to impair the ability of the parties to perform the provisions of this contract, and the City warrants that it has not heretofore impaired any of its water rights.

31. The City agrees to install, operate, and maintain such equipment and to make such computations as may be necessary to record all stream diversions of and by its various project facilities. Authorized representatives of the United States shall have access to such equipment at all reasonable times and shall be supplied with copies of all such records and computations upon request.

32. Except as provided herein, nothing herein is to be construed as an allocation of water rights as between the United States and the City or as between the signatories hereto and any third parties.

33. Subject to the provisions of this contract the United States may store and retain in its reservoirs on the American River, now constructed or to be constructed, all or such part of the water of the American River and its tributaries for such periods of time, including periods of several years' duration, as it may desire, and may withdraw water from storage in its reservoirs, in such amounts and in such rates as it may desire, and may restore

in one or more of its reservoirs all or any part of the water of the American River and its tributaries, and may divert the water within or without the watershed, provided, that nothing herein shall prevent the City from obtaining rights to use waters of the American River for municipal purposes from any storage project on the American River hereafter constructed which does not utilize facilities or water rights of the United States.

34. Subject to the provisions of this contract the United States may store and retain in its reservoirs on the Sacramento River, now constructed or to be constructed, all or such part of the water of the Sacramento River and its tributaries for such periods of time as it may desire, including periods of several years' duration, and may withdraw water from storage in its reservoirs, in such amounts and at such rates as it may desire, and may restore in one or more of its reservoirs all or any part of the water of the Sacramento River and its tributaries as it may desire, and may divert the water within or without the watershed, provided, that nothing herein shall prevent the City from obtaining rights to use waters of the Sacramento River or its tributaries for municipal purposes from any storage project on the Sacramento River or its tributaries hereafter constructed which does not utilize facilities or water rights of the United States.

35. It is the desire of the United States and the City to provide for the maximum beneficial use of the waters of the American and Sacramento Rivers and their tributaries, and to accomplish such purpose it may be desirable that operations under this contract be modified. Representatives of the United States and the City will confer with each other at least once each year, and if it shall appear

to them that storage, retention, or release other than that contemplated by this contract may be made without substantial injury or harm to the respective interests of the parties hereto in such waters and their use, then it is agreed between the parties that such storage, retention, or release may be made for the period agreed upon. Upon the expiration of such agreed period of time, in the absence of further agreement, the operations specified in this contract shall govern. Any such agreement reached by representatives of the United States and of the City shall forthwith be confirmed in writing by the representative of the party initiating the request. For the purpose of such conferences the City shall designate a representative, and the Contracting Officer shall designate a representative for the United States. Each such representative shall continue in office until his successor is duly designated. Such representative shall be authorized so to confer and to agree to such storage, retention, and release under such conditions as may carry out the purpose of this Article.

36. Representatives of the United States and the City shall confer with each other as often as necessary for the purpose of agreeing upon or approving methods, procedure, data, or other matters required under this contract to be mutually agreed upon or approved by the United States and the City. For the purpose of such conferences and for agreeing to or approving such matters the City shall designate a representative, and the Contracting Officer shall designate a representative for the United States, which may be the same persons designated pursuant to the preceding Article. Any such agreement reached by the United States and the City shall be reduced to writing and signed

by such representatives. Each such representative shall continue in office until his successor is duly designated. Such representatives shall be authorized so to confer and to agree to or approve such matters.

37. No member of or delegate to Congress or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit that may arise herefrom, but this restriction shall not be construed to extend to this contract if made by a corporation or company for its general benefit.

38. This contract shall inure solely to the benefit of the parties hereto and their respective successors and assigns. No other person, partnership, association, district, or corporation shall acquire or have any right under or by virtue of this contract. This contract shall be binding upon any respective successors and assigns of the parties hereto.

39. This contract shall become effective concurrently with the issuance to the parties of permits by the California State Water Rights Board in consonance with the operations herein specified. The effective date shall be established by a joint announcement of the parties. The operating requirements of the parties shall begin with the year 1963 in which the City expects to begin the operation of its American River diversion facilities, but payments under the contract by the City shall be apportioned in accordance with the American River diversions by the City during that year.

40. <u>Contingent upon Appropriations</u>

Where the operations of this contract extend beyond the current fiscal year, the contract is made contingent upon Congress

aking the necessary appropriation for expenditures hereunder after such current year shall have expired. In case such appropriation as may be necessary to carry out this contract is not made, the City hereby releases the United States from all liability due to the failure of Congress to make such appropriation.

41. Nondiscrimination in Employment

In connection with the performance of work under this contract, the City agrees not to discriminate against any employee or applicant for employment because of race, religion, color, or national origin. The aforesaid provision shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The City agrees to post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of the nondiscrimination clause.

The City further agrees to insert the foregoing provision in all subcontracts hereunder, except subcontracts for standard commercial supplies or raw materials.

IN WITNESS WHEREOF, the parties hereto have duly executed these presents in eight counterparts all as of the day and year first hereinabove written.

THE UNITED STATES OF AMERICA

/s/ By C. H. SPENCER
Regional Director, Region II
Bureau of Reclamation

CITY OF SACRAMENTO,
a municipal corporation

/s/ By CLARENCE L. AZEVEDO
Mayor

ATTEST:

/s/ PAUL H. MANBY
City Clerk

APPROVED AS TO FORM:

/s/ EVERETT M. GLENN
City Attorney

APPENDIX C

WHAT IS THE HODGE DECISION?

Existing flow requirements, for the Lower American River, known as Decision D – 893, were set 40 years ago when much less was known about the life cycles and needs of the fish, particularly fall-run chinook salmon. Since then we have learned more about them and watched as their population further declined under the outdated standard.

In 1970 the East Bay Municipal Utility District (EBMUD) contracted with the U. S. Bureau of Reclamation for water that would be diverted from the Lower American River into the Folsom South Canal at Nimbus which is upstream of the Lower American River. Parties including Sacramento County, the Environmental Defense Fund, and Save the American River Association sued EBMUD over concern about how these increased diversions would further impact the Lower American River fishery. Millions of dollars were spent on legal costs and fishery studies.

At the end of the 17-year lawsuit, Judge Hodge evaluated all of the evidence and issued his decision which balanced the needs of the fishery with EBMUD's contractual entitlement to American River water. Judge Hodge reasoned that because EBMUD had reasonable and feasible alternatives for meeting its needs, it could use the Folsom-South Canal diversion only when specified flows would remain in the river. These flows have come to be known as the Hodge Flows.

While Judge Hodge's decision applies only to parties to that lawsuit, the Water Forum is considering the same standards for any water district that was found to have reasonable and feasible alternatives.

The Water Forum also recognizes that some agencies, such as those at higher elevations, have no reasonable and feasible alternatives to increased American River diversions in most years and therefore probably would not be held to the Hodge standard.

D – 893

September 15 – December 31	500 cubic feet per second
January 1 – September 14	250 cubic feet per second

Hodge Decision

October 15 – February	2,000 cubic feet per second
March – June	3,000 cubic feet per second
July – October 14	1,750 cubic feet per second

WATER DISTRIBUTION AGREEMENT BETWEEN
THE CITY OF SACRAMENTO
AND SACRAMENTO SUBURBAN WATER DISTRICT

THIS AGREEMENT is made and entered into this 9th day of August, 2007, by the CITY OF SACRAMENTO, a charter municipal corporation (hereinafter referred to as "City") and the SACRAMENTO SUBURBAN WATER DISTRICT, a California special district (hereinafter referred to as "District").

RECITALS

A. The City and District both operate water supply systems serving their respective customers. The District currently is constructing improvements to connect the District's water distribution system to the City's Howe Avenue water transmission main (hereafter referred to as the "Enterprise Drive Interconnection"), that will allow City water to be delivered to the District's water distribution system.

B. City and District are parties to that certain "Wholesale Water Supply Agreement Between the City of Sacramento and Sacramento Suburban Water District" dated January 20, 2004, and identified as City Agreement No. 2004-013 (the "Wholesale Agreement"), which provides for the delivery of potable City water to the District through the Enterprise Drive Interconnection.

C. The City is planning for the potential development of the City's existing Trap Shooting Range site located north of the intersection of Fulton Avenue and the Capital City Freeway as shown on **Exhibit A**, including the provision of City retail water service to such development. Exhibit A also shows various City facilities (including retail, clubhouse, restaurant and related facilities) located nearby the Trap Shooting Range site (hereafter referred to as the "Clubhouse Facilities") that are operated to support the City's Haggin Oaks golf complex. The Trap Shooting Range site and the Clubhouse Facilities are collectively referred to in this Agreement as the "Haggin Oaks Site." The Haggin Oaks Site is located within the City limits, and outside of the District's service area.

D. Although the Clubhouse Facilities currently are served by an on-site groundwater system, this system is not capable of supplying water for development of the Trap Shooting Range site. The City currently does not have surface water distribution facilities serving the Haggin Oaks Site, and extension of the City's water distribution pipelines to serve this location would require costly infrastructure improvements.

E. The District operates and maintains nearby water distribution facilities that could be extended to the Haggin Oaks Site at significantly less cost than an extension of City water service. If a pipeline or pipelines (hereafter referred to as the "Main Extension") were constructed to connect the District's water distribution facilities to the Haggin Oaks Site, these facilities could be used to deliver potable water to the Haggin Oaks Site. Delivering City water to the District's water distribution facilities at the Enterprise Drive

CITY AGREEMENT NO. 2007-0816

CITY AGREEMENT NO. 2007-0816

Interconnection, and using the District's water distribution facilities to deliver potable water to the Main Extension, would allow the City to provide retail water service to the Haggin Oaks Site at less cost than extending the City's water distribution pipelines to serve this location.

F. This Agreement sets forth the terms and conditions for use of the District's water distribution facilities to deliver potable water to the Main Extension for use at the Haggin Oaks Site, in the event that the Main Extension is constructed to provide water service to serve development of the Trap Shooting Range site and/or the Clubhouse Facilities.

G. The City and the District are both signatories to the Sacramento Water Forum Agreement, and this Agreement is consistent with that agreement.

NOW, THEREFORE, in consideration of the foregoing and of the mutual covenants herein contained, the parties agree as follows:

1. Recitals Incorporated:

The foregoing recitals are incorporated herein by this reference.

2. Definitions:

The following terms, when used in this Agreement, shall have the meanings set forth below:

Annual Water Usage Demand: The anticipated maximum amounts of potable water required on an annual basis for the Haggin Oaks Site for domestic, irrigation, and fire protection purposes, as specified in the Water Delivery and Distribution Criteria attached as **Exhibit B**.

City: The City of Sacramento.

City Water: Potable water diverted and treated by the City.

District: The Sacramento Suburban Water District.

District Facilities: The facilities, including transmission and distribution mains, storage facilities and all appurtenances, that are owned and operated by the District to supply water, and that are used by District to convey and distribute Potable Water as provided herein.

Enterprise Drive Interconnection: The point of connection for delivery of City Water from the City's Transmission Main to the District Facilities.

Main Extension: The pipeline or pipelines and related appurtenances and improvements constructed to connect the Service Connection to the Haggin Oaks Site and deliver an adequate supply of Potable Water for domestic, municipal & industrial and fire suppression uses, as provided in this Agreement.

Peak Hour Usage Demand: The peak hourly demand for Potable Water at the Haggin Oaks

Site for domestic, irrigation, and fire protection purposes, as specified in the Water Delivery and Distribution Criteria attached as **Exhibit B**.

Potable Water: Water that meets the drinking water standards established by the California Department of Health Services and the United States Environmental Protection Agency.

Service Connection: The location where a water meter or meters measure the amount of Potable Water delivered from the District Facilities to the Main Extension. The Service Connection will be located at the Sacramento Suburban Water District's Auburn Yard, 2736 Auburn Boulevard, Sacramento, California, unless otherwise agreed in writing by the City's Utilities Director and the District's General Manager.

Water Forum Agreement: The Sacramento Water Forum Agreement dated January 2000 and any subsequent amendments or supplements thereto, including the Purveyor Specific Agreement signed by the District on June 5, 2003.

3. <u>Termination of Project</u>:

Notwithstanding any provision hereof, the City may at any time prior to construction of the Main Extension and Service Connection notify District in writing of City's determination not to construct or have constructed the Main Extension or Service Connection, in which case this Agreement shall automatically terminate with no further obligations on the part of either party.

4. <u>Main Extension and Service Connection</u>:

a. In its sole discretion, the City may construct the Main Extension and Service Connection. The City will be wholly responsible, at no cost to District, for designing, bidding and constructing the Main Extension and Service Connection, as well as preparing all environmental documents and obtaining all permits, property rights or other approvals required for the installation, operation, maintenance and repair of the Main Extension and Service Connection in compliance with all applicable laws and regulations. Such activities will be subject to the following requirements:

(1) Prior to the construction of the Main Extension and Service Connection, both the preliminary design and the final design must be approved in writing by the District General Manager or the General Manager's designated representative. Such approval will not be unreasonably withheld. If either or both the preliminary design or final design is not approved by the District General Manager or the General Manager's designated representative, the District will notify the City in writing of the reason or reasons why such design is not acceptable, and the City will perform such revisions as may be necessary to obtain the District's approval.

(2) The City will reimburse the District for all costs reasonably incurred by the

District during the design and construction of the Main Extension and Service Connection, even if the preliminary or final design is not approved or if the Main Extension and Service Connection are not constructed. Upon City's request, District will provide City with such cost data and other information as may reasonably be required by City to verify the amount of costs reasonably incurred by District.

b. The City will own, operate, maintain and repair the Main Extension.

c. The District will own, operate, maintain and repair the meter(s) and related appurtenances comprising the Service Connection. As part of such operation, maintenance and repair, the District will calibrate instrumentation measuring Potable Water delivered from the District Facilities through the Service Connection when reasonably requested by the City, and will report such calibration to the City.

d. The Service Connection and Main Extension will be sized to support fire flows of 3000 gpm. The District will operate the District Facilities to provide the necessary fire suppression flows at the Service Connection upon demand. Any quantity of water actually used for fire suppression related purposes will be included in calculations as described in section 5(h) of this Agreement.

e. Delivery pressure from the District Facilities at the Service Connection will be a minimum of 30 pounds per square inch ("psi"), but in no event will it be greater than 80 psi.

5. **Use of District Facilities to Service Haggin Oaks Site:**

a. After the Main Extension is constructed as provided in Section 4 above, and the Enterprise Drive Interconnection is completed and operational, the District will utilize the District Facilities to accept City Water at the Enterprise Drive Interconnection and deliver Potable Water to the Service Connection for the Haggin Oaks Site as provided in this Section 5, commencing on such date (referred to in this Section as the "Start Date") as may be specified by the City in a written notice to District.

b. During each calendar year after the Start Date, the City shall deliver City Water, in such quantity as is required to meet that year's Annual Water Usage Demand for the Haggin Oaks Site, to the District Facilities at the Enterprise Drive Interconnection. Such deliveries shall only be made at times when City wholesale water deliveries at the Enterprise Drive Interconnection are authorized under the Wholesale Agreement.

c. District shall operate the District Facilities so that the amount of Potable Water necessary to meet the Peak Water Usage Demand at the Haggin Oaks Site always is available for service to the Haggin Oaks Site at the Service Connection, except as provided in section 6 of this Agreement.

d. The City's delivery and the District's distribution of water pursuant to this

Agreement shall be conducted in accordance with the Water Delivery and Distribution Criteria attached as **Exhibit B**. These Criteria may be modified by written agreement of the City's Utilities Director and the District's General Manager.

e. The District will operate, maintain and repair the District Facilities as necessary to perform the District's obligations hereunder, and the City shall have no responsibility for such operation, maintenance and repair.

f. In accordance with the provisions of Section 7 below, the City shall pay the District for use of the District's Facilities to distribute Potable Water as provided herein based on the amount of such water used at the Haggin Oaks Site for domestic, municipal & industrial, and fire suppression uses, as measured at the Service Connection.

g. Any persons or entities receiving Potable Water through the Main Extension shall be the City's retail water service customers subject to the City's water service regulations and requirements, and the District shall have no rights or obligations with respect to such customers, other than District's obligation to deliver Potable Water to the Service Connection in accordance with the provisions of this Agreement.

h. The District will record the amount of water actually used at the Service Connection each month. The District will bill the City monthly for the delivery of the recorded amount of water in accordance with section 7(a) of this Agreement. Not later than January 31 of each calendar year, the District will provide a summary report of the total amount of water actually delivered to the City at the Service Connection for the previous calendar year. For purposes of determining the amount of wholesale water delivery to bill to the District under the Wholesale Agreement, the City will subtract the amount of water used at the Service Connection from the total amount of water the City delivers to the District at the Enterprise Drive Interconnection, so that the District will not be charged under the Wholesale Agreement for water delivered to the Haggin Oaks Site through the Service Connection. If a calendar year's total amount of water delivered to the City at the Service Connection exceeds the total amount of water the City delivers to the District at the Enterprise Drive Interconnection in the same year, the City will carry over a credit for the amount of such exceedence to be applied as provided above in the next year when the total amount of water the City delivers to the District at the Enterprise Drive Interconnection exceeds the total amount of water delivered to the City at the Service Connection in that same year.

i. The City shall amend its water supply permit with the California Department of Health Services to include infrastructure downstream of the Service Connection.

6. Service Interruptions:

City understands and agrees that, while the District will make every reasonable effort to convey water to the Service Connection pursuant to the terms of this Agreement, the District

is not warranting or guaranteeing that it will be able to do so, nor will the District be liable for any failure to deliver water, in the event prevented from doing so due to an emergency condition of other factors beyond the control of the District.

7. **Payment:**

a. **Water Distribution Charge**

(1) The District will charge the City a Water Distribution Charge for Potable Water delivered to the City at the Service Connection under this Agreement. The Water Distribution Charge shall consist of a Unit Rate charge (the cost-per-unit quantity) for water actually delivered at the Service Connection, plus a monthly Service Charge for fixed administrative costs incurred irrespective of the quantity of water delivered. The District will determine the Unit Rate and Service Charge in an equitable manner such that City neither subsidizes nor is subsidized by any other District customer or contractor. The Unit Rate shall recover a pro-rata portion of the District's annual operating, maintenance, repair and applicable capital improvement costs and an equitable proration of appropriate overhead distribution, but shall exclude such District costs that are unrelated to the distribution of water under this Agreement, such as unrelated distribution system costs. The provisions of this subsection (1) also shall apply to any adjustment of the Service Charge and Unit Rate as provided in subsection (2), below. The estimated Unit Rate and the monthly Service Charge for 2007 is shown on **Exhibit C** to this Agreement.

(2) The District may adjust the Service Charge and Unit Rate in January of each year to reflect actual or anticipated cost increases or decreases, and shall provide City 30 days' prior written notice of such adjustment as provided in Section 10 of this Agreement.

(3) Billing procedures and payment for the Potable Water delivered at the Service Connection will be in accordance with the District's standard practice. The Water Distribution Charge will be in addition to the Connection Fees described in subsection b., below.

b. **Connection Fees**

Prior to receiving water service from the Service Connection, the City will pay the Connection Fees specified in **Exhibit D** to this Agreement. The City, or its successors, also will be liable for any additional Connection Fees owing to the District as a result of future development that requires a new or up-sized connection at the Service Connection, in accordance with the District's then-applicable

ordinances, rules and regulations. The District will have the right to terminate or refuse service to City under this Agreement if the Connection Fee required for such service is not paid to the District.

8. **Term of Agreement:**

This Agreement will become effective as of the date it is approved by the District Board of Directors and the City Council and is signed by the last signatory (the "Effective Date"), and, except as provided in Section 3, above, will continue in full force and effect unless terminated by mutual written agreement of the parties or by operation of law.

9. **Fluoridation:**

The District acknowledges that City Water delivered to the District will contain fluoride. The District will be responsible for any requirements related to the introduction of fluoride into its water supply, consistent with the Wholesale Water Supply Agreement and with any statutory or regulatory requirements, including under the District's permit to operate the District's water system issued by the State Department of Health Services. The City will be solely responsible for all requirements concerning fluoridated water within the Haggin Oaks Site and the Main Extension downstream of the Service Connection resulting from the District's delivery of Potable Water at the Service Connection, which water may contain fluoride.

10. **Notices:**

Unless indicated otherwise herein, all notices, invoices, payments, statements or other writing authorized or required by this Agreement may be delivered personally, or sent in the United States mail, postage prepaid, or sent by electronic mail if the recipient confirms receipt, and addressed to the respective parties as follows:

The City:
Director, Department of Utilities
City of Sacramento
1395 35th Avenue
Sacramento, CA 95822
Electronic mail:greents@cityofsacramento.org

The District:
General Manager
Sacramento Suburban Water District
3701 Marconi Avenue, Suite 100
Sacramento, CA 95881
Electronic mail: rroscoe@sswd.org

All notices, invoices, payments or other writings will be deemed served on the day that they are personally served, deposited, postage prepaid, in the United States mail, or if served electronically, on the day that the recipient acknowledges receipt. A party may change the above designations by providing notice thereof to the other party.

11. Indemnification and Defense:

a. By The City: The City will fully indemnify, hold harmless and defend the District, its officers and employees, from any claims, actions or liability for any damages, any injury to persons or property, or any violation of any law or regulation, occurring by reason of anything done or omitted to be done by the City, its officers, employees or agents, under this Agreement. Except as specified in subsection b., below, the City will fully indemnify, hold harmless and defend the District, its officers and employees from any claims, actions or liability for any damages, any injury to persons or property, or any violation of any law or regulation, occurring by reason of any action taken by the District, its officers or employees, if such action is required or authorized under this Agreement, except to the extent such damages, injury, or violation result from the negligent or wrongful acts of the District, its officers, employees or agents.

b. By The District: Notwithstanding anything to the contrary herein, the District will fully indemnify, hold harmless and defend the City, its officers and employees, from any claims, actions or liability for any damages, any injury to persons or property, or any violation of any law or regulation, occurring by reason of anything done or omitted to be done by the District, its officers, employees or agents in connection with the conveyance and distribution of Potable Water to the Service Connection as provided in this Agreement.

12. Dispute Resolution:

a. Disputes: If a dispute arises concerning any controversy or claim arising out of or relating to this Agreement or the breach thereof, or relating to its application or interpretation, the aggrieved party will notify the other party of the dispute in writing within twenty days after such dispute arises. If the parties fail to resolve the dispute within thirty days after delivery of such notice, each party will promptly nominate a senior officer of its organization to meet at any mutually-agreed time and location to resolve the dispute. The parties agree to use their best efforts to reach a just and equitable solution satisfactory to both parties. Should the parties be unable to resolve the dispute to their mutual satisfaction within thirty days thereafter, the dispute will be subject to arbitration, pursuant to subsection b., below. The time periods set forth in this section are subject to extension as agreed to by the parties.

b. Arbitration: A dispute that is not resolved in accordance with subsection a., above, will be subject to arbitration by an arbitrator in Sacramento, California, provided, however, that each party reserves the right to file with a court of competent jurisdiction an application for temporary or preliminary injunctive relief on the

grounds that the arbitration award to which the applicant may be entitled may be rendered ineffectual in the absence of such relief. Except as otherwise provided herein, the arbitration will be conducted under and will be subject to the provisions of the California Arbitration Act (Code of Civil Procedure sections 1280 through 1294.2). The parties in the arbitration will select a single, qualified, neutral arbitrator. If they cannot agree on an arbitrator, or an alternative selection process, the parties will request that the Presiding Judge of the Sacramento County Superior Court select an arbitrator in accordance with the provisions of section 1281.6 of the Code of Civil Procedure.

A hearing on the matter to be arbitrated will take place before the arbitrator in the County of Sacramento at a time and place selected by the arbitrator. However, the hearing will take place no later than sixty days after selection of the arbitrator. The arbitrator will select the time and place for the hearing, and will give the parties written notice of the time and place at least twenty days before the date of the hearing. At the hearing, any relevant evidence may be presented by the parties, and the formal rules of evidence applicable to judicial proceedings will not apply. The arbitrator will hear and determine the matter. The arbitration award may include an award of damages and/or an award or decree of specific performance or declaratory or injunctive relief, will be in writing and will specify the factual and legal bases for the award. An award rendered pursuant hereto may be confirmed, corrected or vacated by a court of competent jurisdiction in accordance with the provisions of the California Arbitration Act. The arbitrator will have no authority, power or right to award punitive or other damages not measured by the prevailing party's actual damages, and will not make any ruling, finding or award that is inconsistent with or which alters, changes, amend, modifies, waives, adds to or deletes from any of the provisions of this Agreement.

The ongoing cost of the arbitration, including the arbitrator's fees, will be borne equally by the parties. Each party will also pay the costs of its own counsel, experts, witnesses and preparation and presentation of proofs. Additional incidental costs of arbitration may be allocated by the arbitration award.

c. Defense to Suit: The parties agree that the failure to comply with the provisions of this Section will be a complete defense to any suit, action or proceeding instituted in any federal or state court, or before any administrative body, with respect to any dispute that is subject to arbitration hereunder, provided, however, that this subsection c. will not apply to any application for temporary or preliminary injunctive relief authorized under this Section.

13. Records Inspection:

Each party will be entitled to inspect and photocopy the records of the other party relating to this Agreement, upon providing reasonable notice to such other party of its intent to do so. Each party may also appoint an auditor or auditors to examine the financial records of the other party to determine the adequacy of cost accumulation and billing information

maintained by each party. After reasonable notice, each party will make available to the other party's auditor or auditors all requested records, and will assist and cooperate with such auditors. Each party will keep its accounting and financial records in accordance with generally-accepted accounting principles and any applicable laws or regulations.

14. Amendments:

No amendment or modification to this Agreement will be valid unless executed in writing and approved by the governing bodies of the parties; except that the Water Delivery and Distribution Criteria may be amended as provided in Section 5(d) of this Agreement.

15. No Third-Party Beneficiary:

This Agreement is not intended to, and will not be interpreted as conferring, any benefit or right whatsoever upon any person or entity that is not a party hereto.

16. Exhibits Incorporated:

All Exhibits referred to herein and attached hereto are fully incorporated into this Agreement as if such Exhibits were set forth in their entirety at this place.

17. Other Agreements:

Nothing in this Agreement is intended to affect or alter the provisions of any agreement entered into between the parties prior to the Effective Date of this Agreement, and in the event of any conflict between this Agreement and any such prior agreement, the prior agreement will govern.

18. General Provisions:

a. This Agreement will be construed in accordance with, and governed by, the laws of the State of California. The place where this Agreement is to be performed and its situs or forum will at all times be in the County of Sacramento.

b. The headings of the sections and paragraphs in this Agreement are inserted for convenience only. They do not constitute part of this Agreement and will not be used in its construction.

c. This Agreement is the result of the joint efforts and negotiations of both parties, and both parties agree that this Agreement will be interpreted as though each of the parties participated equally in the drafting and composition of this Agreement and each and every part hereof.

d. This Agreement may not be assigned by either party without the written consent of the non-assigning party, and any purported assignment without such consent will be void.

e. The provisions of this Agreement shall bind the parties' successor entities and authorized assigns.

f. Neither party nor its agents or contractors are or shall be considered to be agents of the other party in connection with the performance of this Agreement. Nothing in this Agreement shall be construed to create a joint venture, partnership or other relationship between the parties, other than the use of District Facilities to convey and distribute Potable Water as provided herein.

g. The waiver by either party to this Agreement of a breach of any provision of this Agreement shall not be deemed a continuing waiver or a waiver of any subsequent breach of that or any other provision of the Agreement.

CITY OF SACRAMENTO

Attest:

By: _____
Asst City Clerk 8-14-07

By: _____
Marty Hanneman, Assistant City Manager
for Ray Kerridge, City Manager/August 13, 2007

Approved as to Form:

By: _____
City Attorney

SACRAMENTO SUBURBAN WATER DISTRICT

By: _____
David J. Githens,
President, Board of Directors

Attest:

By: _____
Robert S. Roscoe, P.E.
General Manager/Secretary

CITY
AGREEMENT NO. 2007-0816

List of Exhibits:

Exhibit A	Haggin Oaks Site
Exhibit B	Water Delivery and Distribution Criteria
Exhibit C	Unit Rate and Monthly Service Charge (2006)
Exhibit D	Connection Fees

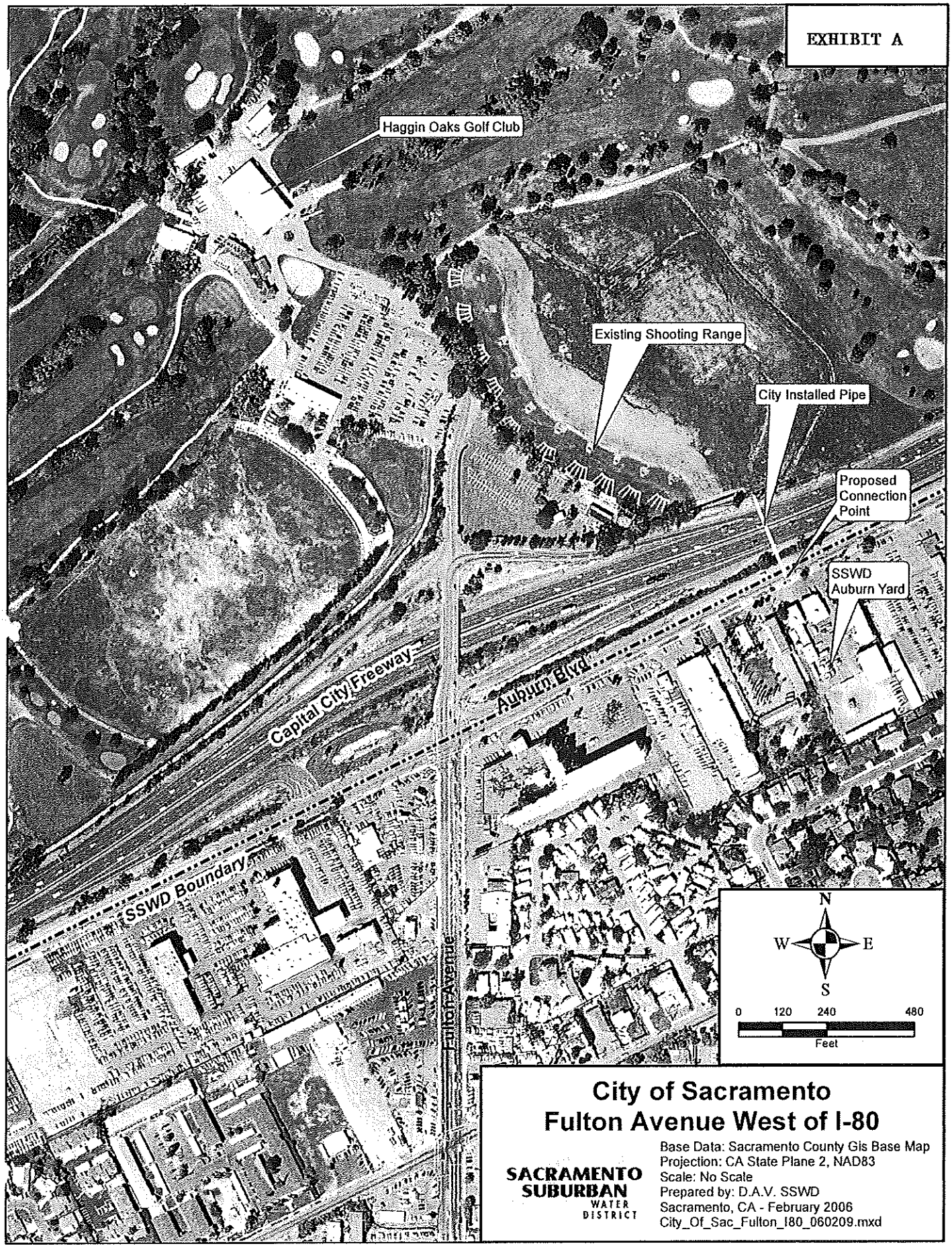


EXHIBIT A
Haggin Oaks Golf Club
Existing Shooting Range
City Installed Pipe
Proposed Connection Point
SSWD Auburn Yard
Capital City Freeway
Auburn Blvd
SSWD Boundary
Fulton Avenue
N
W
E
S
0
120
240
480
Feet
City of Sacramento
Fulton Avenue West of I-80
SACRAMENTO SUBURBAN WATER DISTRICT
Base Data: Sacramento County Gis Base Map
Projection: CA State Plane 2, NAD83
Scale: No Scale
Prepared by: D.A.V. SSWD
Sacramento, CA - February 2006
City_Of_Sac_Fulton_I80_060209.mxd

EXHIBIT B

CITY OF SACRAMENTO
AND
SACRAMENTO SUBURBAN WATER DISTRICT
WATER DELIVERY AND DISTRIBUTION CRITERIA

OPERATING CRITERIA

This document outlines the general delivery guidelines and criteria for the operation of service connections between the City of Sacramento (City) and the Sacramento Suburban Water District (District) as provided in section 5 of the Water Distribution Agreement between the City and the District (Agreement). The initial water delivery and distribution connection is located on the District's water facilities at 2736 Auburn Boulevard in the south service area of the District.

LIST OF CONTACTS:

The following listing of City and District contact names and phone numbers is provided in order of contact priority.

District:	WORK (916 Area Code)
James Arenz, Production Superintendent	679-2892 (Cell-869-7359)
*Field Operations Dispatch (for Operator on Call)	972-7171
Hector Segoviano, Production Foreman	679-2892 (Cell-869-7363)
*Utility Emergency Number (24-hr Line)	972-7171
Dan York, Field Operations Manager	679-2880 (Cell-869-7349)
Warren Jung, District Engineer, Operations	679-2896 (Cell-416-5467)

*Daily 8am-5pm; after hours, weekends and holidays-same number to answering service.

City:	WORK (916 Area Code)
E. A. Fairbairn WTP Control Room	808-3120
E. A. Fairbairn WTP Hotline	383-1516
Mary Krizanosky, Plant Operator Supervisor	808-3111
Steve Willey, Plant Operator Supervisor	808-7407
Mike Yee, Plant Services Division Manager	808-5583
Roland Pang, Water Superintendent	808-3119

OPERATIONAL PARAMETERS:

In accordance with the Agreement, the City and District operators controlling the service connection shall maintain the following operational parameters.

Service Connection Location - 8-inch connection at 2736 Auburn Boulevard

District Maintenance Responsibility – Connection to District water main up to the outlet side of the water meter.

City Maintenance Responsibility – Outlet side of the water meter up to the customer service connection points.

In accordance with the operational requirements of the District supply and distribution system, the following additional operational parameters shall be maintained.

Maximum District Delivery Operating Pressure	= 80 psi
Minimum District Delivery Operation Pressure	= 30 psi

OPERATIONAL PROCEDURES:

1. Upon meeting at the meter site after completion and connection of the intertie and meter installation, the District will turn on the control valve upstream of the water meter. The City will turn the control valve downstream of the water meter.

2. The District shall be responsible for reading the meter and recording the time and flow quantities.

3. The City can take a maximum daily flow rate through the connection as measured by the District maintained service connection flow meter as long as the service connection pressures and conditions provided in the Agreement are met.

4. The aforementioned delivery criteria may be modified only upon the written agreement of the City and the District as provided in subdivision d of section 5 of the Agreement.

PRIORITY OF AGREEMENT:

This Exhibit B is intended to reflect the terms and conditions of the Agreement as approved by the City and the District's governing bodies. In the case of any conflict between the terms of the Agreement and the terms of this Exhibit B, the terms of the Agreement will govern.

EXHIBIT C

SACRAMENTO SUBURBAN WATER DISTRICT
WATER DISTRIBUTION CHARGE

The Water Distribution Charge for water service under the Water Distribution Agreement between the City and the District (Agreement) is a monthly Service Charge of $15.00 for fixed administrative costs incurred irrespective of the quantity of water delivered and a Unit Rate Charge of $0.86/CCF (hundred cubic feet) for water actually delivered at the Service Connection.

The Water Distribution Charge, under the Agreement, will be reviewed annually by the District and may be changed in its sole discretion as conditions dictate, subject to the provisions of Section 7(a) of the Agreement. The District will notify the City at least 30 days prior to the implementation of any increase in the Water Distribution Charge.

Background:

The monthly Service Charge is the District's standard rate established for unique situations, such as a special water rate that is charged for public entities that agree to conservation measures for irrigation of large landscape areas. The standard District service charges would not apply because the service provided by the District is only conveying City water through District facilities to City land. The monthly Service Charge is intended to pay the District's costs of administrative tasks such as reading the meter once monthly, manually performing calculations for the billing of facilities usage and preparing a billing statement to the City.

The Unit Rate Charge is calculated based on the debt service for the South Service Area Transmission Mains and Enterprise–Northrop Pump Station/Reservoir that were constructed to move treated surface water from the City of Sacramento throughout the South Service Area of the District, the estimated cost of power to lift City water from the Enterprise Drive Interconnection into the system, and a pro-rata share of the District's water system operation and maintenance costs.

EXHIBIT D

SACRAMENTO SUBURBAN WATER DISTRICT
CONNECTION FEE

The 2007 connection fee for an 8-inch water service connection as calculated in accordance with the Sacramento Suburban Water District's Regulations Governing Water Service as enacted in Ordinance 2004-03 and as amended on December 18, 2006, is $ 224,812.00.

Under Regulation No. 7, the District's connection fees are reviewed and, if necessary, adjusted each January 1. Adjustments to connection fees are made to account for the changes in the District's costs include without limitation: (1) construction of new water system facilities; (2) retirement of existing facilities; (3) changes in cost indices and depreciation; (4) changes in work in progress and available reserves; (5) changes in outstanding principal on outstanding COPs; and (6) changes in the number of ¾ inch equivalent meters installed within the District. Future adjustments to the connection fee would apply to connection fees due for new or upsized connections, but would not apply to connections for which connection fees have already been imposed.

RESOLUTION NO. 2007-581

Adopted by the Sacramento City Council

August 9, 2007

APPROVING THE WATER DISTRIBUTION AGREEMENT WITH THE SACRAMENTO SUBURBAN WATER DISTRICT

BACKGROUND

A. The existing water facilities that serve the Haggin Oaks Golf Complex site do not have sufficient capacity to serve the proposed development of this site, and extension of the City's water distribution pipelines to serve this location would require costly infrastructure improvements.

B. The Sacramento Suburban Water District (District) operates and maintains nearby water distribution facilities that can be extended to the Golf Complex site at less cost, and the City already has an interconnection that provides City water to the District's water distribution system.

C. The City and District have negotiated an agreement whereby a pipeline will be constructed to connect the District's water distribution facilities to the Golf Complex site, so that these facilities can be used to deliver City water to the Golf Complex site.

D. The Water Distribution Agreement will provide a cost effective means to serve water to the proposed development at this site.

BASED ON THE FACTS SET FORTH IN THE BACKGROUND, THE CITY COUNCIL RESOLVES AS FOLLOWS:

Section 1. The City Manager is authorized to execute the Water Distribution Agreement between the City of Sacramento and the Sacramento Suburban Water District to utilize District facilities to distribute City water to the Haggin Oaks Golf Complex.

Adopted by the City of Sacramento City Council on August 9, 2007 by the following vote:

Ayes: Councilmembers, Cohn, Fong, Hammond, McCarty, Pannell, Sheedy, Tretheway, and Mayor Fargo.

Noes: None.

Abstain: None.

Absent: Councilmember Waters.

Heather Fargo

Heather Fargo, Mayor

Attest:

Shirley Concolino

Shirley Concolino, City Clerk

Appendix D

DEPARTMENT OF WATER RESOURCES SUBBASIN INFORMATION

Sacramento Valley Groundwater Basin
North American Subbasin

- Groundwater Basin Number: 5-21.64
- County: Sutter, Placer, Sacramento
- Surface Area: 351,000 acres (548 square miles)

Basin Boundaries and Hydrology

The North American subbasin lies in the eastern central portion of the Sacramento Groundwater Basin. The Bear River is its northern boundary, the Feather River is its western boundary, and the Sacramento River is its southern boundary. The eastern boundary is a north-south line extending from the Bear River south to Folsom Lake, which passes about 2 miles east of the town of Lincoln. The eastern boundary represents the approximate edge of the alluvial basin, where little or no groundwater flows into or out of the groundwater basin from the rock of the Sierra Nevada (DWR 1997). The eastern portion of the study area is characterized by low rolling dissected uplands. The western portion is nearly a flat flood basin for the Bear, Feather, Sacramento and American rivers, and several small east side tributaries. The general direction of drainage is west-southwest at an average grade of about 5 percent.

Precipitation ranges from 18-20 inches in the western half of the subbasin to 20-24 inches in the eastern half of the subbasin.

Hydrogeologic Information

The following geologic references are presented in Feasibility Report, American Basin Conjunctive Use Project by California Department of Water Resources (1997).

Water Bearing Formations

The water-bearing materials of the North American subbasin are dominated by unconsolidated continental deposits of Late Tertiary and Quaternary age. Deposits include Miocene/Pliocene volcanics, older alluvium, and younger alluvium. The alluvium can be characterized as comprising the upper aquifer system, occupying the upper 200 to 300 feet below ground surface; the Mehrten and older geologic units can be characterized as comprising the lower aquifer system, occurring generally deeper than 300 feet towards the west side of the subbasin. The cumulative thickness of these deposits increases from a few hundred feet near the Sierra Nevada foothills on the east to over 2,000 feet along the western margin of the subbasin. Most of the groundwater is produced in the northern portion of the subbasin. The aquifer zones in the upper 200 to 300 feet of this portion of the subbasin appear to be unconfined and behave similarly to stresses imposed on them. Conversely, deeper zones show a delayed response to stresses in the upper zone, indicating possibly limited interconnection with the shallower zones (DWR 1997).

Younger Alluvium. These deposits include flood basin deposits and recent stream channel deposits. The flood basin deposits occur along the western margin of the subbasin adjacent to the Sacramento River. The flood basin

deposits consist primarily of silts and clays, although they may be locally interbedded with stream channel deposits of the Sacramento River. Thickness of the unit ranges from 0 to 100 feet. Because of the fine-grained nature, the flood basin deposits have low permeability and generally yield low quantities of water to wells. Brackish water is often encountered in these deposits.

The stream channel deposits include sediments deposited in the channels of active streams as well as overbank deposits of those streams, terraces, and local dredge tailings. These deposits occur predominantly along the Sacramento and American Rivers and their major tributaries, and consist primarily of unconsolidated silt, fine- to medium-grained sand, and gravel. Thickness of the unit ranges from 0 to about 100 feet. Sand and gravel zones in the younger alluvium are highly permeable and yield significant quantities of water to wells.

Older Alluvium. These deposits consist of loosely to moderately compacted sand, silt, and gravel deposited in alluvial fans during the Pliocene and Pleistocene. A number of formational names have been assigned to the older alluvium, including the Modesto, Riverbank, and Turlock Lake Formations (Helley and Harwood 1985), Victor and Laguna Formations (Olmstead and Davis 1961), and Arroyo Seco Gravels, South Fork Gravels, and Fair Oaks Formation (DWR 1974). The older alluvial units are widely exposed between the Sierra Nevada foothills and overlying younger alluvial units near the axis of the Sacramento Valley. Thickness of the older alluvium ranges between 100 to 650 feet. It is moderately permeable.

Miocene/Pliocene Volcanics. These deposits consist of the Mehrten Formation, a sequence of fragmented volcanic rocks. The Mehrten Formation is exposed along the eastern margin of the subbasin between the towns of Lincoln and Folsom. It is composed of intervals of "black sands," stream gravels, silt, and clay interbedded with intervals of dense tuff breccia. The sand and gravel intervals are highly permeable and wells completed in them have reported yields of over 1,000 gpm. The tuff breccia intervals act as confining layers. Thickness of the unit is between 200 and 1,200 feet.

Groundwater Level Trends

Groundwater levels in southwestern Placer County and northern Sacramento County have generally decreased, with many wells experiencing declines at a rate of about one and one-half feet per year for the last 40 years or more (PCWA1999). Some of the largest decreases have occurred in the area of the former McClellan AFB. Groundwater levels in Sutter and northern Placer Counties generally have remained stable, although some wells in southern Sutter County have experienced declines (DWR 1997).

Groundwater Storage

Groundwater Storage Capacity. DWR (1997) assumed a specific yield of 7% and an aquifer thickness of 200 feet for 200,000 acres within the North American subbasin. Storage capacity can be estimated for the North American subbasin by applying the same assumptions as DWR (1997) – specific yield of 7% and an assumed thickness of 200 feet over the entire

351,000 acre subbasin. This results in an estimated storage capacity of approximately 4.9 million acre-feet.

Groundwater in Storage. There are no known published reports that discuss groundwater in storage.

Groundwater Budget (Type B)

As part of its water planning process, DWR estimated the following components of the groundwater budget. The calculations are for a 1990 level of development. Estimated inflows include natural recharge at 83,800 acre-feet and applied water recharge at 29,800 acre-feet. There was no artificial recharge. Estimated outflows include urban extraction at 109,900 acre-feet and agricultural extraction at 289,100 acre-feet.

Groundwater Quality

Characterization. The chemistry and quality of groundwater has been assessed for the American Basin. Many areas of good quality groundwater exist in the North American subbasin. In some portions of the basin groundwater quality is marginal. The three major groundwater types are: magnesium calcium bicarbonate or calcium magnesium bicarbonate; magnesium sodium bicarbonate or sodium magnesium bicarbonate; and sodium calcium bicarbonate or calcium sodium bicarbonate (DWR 1997).

Comparison of groundwater quality data with applicable water quality standards and guidelines for drinking and irrigation indicate elevated levels of TDS/specific conductance, chloride, sodium, bicarbonate, boron, fluoride, nitrate, iron manganese, and arsenic may be of concern in some locations within the subbasin (DWR 1997).

High TDS levels exist in an area along the Sacramento River extending from Sacramento International Airport northward to the Bear River. The highest levels of TDS are found in an area extending just south of Nicholas to Verona, between Reclamation District 1001 and the Sutter Bypass. Some wells in this area have reported TDS exceeding 1,000 mg/L.

This same area along the Sacramento River extending from Sacramento International Airport northward to the Bear River also contains high levels of chloride, sodium, bicarbonate, manganese, and arsenic. The groundwater in the southern part of the basin is generally characterized as good quality, low in disinfection by-product precursor materials and moderate in mineral content, although some localized contamination issues do exist.

Impairments. There are three sites within the subbasin with significant groundwater contamination issues: the former McClellan AFB, Union Pacific Railroad Rail Yard in Roseville and the Aerojet Superfund Site. Although the Aerojet site lies south of the North American subbasin, a contaminant plume (including TCE and PCE) extends north from Aerojet, under the American River and into the North American subbasin (Montgomery Watson 2000). Other localized areas of contamination exist throughout the basin and are generally smaller in scope and extent of contamination.

Water Quality in Public Supply Wells

Constituent Group[1]	Number of wells sampled[2]	Number of wells with a concentration above an MCL[3]
Inorganics – Primary	265	7
Radiological	254	2
Nitrates	276	0
Pesticides	268	0
VOCs and SVOCs	267	6
Inorganics – Secondary	265	75

[1] A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).
[2] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.
[3] Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: 752-2,500	Average: 800 (DWR 1997)
	Total depths (ft)	
Domestic	Range: 50-1,750	Average: 190 (665 well completion reports)
Municipal/Irrigation	Range: 77-1,025	Average: 396 (105 well completion reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR	Groundwater levels	53 wells semi-annually, 7 monthly
Sacramento County		17 wells semi-annually
South Sutter WD		21 wells semi-annually, 1 monthly
Sutter County		22 wells semi-annually
DWR	Mineral, nutrient, & minor element.	32 wells biennially
Department of Health Services (including co-operators)	Title 22	Approximately 275 wells

Basin Management

Groundwater management:	The Sacramento Groundwater Authority (SGA) is a joint powers authority responsible for the protection of the regional groundwater basin within Sacramento County north of the American River. SGA adopted a groundwater management plan on December 11, 2003. South Sutter WD adopted an AB 3030 plan in 1995. Placer County Water Agency adopted an AB 3030 plan in 1998 and updated this plan in 2003. City of Lincoln adopted a groundwater management plan on November 12, 2003.
Water agencies	
Public	South Sutter WD, Camp Far West ID, Rio Linda/Elverta CWD, Citrus Heights WD, San Juan Suburban WD, Fair Oaks WD, Carmichael WD, Sacramento Suburban WD, Western Placer ID, Placer County WA, Del Paso Manor WD, City of Sacramento WSA, City of Roseville, Sacramento County Water Agency
Private	Pleasant Grove – Verona MWC, Natomas Central MWC, California-American WC, Orangevale WC, Southern California WC,

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Errata

Updated groundwater management information and added hotlinks to applicable websites. (1/20/06)

Sacramento Valley Groundwater Basin
South American Subbasin

- Groundwater Basin Number: 5-21.65
- County: Sacramento
- Surface Area: 248,000 acres (388 square miles)

Basin Boundaries and Hydrology

The subbasin is bounded on the east Sierra Nevada, on the west by the Sacramento River, on the north by the American River, on the south by the Cosumnes and Mokelumne Rivers. These perennial rivers generally create a groundwater divide in the shallow subsurface. It is clear that there is interaction between groundwater of adjacent subbasins at greater depths. Average annual precipitation ranges from about 14" along the western boundary to greater than 20" along the eastern boundary.

Hydrogeologic Information

Water Bearing Formations

The South American subbasin aquifer system is comprised of continental deposits of Late Tertiary to Quaternary age. These deposits include younger alluvium (consisting of flood basin deposits, dredge tailings and Holocene stream channel deposits), older alluvium, and Miocene/Pliocene volcanics. The cumulative thickness of these deposits increases from a few hundred feet near the Sierra Nevada foothills on the east to over 2,500 feet along the western margin of the subbasin. The maximum combined thickness of all the younger alluvial units is about 100 feet. Calculated specific yield values range from about 5.4% in the flood basin deposits to 10% in the stream channel deposits (Olmstead and Davis 1961).

Flood basin deposits. These deposits occur along the western margin of the subbasin adjacent to the Sacramento River. They consist primarily of silts and clays, but along the western margin of the subbasin may be locally interbedded with stream channel deposits of the Sacramento River. Because of their fine-grained nature, the flood basin deposits have low permeability and generally yield low quantities of water to wells.

Dredger tailings. Tailings are exposed primarily along the American River in the northeastern corner of the subbasin. They consist of windows of gravel, cobbles, boulders, sand, and silt resulting from the activities of gold dredging operations. The tailings are highly permeable, but well construction is complicated by the presence of cobbles and boulders.

Stream Channel Deposits. The stream channel deposits include sediments deposited in the channels of active streams as well as overbank deposits of those streams, terraces, and local dredger tailings. They occur along the Sacramento, American, and Cosumnes Rivers and their major tributaries and consist primarily of unconsolidated silt, fine- to medium-grained sand, and gravel. Sand and gravel zones in the younger alluvium are highly permeable and yield significant quantities of water to wells.

Older alluvium. These deposits consist of loosely to moderately compacted sand, silt and gravel deposited in alluvial fans during the Pliocene and Pleistocene. A number of formational names have been assigned to the older alluvium, including the Modesto and Riverbank Formations (Helley and Harwood, 1985), Victor Formation and Laguna Formation (Olmstead and Davis 1961), and Victor Formation, Laguna Formation, Arroyo Seco Gravels, South Fork Gravels, and Fair Oaks Formation (DWR 1974). The older alluvial units are widely exposed between the Sierra Nevada foothills and overlying younger alluvial units near the axis of the Sacramento Valley. Thickness of the older alluvium is about 100 to 650 feet. It is moderately permeable. The calculated specific yield of these deposits is about 7% (Olmstead and Davis 1961).

Miocene/Pliocene Volcanics. These consist of the Mehrten Formation, a sequence of fragmental volcanic rocks, which crops out in a discontinuous band along the eastern margin of the basin. It is composed of intervals of "black sands," stream gravels, silt, and clay interbedded with intervals of dense tuff breccia. The sand and gravel intervals are highly permeable and wells completed in them can have high yields. The tuff breccia intervals act as confining layers. Thickness of the unit is between 200 and 1,200 feet.

Groundwater Level Trends

A review of 18 long-term hydrographs dating back into the 1960s shows a consistent pattern of water level trends through much of the basin. Groundwater elevations generally declined consistently from the mid-1960s to about 1980 on the order of 20 feet. From 1980 through 1983 water levels recovered by about 10 feet and remained stable until the beginning of the 1987 through 1992 drought. From 1987 until 1995, water levels declined by about 15 feet. From 1995 to 2000 most water levels recovered by up to 20 feet leaving them generally higher than levels prior to the 1987 through 1992 drought. Exceptions to this trend include: 1) wells in the vicinity of the city of Sacramento, which fluctuated generally less than 10 feet overall since the mid-1970s; and 2) wells in the vicinity of Rancho Cordova, which appear to have recovered less than the other wells in the subbasin since 1995 (generally less than 10 feet).

Groundwater Storage

No published calculations for subbasin storage capacity are available. However, based on available information from Olmstead and Davis (1961), DWR calculated groundwater storage capacity in the subbasin at 4,816,000 af. This was calculated by superimposing the hydrogeologic units described in Olmstead and Davis over a map of the subbasin. A planimeter was used to determine the percent coverage of each of these units in the subbasin. The specific yield values provided by Olmstead and Davis for each unit were then used to calculate an average specific yield of 6.8 percent for a depth range of 20 feet below ground surface to 310 feet bgs. The surface area used in that calculation was 243,200 acres.

Groundwater Budget (Type A)

A groundwater model was developed for Sacramento County by Montgomery Watson (see Montgomery Watson 1993). Based on this model

and subsequent data updates, Bookman-Edmonston/Navigant Consulting provided estimates of several groundwater budget components for an area generally corresponding to the South American Subbasin. The data represent an average budget for the period from 1970 to 1995. Basin inflows include natural and applied water recharge, which total 257,168 af. Subsurface inflow and outflow are not known specifically, but the model indicates that there is a net subsurface outflow of 29,676 af annually. Other groundwater outflows include annual urban extraction of 68,058 af and agricultural extraction of 162,954 af.

Groundwater Quality

Characterization. Groundwater is typically a calcium magnesium bicarbonate or magnesium calcium bicarbonate. Other minor groundwater types include a sodium calcium bicarbonate or calcium sodium bicarbonate in the vicinity of Elk Grove and a magnesium sodium bicarbonate or sodium magnesium bicarbonate near the confluence of the Sacramento and American rivers (Bertoldi and others 1991). TDS ranges from 24 – 581 mg/l and averages 221 mg/l based on 462 records (Montgomery Watson 1993).

Impairments. Montgomery Watson (1997) listed seven sites within the subbasin with significant groundwater contamination. Included in the list are three USEPA Superfind sites – Aerojet, Mather Field, and the Sacramento Army Depot. Other sites are the Kiefer Boulevard Landfill, an abandoned PG&E site on Jiboom Street near Old Sacramento, the Southern Pacific and Union Pacific Rail Yards in downtown Sacramento.

Water Quality in Public Supply Wells

Constituent Group[1]	Number of wells sampled[2]	Number of wells with a concentration above an MCL[3]
Inorganics – Primary	144	2
Radiological	147	1
Nitrates	170	1
Pesticides	148	0
VOCs and SVOCs	144	8
Inorganics – Secondary	144	46

[1] A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).
[2] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.
[3] Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Characteristics

	Well yields (gal/min)	
Municipal:	Range: N/A	Average: 908 (Montgomery Watson 1997)
Irrigation:	Range: N/A	Average: 971 (Montgomery Watson 1997)
	Total depths (ft)	
Domestic	Range: 87 – 575	Average: 247 (422 Well Completion Reports)
Municipal/Irrigation	Range: 41 – 1,000	Average: 372 (78 Well Completion Reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR	Groundwater levels	34 wells semi-annually 3 wells monthly
Sacramento County		30 wells semi-annually
SMUD		9 wells semi-annually
USBR		29 wells semi-annually
DWR (incl. Cooperators)	Mineral, nutrient, & minor element.	9 wells every two years
Department of Health Services and local cooperators	Coliform, nitrates, mineral, organic chemicals, and radiological.	247 wells as required in Title 22, Calif. Code of Regulations

Basin Management

Groundwater management:	No AB3030 plan - Sacramento North Area Groundwater Management Authority (SNAGMA), is a joint powers authority responsible for the protection of the regional groundwater basin. No AB3030 plans – Initial phase 3/94 - Sacramento Metropolitan Water Authority (SMWA) is a joint powers authority and non-profit benefit association formed by 16 water supply agencies and utilities.
Water agencies	
Public	Arden Cordova Water Service, City of Folsom, City of Sacramento, County of Sacramento, Elk Grove Water Works, Florin County WD Fruitridge Vista, Mather Air Force Base, North Delta Water Agency Omochumne-Hartnell WD, Rancho Murieta CSD, Tokay Park Sacramento County WMD, Sacramento County WMD- Zone 40
Private	Citizens Utilities Company.

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Errata

Changes made to the basin description will be noted here.

Appendix E

SACRAMENTO GROUNDWATER AUTHORITY AND CENTRAL SACRAMENTO COUNTY GROUNDWATER MANAGEMENT PLANS

(CD to be included in Final UWMP)

Appendix F

WATER SHORTAGE CONTINGENCY PLAN RESOLUTION

DRAFT RESOLUTION FOR USE BY CITY IF WATER SHORTAGE CONTINGENCY PLAN NEEDS TO BE IMPLEMENTED

RESOLUTION NO. ____

Adopted by the Sacramento City Council

IMPLEMENTING STAGE *[1][2][3][4]* OF THE CITY OF SACRAMENTO WATER SHORTAGE CONTINGENCY PLAN

BACKGROUND

A. The City of Sacramento has three water supply sources: American River water, Sacramento River water and groundwater. Normally, the City's water supplies are adequate to meet the City's retail and wholesale water demands. However, because of *[on-going drought conditions statewide][the required shutdown of the City's Fairbairn Water Treatment Plant/Sacramento River Water Treatment Plant due to _____][or describe other event]*, the Sacramento City Council has determined that it is necessary to enact water conservation measures and water use restrictions, in addition to those already included in the City ~~Municipal~~ Code (Chapter 13.04 Water Service System, Article XI Water Conservation), as authorized under City Code section _____, in order to reduce water use within the City's water service area.

B. On January 28, 1992, the Sacramento City Council adopted a Water Shortage Contingency Plan that included four water conservation stages for a reduction in water use of up to 50 percent.

Water Conservation Stage	Water Use Reduction Goal
Stage 1	10 to 20%
Stage 2	20 to 30%
Stage 3	30 to 40%
Stage 4	40 to 50%

Each water conservation stage includes specific water conservation measures and water use restrictions designed to conserve water. Implementation of the water conservation

stages shall be cumulative, meaning that implementation of a higher stage shall also include implementation of all lower stages. For example, if Stage 2 is to be implemented, all of the provisions in Stage 1 shall also be implemented.

BASED ON THE FACTS SET FORTH IN THE BACKGROUND, THE CITY COUNCIL RESOLVES AS FOLLOWS:

Section 1. That the foregoing recitals are true and correct.

Section 2. That, based on the *[on-going statewide drought conditions][failure of the Fairbairn Water Treatment Plant/Sacramento River Water Treatment Plant]*, the Sacramento City Council hereby declares that a water shortage emergency condition prevails within the water service area of the City and that water use within the City should be reduced by up to *[10, 20, 30, 40, 50]* percent.

Section 3. That required water use reduction described in Section 2 necessitates implementation of Stage *[1, 2, 3, 4]* of the City's Water Shortage Contingency Plan. The water conservation measures and water use restrictions for Stage *[1, 2, 3, 4]* are described below. Implementation of Stage *[1, 2, 3, 4]* shall be cumulative and shall also include implementation of the provisions of the Stages *[1, 2, 3]*.

Stage 1 includes the following water conservation measures and water use restrictions:

1. The City Manager shall initiate a public information campaign to inform the City's water customers of the need for water conservation and the provisions enacted by this Resolution.
2. The City Manager shall request customers to voluntarily reduce their water use by 10 to 20 percent. Such request shall include information on practical ways for customers to reduce their water use.

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3. The City Manager shall increase the City's water waste patrols to enforce the provisions of Sacramento Municipal Code, Chapter 13.04 Water Service System, Article XI Water Conservation.
4. The City Manager shall increase the City's enforcement of its hydrant use regulations in accordance with Sacramento Municipal Code §13.04.130.
5. The City Manager shall reduce irrigation of parks and cemeteries to the following days and hours: *[describe reduced watering schedule]*
6. Shut-off valves shall be required on all hoses used for irrigation purposes, car washing or other water uses.
7. All of the provisions of Sacramento Municipal Code §13.04.860 Outdoor Conservation of Water, including, but not limited to, the three day per week outdoor irrigation schedule, no outdoor irrigation allowed on Mondays, and allowable times for outdoor irrigation, shall be enforced.

Stage 2 includes the following water conservation measures and water use restrictions:

1. All of the provisions of Stage 1 shall be implemented as stated above, unless otherwise modified by these Stage 2 provisions.
2. The City Manager shall intensify the public information campaign to inform the City's water customers of the need for water conservation and the provisions enacted by this Resolution.
3. The City shall further increase its water waste patrols to enforce the provisions of Sacramento Municipal Code, Chapter 13.04 Water Service System, Article XI Water Conservation.
4. Outdoor irrigation shall be limited to two days per week. Locations bearing a street address ending in an odd number shall be permitted to irrigate only on Tuesday and Saturday. Locations bearing a street address ending in an even

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number shall be permitted to irrigate only on Wednesday or Sunday. There shall be no water irrigation on Mondays, Thursdays, or Fridays.

5. Landscape irrigation shall be prohibited between the hours of *[insert hours--§13.04.860 already prohibits irrigation between 12:00 noon and 6:00 pm]* from the last Sunday in April to the last Sunday in October.
6. The City Manager shall further reduce irrigation of parks and cemeteries to the following days and hours: *[describe reduced watering schedule]*
7. Car washing shall be allowed with the use of a bucket only.
8. All public water uses not required for health and safety shall be prohibited.
9. Main flushing shall be allowed only for emergency purposes.

Stage 3 includes the following water conservation measures and water use restrictions:

1. All of the provisions of Stages 1 and 2 shall be implemented as stated above, unless otherwise modified by these Stage 3 provisions.
2. The City Manager shall continue the public information campaign to inform the City's water customers of the need for water conservation and the provisions enacted by this Resolution.
3. The City Manager shall intensify the City's leak detection program.
4. Outdoor irrigation shall be limited to one day per week using manual application only. Use of automatic sprinkler systems shall be prohibited. Locations bearing a street address ending in an odd number shall be permitted to irrigate only on Saturday. Locations bearing a street address ending in an even number shall be permitted to irrigate only on Sunday. There shall be no water irrigation on Mondays, Tuesdays, Wednesdays, Thursdays, or Fridays.

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5. Landscape irrigation shall be prohibited between the hours of *[insert hours--§13.04.860 already prohibits irrigation between 12:00 noon and 6:00 pm]* from the last Sunday in April to the last Sunday in October.
6. The City Manager shall further reduce irrigation of parks and cemeteries to the following days and hours: *[describe reduced watering schedule]*
7. Car washing shall be prohibited.

Stage 4 includes the following water conservation measures and water use restrictions:

1. All of the provisions of Stages 1, 2 and 3 shall be implemented as stated above, unless otherwise modified by these Stage 4 provisions.
2. The City Manager shall continue the public information campaign to inform the City's water customers of the need for water conservation and the provisions enacted by this Resolution.
3. Outdoor irrigation of residential turf areas shall be prohibited.
4. Irrigation of median strips shall be prohibited.
5. The City Manager shall further reduce irrigation of parks and cemeteries to the following days and hours: *[describe reduced watering schedule]*

Section 4. That the City Manager is hereby authorized and empowered to delegate his or her authority hereunder to such assistants, deputies, officers, employees, or agents of the City as he or she shall designate, and to establish such rules, regulations, and procedures, and to prepare or furnish such forms, as he or she deems necessary or appropriate to carry out the provisions of this Resolution.

Section 5. That in the event any person shall violate any of the provisions of this Resolution, the violations and penalties set forth in ~~the Sacramento Municipal~~City Code _____ shall apply.

Section 6. That this Resolution shall be effective upon its adoption, and shall remain effective until the conditions described in Section 2 are resolved, in which case this Resolution shall be rescinded, or until conditions described in Section 2 worsen, thus requiring additional action by the City Council, in which case a subsequent Resolution will be considered for adoption.

_____

Mayor

Attest:

_____

City Clerk

DRAFT

Appendix G

OUTDOOR WATER CONSERVATION ORDINANCE AMENDMENT

REPORT TO COUNCIL
City of Sacramento

915 I Street, Sacramento, CA 95814-2604
www. CityofSacramento.org

Staff
November 3, 2009

Honorable Mayor and
Members of the City Council

Continued to November 10, 2009

Title: Ordinance Amendment: Outdoor Water Conservation

Location/Council District: Citywide

Recommendation: Adopt an Ordinance amending Article XI of Chapter 13.04 of the Sacramento City Code, relating to outdoor water conservation.

Contact: Michael Malone, Field Services Manager, 808-6226
Terrance Davis, Field Services Program Manager, 808-4929
Julie Friedman, Water Conservation Coordinator, 808-7898

Presenters: Michael Malone, Field Services Manager
Terrance Davis, Field Services Program Manager

Department: Utilities

Division: Field Services Division, Water Conservation

Organization No: 14001441

Description/Analysis

Issue: When the City Council adopted revisions to the City's Outdoor Water Conservation Ordinance on May 12, 2009, the Council requested that staff return after six months with an update on the implementation of the ordinance, including possible amendments.

Based on comments from customers and community stakeholders and staff's own experience implementing the ordinance, this report recommends the amendments included in the attached Ordinance that will (1) promote drip irrigation and other low volume irrigation methods that reduce outdoor water use by limiting restrictions on when they can be used, (2) allow for either Saturday or Sunday irrigation after daylight savings time is completed, rather than limiting customers to one specified weekend day based on their address, (3) extend the prohibition of watering during daylight savings time for one hour (from 10 am to 7

pm, rather than 6 pm as currently provided) to limit the loss of water due to evapotranspiration, and (4) add more detail to the penalty provisions. The Department's community outreach efforts, program update and recommended changes are described in the background section of this report.

Policy Considerations: Over the past eighteen years, the City has been committed to meeting Best Management Practices (BMPs) through the Water Forum and California Urban Water Conservation Council (CUWCC). In order to meet these BMPs it is paramount for the City to have an effective water conservation ordinance and enforcement strategy.

Environmental Considerations:

The California Environmental Quality Act (CEQA):

CEQA applies only to projects that have the potential for causing a significant effect on the environment (CEQA Guidelines § 15061(b) (3)). Adoption of the proposed ordinance to provide the City with better tools to prevent water waste and regulate water use for purposes of water conservation will not cause any significant environmental effects. In addition, under CEQA Guidelines § 15378(b), continuing administrative activities do not constitute a project and are, therefore, exempt from review.

Sustainability Considerations:

Water conservation and prohibiting water waste is important for maintaining and protecting the water supply during dry years and minimizing the City's carbon footprint by reducing the demand for water diversion and treatment. The City's efforts benefit California's river resources by reducing the region's surface water demand. In addition, this ordinance supports water shortage response measures.

The Outdoor Water Conservation Ordinance is consistent with City Council goals for achieving sustainability and livability and contributes to the City's efforts to reduce water waste. In addition, the ordinance is consistent with the City's approved Sustainability Master Plan (Resolution No. 2007-944).

Commission/Committee Action: The proposed Ordinance was presented to the Law and Legislation Committee on October 20, 2009, with direction from the Committee to forward the Ordinance to City Council for adoption.

Rationale for Recommendation: The recommended amendments will improve the Outdoor Water Conservation Ordinance, facilitate implementation of the program, and meet the City's commitments to improved water efficiency.

Financial Considerations: The ordinance institutes fines for violating the ordinance after the second violation in a twelve month time period. These fines

will be collected and directed back to the Department of Utilities Water Conservation Office for the purpose of outreach and education activities. The amended ordinance includes a new provision that limits application of the penalty waiver provided for attendance of a water conservation class to once in any 24 month period.

Emerging Small Business Development (ESBD): Not applicable.

Respectfully Submitted by: _____
Julie Friedman
Water Conservation Coordinator

Approved by: _____
Marty Hanneman
Director, Department of Utilities

Recommendation Approved:

_____
Ray Kerridge
City Manager

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Attachment 1

BACKGROUND

The recently revised Water Conservation Ordinance establishing outdoor water use requirements was adopted on May 12, 2009, and went into effect on June 12, 2009.

As a signatory to the California Urban Water Conservation Council (CUWCC), the City is committed to implementing a comprehensive water conservation plan consisting of a series of Best Management Practices (BMPs). Two categories, Utility Operations and Education, are "Foundational BMPs" because they are considered to be essential water conservation activities for any utility. The City's Water Conservation Ordinance implements these BMPs.

During the summer of 2009, customers, stakeholders, City staff and regional and statewide agency representatives provided their feedback on the effectiveness of the ordinance and water conservation program. These groups provided input which staff has addressed through the proposed amendments to the ordinance.

As requested by City Council on May 12, 2009, staff is reporting back within six months with an update on the ordinance implementation, including proposed amendments.

Update and Program Highlights

The Department of Utilities reached out to its customers by launching a comprehensive outreach effort to inform and build awareness about the ordinance as well as provide ways to help customers become more water efficient (see Attachment 2, Water Conservation Implementation Update, May through September 2009). City staff, community groups and strategic City partners, and Water Conservation Ambassadors helped in communicating the Water Conservation program and new ordinance requirements.

Recommendations for Amendments

As a result of the comments provided by customers, Councilmembers, City staff, community groups, stakeholders, regional and statewide agency representatives, and Ambassadors, ordinance amendments are being recommended to enhance the ordinance's ability to be enforced and to encourage more responsible irrigation behaviors. These recommendations are shown in Table 2 in Attachment 3, Comparison, Current Ordinance and Proposed Amendments (in a side-by-side comparison).

The primary proposed amendment recommendation is the removal of limits to the watering schedule for drip or low volume irrigation. In addition, specific drip irrigation language from the Department of Water Resources' recent model landscape irrigation ordinance was included.

Removal of this provision will allow residents and businesses using low volume irrigation systems to water for as long as they need provided this does not cause any water run-off prohibited by the ordinance. This will allow residents and businesses with plants that require deep and infrequent soaking, typically native or drought tolerant plants, to water their plants as needed for optimal growth.

Additional changes are to the winter watering schedule that limits outside irrigation during cooler and wet winter months and requires the odd/even schedule on the weekend. The recommended change is to allow watering during the wet season (after daylight savings time ends) on Saturday or Sunday. This change is intended to help customers with concerns pertaining to vehicle washing on the weekend.

Staff continues to recommend that the ordinance contain the odd/even watering schedule during daylight savings time, as is provided in the current City Code. This will help to allow for steady water consumption during the six watering days each week, with a low-level consumption day on Monday when there is no watering allowed. If residents were allowed to water as they wished, consumption could vary greatly daily.

Staff reviewed hourly evapotranspiration and wind speed data from the Fair Oaks Station of the California Irrigation Management Information System (CIMIS). Evapotranspiration is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). CIMIS was developed in 1982 by the California Department of Water Resources and the University of California, Davis to facilitate the efficient management of water resources by irrigators. CIMIS contains reference evapotranspiration data (ETo), which is used with other factors to determine how much water the landscape needs for healthy growth.

This review (Figure 1) shows that the maximum wind speeds typically occur in the late afternoon to early evening and that the evapotranspiration drops off significantly after 7 pm. Based on this information, staff recommends extending the prohibition of watering from 6 pm to 7 pm (to prohibit watering from 10 am to 7 pm) to realize further conservation benefits.

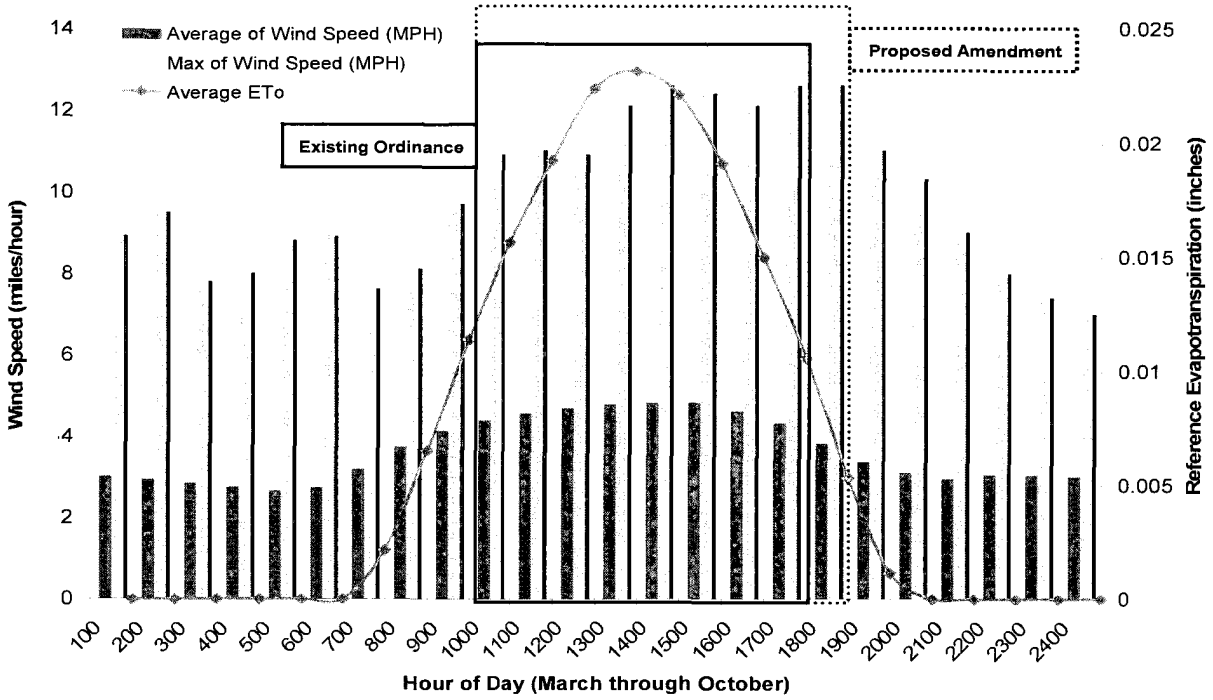

Figure 1. Wind speed and reference ET by *hour* at the Fair Oaks CIMIS station, March through October 2009.

Attachment 2

Water Conservation Implementation Update, May through September 2009

- **Three Spare the Water Alerts Issued to Conserve Water and Energy.** The City issued three "Spare the Water Alerts" when temperatures were expected to be near or reached 100 degrees for at least three consecutive days and demand for water was projected to be high. On those days, customers were urged to reduce and delay non-essential water use in order to conserve water and energy by delaying landscape irrigation and use of indoor appliances (such as dishwashers and washing machines) until late at night or early morning. Customers were notified of the Alert via the City's web site and news media announcements and provided tips on reducing water use at www.SpareSacWater.org.

- **Provided Free Water Wise House and Business Calls; calls increased by 60 percent.** Water Conservation Specialists received approximately 186 requests for landscape irrigation audits this past season. Specialists visited 166 homes or business by appointment. They assessed customer's current water management in and around their home or business, identified needed repairs, provided suggestions for water efficient systems and instructions on how to use irrigation controllers, and recommended an irrigation schedule appropriate for plants and soils. They additionally qualified requesting customers to receive a rebate for high efficiency toilets or washing machines. These calls increased by approximately 60 percent from the prior year, 2008's season.

- **Utilized 311 for Reports of Water Waste or Run-off and for Enforcement; Water waste calls increased by 133 percent in the past five months.** Calls were relayed to 311. The City 311 received 2,970 calls this season. Water Conservation Specialists provided follow up with investigative site visits. Effective this summer, those customers that were reported in a second call following an initial courtesy visit were subject to be fined $25; this fine could be waived by the customer attending an educational seminar at the Water Conservation Office. If a third offense was reported, the fine would increase to $100, and to $500 for the fourth violation. Five Conservation Workshops were held this last summer season, with sixteen (16) people attending.

  Approximately 2,300 water waste calls were addressed by Water Conservation staff during the 5-month period, May through September. Door tag courtesy notices were left with customers (156 notice of violations) when the Water Waste Inspector or Water Conservation Specialist observed a violation. Three second notices of violations were issued: Two were waived after the customer attended a water conservation workshop, and one is pending (awaiting the 60-day period that customers have to waive the fine by attending a workshop).

Customer water waste calls increased 133 percent in the last five months of 2009 as compared to 2008 (see Figure 2 and Table 1 below).

Figure 2. Comparison of Water Waste Service Requests, 5-Month Season, 2008 and 2009

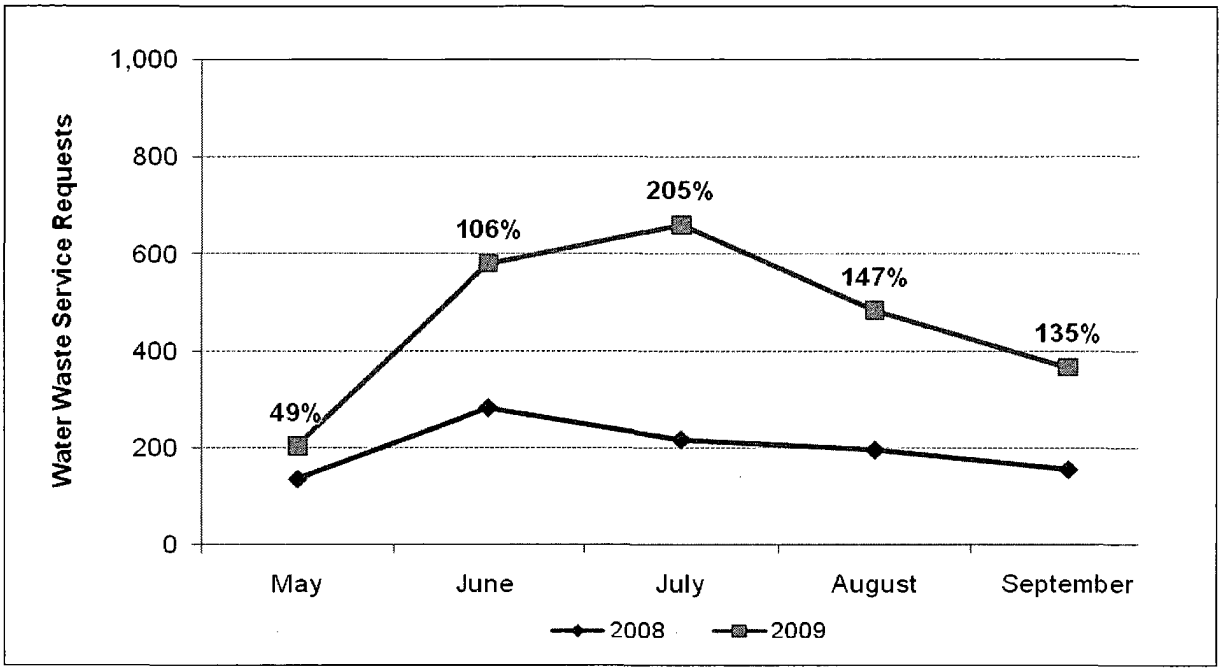

Table 1. Comparison of Water Waste Service Requests, 5-Month Season, 2008 and 2009

Months	Water Waste Calls 2008	Water Waste Calls 2009	Water Waste Calls Percent increase
May	136	203	49%
June	282	581	106%
July	217	661	205%
August	196	484	147%
September	156	366	135%
Total, 5 Months	**987**	**2,295**	**133%**

- **Increased Awareness and Outreach**
  During daylight savings time, customers were made aware of the schedule to water three days per week on an odd/even schedule, before 10 a.m. and after 6 p.m., as follows: Addresses ending in an odd number are on the Tuesday, Thursday and Saturday watering schedule; those ending in an even number are on the Wednesday, Friday and Sunday schedule; Monday watering is not allowed. Vehicle washing was based on the odd/even schedule, and new landscaping may be watered every day for 21 days after installation to allow for plants to root.

  Water Conservation Specialists were available to answer questions and participated in neighborhood or community meetings. A summary of outreach provided in the last five months is described in Table 2 below.

Table 2. Water Conservation Outreach and Education, May-September, 2009

Category	Description
Print	Sacramento Bee, Hai Van News, Sacramento News and Review
Television (stories aired)	News 10 (ABC), KCRA 3 (NBC), Univision
Radio (stories aired)	Radio Disney AM 1470, Capital Public Radio, CBS Radio Stations 1140: AM KHTK (Sports 1140), 100.5 FM KZZO (The Zone), KNCI-FM Country 105.1, KQJK-FM Jack 93.7, KSFM-FM and KYMX-FM 96.1, KFBK AM 1530 KEAR-FM 88.1, KEBR 1210 AM, KHAP 89.1 FM, KPRA 89.5 FM
Web	AP Story, Sacramentopress.com, inourpocket.com, KCRA 3, KGET 17/NBC (Bakersfield): AP Story (Web), CBS 13/CW 31 (Web), CBS 47 TV (Fresno): AP Story (Web); Twitter, NRGideas blog
City Website	Developed www.sparesacwater.org and included FAQs from customer and media comments and questions; added high efficiency toilet and washing machine rebate applications
Media Partnerships (included PSA messaging)	Radio Disney AM1470 and Capital Public Radio
Presentations and Information to Community Groups	Latina Luncheon CAPITAL Organization Pocket Neighborhood The Sacramento Chinese Community Service Center Our Lady of Guadalupe Church La Familia Counseling Center Franklin Center Business Walk (Hispanic Chamber) MAAP, Sacramento Community Health Center
Customer Bill Inserts	3 Utility Bill Stuffers (Landscape Smart (May), Spare Sacramento Water (July), and Irrigation Reminder (October))
Provided Monthly Workshops	5 Water Conservation Workshops, 16 attendees
Neighborhood Services Workshops	4 Green Gardener Workshops (North,South, East, West)

Table 2. Water Conservation Outreach and Education, May-September, 2009 (Continued)

Category	Description
Events	Zone and Radio Disney Events: REI, Capital Nursery, Home Depot, Arden Fairytale Town Goes Green Pacific Rim Festival Chinese Mall Event
Developed Promotional Items	Tip Cards, Watering Schedule Magnets (4 languages)
City Vehicle Advertising	Truck Magnets (Utility and Solid Waste Vehicles)
Billboards	6 Billboards throughout City
Participation in Regional, Statewide Meetings	RWA, Water Forum, and CUWCC
Community Association Newsletter Articles Submitted	Homeowner and Neighborhood Associations

Attachment 3

Comparison, Current Ordinance and Proposed Amendments

Proposed changes are noted in bold.

Revised Ordinance (Effective June 12, 2009)	**Proposed Amendments to Ordinance (November 3, 2009)**
Water run-off prohibited	No change
Odd-Even Watering Schedule: Addresses ending in an ODD number (1,3,5,7,9) may water on Tuesday, Thursday, and Saturday; Addresses ending in an EVEN number (0,2,4,6,8) may water on Wednesday, Friday, and Sunday; There is no watering on Mondays	Added: **Limitations to the watering schedule shall not apply to drip or low volume irrigation.** More specifics are added, using language from DWR's recent model landscape irrigation ordinance on drip irrigation.
No watering between 10 a.m. and 6 p.m. on your watering day	Added: **Limitations to the watering schedule shall not apply to drip or low volume irrigation.** **No watering between 10 am and 7 pm on your watering day.**
Seasonal (Winter) watering schedule limits watering to 1 day per week during wet season (after daylight savings time ends) Addresses ending in an ODD number (1,3,5,7,9) may water on Saturday; Addresses ending in an EVEN number (0,2,4,6,8) may water on Sunday. Vehicle washing is limited to Saturday for odd, Sunday for even schedule. Hoses must have an auto-shut off nozzle.	Changed Seasonal (Winter) watering schedule: Limits watering during wet season (after daylight savings time ends) **to Saturday or Sunday.** **Limitations to the watering schedule shall not apply to drip or low volume irrigation.** Vehicle washing is limited in Winter schedule to **Saturday or Sunday**. Hoses must have an auto-shut off nozzle.
1st Violation: Written notification to Property Owner and Tenant. 2nd Violation: Written notification to Owner and Tenant and $25 fine (can be waived by attending a Water Conservation Seminar). 3rd Violation: Written notification to Owner and Tenant and $100 fine. 4th Violation: Written notification to Owner and Tenant and $500 fine.	1st Violation: Written notification to Property Owner and Tenant. 2nd Violation: Written notification to Owner and Tenant and $25 fine (can be waived by attending a Water Conservation Seminar **provided that only one such penalty waiver shall be allowed for the premises within any twenty-four (24) month period.** 3rd Violation: Written notification to Owner and Tenant and $100 fine. 4th Violation: Written notification to Owner and Tenant and $500 fine. **The written notices shall provide notice of the right to appeal;** **The penalties shall be imposed on the owner of the premises where the violation occurs regardless of whether the violation is committed by the owner of the premises or any other person.**

Attachment 4

ORDINANCE NO.

Adopted by the Sacramento City Council

Date Adopted

AN ORDINANCE AMENDING ARTICLE XI
OF CHAPTER 13.04 OF THE SACRAMENTO CITY CODE,
RELATING TO OUTDOOR WATER CONSERVATION

BE IT ENACTED BY THE COUNCIL OF THE CITY OF SACRAMENTO:

SECTION 1

Article XI of Chapter 13.04 of the Sacramento City Code is amended to read as follows:

Article XI Outdoor Water Conservation

13.04.830 Legislative Intent.

The city council finds and determines:

A. To prevent waste and ensure reasonable use of water supplied by the city water distribution system, it is necessary and desirable to enact certain limitations to promote water conservation by city customers.

B. These limitations should be focused on outdoor water use, because the maximum demands for water from the city's water distribution system occur during the summer months, with outdoor irrigation use exceeding all other demands.

C. Water use limitations should be designed to promote the use of drip irrigation and other low volume irrigation methods that reduce outdoor water use by applying water more efficiently than traditional irrigation methods.

D. Reduction of water use through water conservation protects and promotes the public health, safety and welfare by conserving a vital resource that is subject to ever-increasing demands.

E. Reduction of water demands through water conservation will reduce the per capita amount of water used by city customers, and also will reduce the city's

costs for electrical energy, equipment and chemicals utilized to pump and treat water supplied to the city water distribution system.

F. By reducing the use of electrical energy, equipment and chemicals, the reduction of water demands through water conservation also protects and promotes the public health, safety and welfare by reducing greenhouse gas emissions associated with the production and transport of electrical energy, equipment and chemicals.

13.04.840 Definitions.

When used in this article, the following words or phrases shall have the meanings set forth below:

"City water" shall mean any water delivered by the city's water distribution system.

"Integrated pest management" shall mean a pest control methodology that utilizes a variety of complementary strategies to significantly reduce or eliminate the use of pesticides while at the same time managing pest populations at an acceptable level.

"Low volume irrigation system" shall mean any irrigation system that applies irrigation water at low pressure through a system of tubing or lateral lines and low-volume emitters such as drip, drip lines, and bubblers with a flow rate measured in gallons per hour, and that is designed to apply small volumes of water slowly at or near the root zone of plants. This includes but is not limited to properly functioning drip irrigation systems and soaker hoses.

"New landscaping" shall mean any lawn, plants or other landscaping planted after the effective date of the ordinance adopting this section.

"Water waste runoff" shall mean water flowing away from property in any gutter, ditch or other manner over the surface of the ground due to excessive application of city water.

13.04.850 Substandard water fixtures prohibited.

No person shall cause or allow any city water to be wasted due to leaky or faulty water lines, hoses, fixtures or other water using or distributing devices, unless such person shall have first obtained the written consent of the director to do so.

13.04.860 Water runoff prohibited.

No person shall knowingly or willingly cause or allow any city water applied to any landscaping, including new landscaping, or used for any other irrigation purposes, to flow away as water waste runoff from property owned or occupied by such person.

13.04.870 Outdoor conservation of water.

A. No person shall use, or cause to be used, any city water for the purpose of washing down sidewalks, driveways, or parking areas except to alleviate immediate fire, health or sanitation hazards, or to implement an integrated pest management program, unless the director provides prior written consent.

B. No person shall use, or cause to be used, any city water through a hose for the purpose of washing a vehicle unless:

1. The hose is equipped with an automatic shut-off nozzle attachment, and the attachment is being used to shut off the flow of water at all times when the hose is not being used to wash the vehicle; and

2. The vehicle washing is conducted on a day of the week when outdoor irrigation is permitted for the street address where the vehicle is being washed, as specified in this section.

This subsection shall not apply to commercial car washing businesses.

C. Beginning on the day that daylight savings time begins, and extending until the day before daylight savings time ends:

1. No person shall use, or cause to be used, any city water for landscape irrigation between the hours of ten a.m. and seven p.m., unless the director provides prior written consent to a different time limitation.

2. Residential and commercial locations bearing a street address ending in an odd number shall be permitted to irrigate with city water only on Tuesday, Thursday and Saturday, and locations bearing a street address ending in an even number shall be permitted to irrigate with city water only on Wednesday, Friday and Sunday, unless the director provides prior written consent to a different irrigation pattern.

3. No landscape irrigation shall be allowed on Mondays.

D. Beginning on the day that daylight savings time ends, and extending until the day before daylight savings time begins, all residential and commercial locations shall be permitted to irrigate with city water only on Saturday and Sunday, and

landscape irrigation shall be prohibited on any other days of the week, unless the director provides prior written consent to a different irrigation pattern.

E. The limitations specified in subsections C and D shall not apply to landscape irrigation using a low volume irrigation system, nor to the irrigation of container plants, nor to the irrigation of new landscaping that is subject to the provisions of section 13.04.880.

F. References in this article to any day of the week shall mean the period beginning at twelve a.m. on that day and ending twenty-four (24) hours later.

G. Upon declaration of a water shortage, the city council may impose revised and/or additional limitations on outdoor water use, as specified in section 13.04.910, and no person shall use, or cause to be used, city water in violation of such limitations while the water shortage remains in effect.

13.04.880 New landscaping.

The following regulations shall apply to the use of city water to irrigate new landscaping:

A. Irrigation of new landscaping shall be allowed on any day of the week for a period of twenty-one (21) days after the new landscaping is planted, unless the director provides prior written consent to extend this time period based on plant type and the season when the new landscaping is planted.

B. Any irrigation of new landscaping after expiration of the time period specified in subsection A, and any irrigation of existing landscaping adjacent to the new landscaping, shall be subject to the limitations specified in section 13.04.870.

C. Upon declaration of a water shortage, the city council may impose revised and/or additional limitations on the irrigation of new landscaping, as specified in section 13.04.910, and no person shall use, or cause to be used, city water in violation of such limitations while the water shortage remains in effect.

13.04.890 Penalties for violation.

A. The following penalties shall be imposed for violation of any of the provisions of sections 13.04.850 through 13.04.880, inclusive. Any violations occurring on separate calendar days shall be considered separate violations.

1. First violation during any twelve (12) month period: No penalty shall be imposed, but a written notice describing the violation and the penalties for subsequent violations shall be issued to the owner and the occupant (if different than the owner) of the premises where the violation occurred.

2. Second violation during any twelve (12) month period: A written notice describing the violation and the penalty shall be issued to the owner and the occupant (if different than the owner) of the premises where the violation occurred. A penalty of twenty-five dollars ($25.00) shall be imposed, but this penalty shall be waived if the owner of the premises where the violation occurred, or the occupant (if different than the owner, and the occupant committed the violation), attends a water conservation seminar offered by the department within sixty (60) days after the date of the penalty notice; provided that only one such penalty waiver shall be allowed for the premises within any twenty-four (24) month period.

3. Third violation during any twelve (12) month period: A written notice describing the violation and the penalty shall be issued to the owner and the occupant (if different than the owner) of the premises where the violation occurred. A penalty of one hundred dollars ($100) shall be imposed.

4. Fourth violation and any successive violations during any twelve (12) month period: A written notice describing the violation and the penalty shall be issued to the owner and the occupant (if different than the owner) of the premises where the violation occurred. A penalty of five hundred dollars ($500) shall be imposed.

B. The written notices specified in subsection A also shall provide notice of the right to appeal pursuant to section 13.04.900 and shall specify the address where the notice of appeal shall be filed.

C. The penalties specified in subsection A shall be imposed on the owner of the premises where the violation occurs regardless of whether the violation is committed by the owner of the premises or any other person.

D. Upon declaration of a water shortage by the city council, as specified in section 13.04.910, the penalty amounts specified in subsection A shall be doubled while the water shortage remains in effect.

E. The violation of any of the provisions of sections 13.04.850 through 13.04.880, inclusive, also shall be deemed to constitute a public nuisance, subject to abatement in accordance with the provisions of chapter 8.04 of this code, as applicable.

F. The foregoing provisions are cumulative and in addition to any other remedies or penalties authorized or imposed under any other provision of this code, including but not limited to section 13.04.270, or any other applicable law or regulation. The provisions of this article may be enforced by the department or by the department of code enforcement.

13.04.900 Appeal.

A. The owner or occupant of the premises where the violation occurred may appeal a notice of violation issued under Section 13.04.890 (A) to the director for review and determination, by filing a written notice of appeal with the director not later than thirty (30) days after the notice of violation is issued. Such notice of appeal shall specify the grounds for appeal and shall provide the appellant's address and telephone number, with a statement that the appellant agrees to accept service at such address of the written notice of the time and place of the appeal hearing and the determination of the director or the director's designee.

B. Upon receipt of a timely notice of appeal, the director or the director's designee shall set the matter for an informal hearing at the earliest practical date. Not less than seven (7) days prior to the date of hearing, the director or the director's designee shall provide written notice of the hearing to the appellant. At the hearing, the director or the director's designee shall hear any relevant evidence presented by the appellant or department staff, and may uphold, modify or rescind the notice of violation, including the penalty imposed by the notice of violation, if any. The person filing the appeal shall be provided written notice of the determination of the director or the director's designee, which shall be the city's final administrative determination of the matter.

C. The failure of the owner or occupant of the premises where the violation occurred to file a timely notice of appeal in accordance with the provisions of this section shall constitute an irrevocable waiver of the right to appeal and a failure to exhaust the owner's and occupant's administrative remedies with regard to the notice of violation.

D. Upon determination after appeal by the director or the director's designee that a penalty shall be imposed, or upon issuance of a notice of violation and penalty and expiration of the appeal period specified in subsection A with no notice of appeal being filed, the penalty amount shall be included on the bill for water service provided to the premises where the violation occurred and shall be collected in accordance with the provisions of chapter 13.12 of this code. Any penalties collected shall be used by the department to fund water conservation programs.

13.04.910 Declaration of water shortage.

In response to any condition necessitating increased water conservation, such as a water shortage due to drought, natural disaster or other reduction of water supply availability, or as may otherwise be required to protect the public health, safety and welfare, the city council may by resolution declare the existence of a water shortage and impose revised and/or additional limitations and time restrictions on outdoor water use while the water shortage remains in effect, and no person shall use, or cause to be used, city water in violation of such limitations or restrictions while the water shortage

remains in effect. Unless the resolution specifies an ending date, the declaration of water shortage shall remain in effect until rescinded or otherwise modified by subsequent resolution of the city council.

13.04.920 Access to customer premises; compliance.

A. A customer receiving city water service shall provide the department's employees and/or contractors access to and use of the premises where city water service is received as may be required by the city's employees or contractors to determine whether there is any violation of any of the provisions of sections 13.04.850 through 13.04.880, inclusive, or to abate any violation thereof. If the customer refuses to allow such access, the city may seek authorization from any court of competent jurisdiction for such access and abatement.

B. Compliance with the provisions of this article shall be a condition of the customer receiving or continuing to receive city water service.

13.04.930 Fire and other emergencies.

Nothing in this article shall be construed to apply to the use of city water for purposes of extinguishing fire or any other similar emergency.

13.04.940 Consent of director.

Whenever in this article a person is authorized to obtain the consent of the director to perform an act otherwise prohibited, the director may give consent on such conditions as the director may specify, and the director shall give such consent only where the director determines:

A. There is no practical alternative manner in which the person may accomplish the desired result; and

B. The desired result is of substantial importance when compared with the importance of conserving water resources as set forth in this article.

13.04.950 City water use.

The city of Sacramento, and its officers, employees, and agents when acting in the course and scope of their employment, shall be exempt from the provisions of this article; provided, however, that the city manager shall promulgate administrative regulations governing water use by the city, and its officers, employees, and agents, as may be necessary for the city to achieve the conservation of water resources equal to or greater than the level of conservation achieved by the city's water service customers.

SECTION 2

The adoption of this ordinance amending Article XI of Chapter 13.04 of the Sacramento City Code is not intended to and does not affect any administrative, civil, or criminal actions or proceedings brought or to be brought to enforce the provisions of Article XI of Chapter 13.04 of the Sacramento City Code, as they existed prior to the effective date of this ordinance. The provisions of Article XI of Chapter 13.04 of the Sacramento City Code as they exist prior to the effective date of this ordinance shall continue to be operative and effective with regard to any violations or acts occurring prior to the effective date of this ordinance.

Attachment 5

REDLINE DRAFT

ORDINANCE NO.

Adopted by the Sacramento City Council

Date Adopted

AN ORDINANCE AMENDING ARTICLE XI
OF CHAPTER 13.04 OF THE SACRAMENTO CITY CODE,
RELATING TO OUTDOOR WATER CONSERVATION

BE IT ENACTED BY THE COUNCIL OF THE CITY OF SACRAMENTO:

SECTION 1

Article XI of Chapter 13.04 of the Sacramento City Code is amended to read as follows:

Article XI Outdoor Water Conservation

13.04.830 Legislative Intent.

The city council finds and determines:

A. To prevent waste and ensure reasonable use of water supplied by the city water distribution system, it is necessary and desirable to enact certain limitations to promote water conservation by city customers.

B. These limitations should be focused on outdoor water use, because the maximum demands for water from the city's water distribution system occur during the summer months, with outdoor irrigation use exceeding all other demands.

C. Water use limitations should be designed to promote the use of drip irrigation and other low volume irrigation methods that reduce outdoor water use by applying water more efficiently than traditional irrigation methods.

D~~C~~. Reduction of water use through water conservation protects and promotes the public health, safety and welfare by conserving a vital resource that is subject to ever-increasing demands.

E~~D~~. Reduction of water demands through water conservation will reduce the per capita amount of water used by city customers, and also will reduce the city's costs for electrical energy, equipment and chemicals utilized to pump and treat water supplied to the city water distribution system.

F~~E~~. By reducing the use of electrical energy, equipment and chemicals, the reduction of water demands through water conservation also protects and promotes the public health, safety and welfare by reducing greenhouse gas emissions associated with the production and transport of electrical energy, equipment and chemicals.

13.04.840 Definitions.

When used in this article, the following words or phrases shall have the meanings set forth below:

"City water" shall mean any water delivered by the city's water distribution system.

"Integrated pest management" shall mean a pest control methodology that utilizes a variety of complementary strategies to significantly reduce or eliminate the use of pesticides while at the same time managing pest populations at an acceptable level.

"Low volume irrigation system" shall mean any irrigation system that applies irrigation water at low pressure through a system of tubing or lateral lines and low-volume emitters such as drip, drip lines, and bubblers with a flow rate measured in gallons per hour, and that is designed to apply small volumes of water slowly at or near the root zone of plants. This includes but is not limited to properly functioning drip irrigation systems and soaker hoses.

"New landscaping" shall mean any lawn, plants or other landscaping planted after the effective date of the ordinance adopting this section.

"Water waste runoff" shall mean water flowing away from property in any gutter, ditch or other manner over the surface of the ground due to excessive application of city water.

13.04.850 Substandard water fixtures prohibited.

No person shall cause or allow any city water to be wasted due to leaky or faulty water lines, hoses, fixtures or other water using or distributing devices, unless such person shall have first obtained the written consent of the director to do so.

13.04.860 Water runoff prohibited.

No person shall knowingly or willingly cause or allow any city water applied to any landscaping, including new landscaping, or used for any other irrigation purposes, to flow away as water waste runoff from property owned or occupied by such person.

13.04.870 Outdoor conservation of water.

A. No person shall use, or cause to be used, any city water for the purpose of washing down sidewalks, driveways, or parking areas except to alleviate immediate fire, health or sanitation hazards, or to implement an integrated pest management program, unless the director provides prior written consent.

B. No person shall use, or cause to be used, any city water through a hose for the purpose of washing a vehicle unless:

1. The hose is equipped with an automatic shut-off nozzle attachment, and the attachment is being used to shut off the flow of water at all times when the hose is not being used to wash the vehicle; and

2. The vehicle washing is conducted on a day of the week when outdoor irrigation is permitted for the street address where the vehicle is being washed, as specified in this section.

This subsection shall not apply to commercial car washing businesses.

C. Beginning on the day that daylight savings time begins, and extending until the day before daylight savings time ends:

1. No person shall use, or cause to be used, any city water for landscape irrigation between the hours of ten a.m. and ~~six~~seven p.m., unless the director provides prior written consent to a different time limitation.

2. Residential and commercial locations bearing a street address ending in an odd number shall be permitted to irrigate with city water only on Tuesday, Thursday~~,~~ and Saturday, and locations bearing a street address ending in an even number shall be permitted to irrigate with city water only on Wednesday, Friday and Sunday, unless the director provides prior written consent to a different irrigation pattern.

3. No landscape irrigation shall be allowed on Mondays.

D. Beginning on the day that daylight savings time ends, and extending until the day before daylight savings time begins, all residential and commercial locations ~~bearing a street address ending in an odd number~~ shall be permitted to irrigate with city water only on Saturday and ~~, and locations bearing a street address ending in an even number shall be permitted to irrigate with city water only on~~ Sunday, and landscape irrigation shall be prohibited on any other days of the

week, unless the director provides prior written consent to a different irrigation pattern.

E. The limitations specified in subsections C and D shall not apply to landscape irrigation using a low volume irrigation system, nor to the irrigation of container plants, nor to the irrigation of new landscaping that is subject to the provisions of section 13.04.880.

F. References in this article to any day of the week shall mean the period beginning at twelve a.m. on that day and ending twenty-four (24) hours later.

G. Upon declaration of a water shortage, the city council may impose revised and/or additional limitations on outdoor water use, as specified in section 13.04.910, and no person shall use, or cause to be used, city water in violation of such limitations while the water shortage remains in effect.

13.04.880 New landscaping.

The following regulations shall apply to the use of city water to irrigate new landscaping:

A. Irrigation of new landscaping shall be allowed on any day of the week for a period of twenty-one (21) days after the new landscaping is planted, unless the director provides prior written consent to extend this time period based on plant type and the season when the new landscaping is planted.

B. Any irrigation of new landscaping after expiration of the time period specified in subsection A, and any irrigation of existing landscaping adjacent to the new landscaping, shall be subject to the limitations specified in section 13.04.870.

C. Upon declaration of a water shortage, the city council may impose revised and/or additional limitations on the irrigation of new landscaping, as specified in section 13.04.910, and no person shall use, or cause to be used, city water in violation of such limitations while the water shortage remains in effect.

13.04.890 Penalties for violation.

A. The following penalties shall be imposed for violation of any of the provisions of sections 13.04.850 through 13.04.880, inclusive. Any violations occurring on separate calendar days shall be considered separate violations.

1. First violation during any twelve (12) month period: No penalty shall be imposed, but a written notice describing the violation and the penalties for subsequent violations shall be issued to the owner and the occupant (if different than the owner) of the premises where the violation occurred.

2. Second violation during any twelve (12) month period: A written notice describing the violation and the penalty shall be issued to the owner and the occupant (if different than the owner) of the premises where the violation occurred. A penalty of twenty-five dollars ($25.00) shall be imposed, but this penalty shall be waived if the owner of the premises where the violation occurred, or the occupant (if different than the owner, and the occupant committed the violation), attends a water conservation seminar offered by the department within sixty (60) days after the date of the penalty notice; provided that only one such penalty waiver shall be allowed for the premises within any twenty-four (24) month period.

3. Third violation during any twelve (12) month period: A written notice describing the violation and the penalty shall be issued to the owner and the occupant (if different than the owner) of the premises where the violation occurred. A penalty of one hundred dollars ($100) shall be imposed.

4. Fourth violation and any successive violations during any twelve (12) month period: A written notice describing the violation and the penalty shall be issued to the owner and the occupant (if different than the owner) of the premises where the violation occurred. A penalty of five hundred dollars ($500) shall be imposed.

B. The written notices specified in subsection A also shall provide notice of the right to appeal pursuant to section 13.04.900 and shall specify the address where the notice of appeal shall be filed.

C. The penalties specified in subsection A shall be imposed on the owner of the premises where the violation occurs regardless of whether the violation is committed by the owner of the premises or any other person.

D~~B~~. Upon declaration of a water shortage by the city council, as specified in section 13.04.910, the penalty amounts specified in subsection A shall be doubled while the water shortage remains in effect.

E~~C~~. The violation of any of the provisions of sections 13.04.850 through 13.04.880, inclusive, also shall be deemed to constitute a public nuisance, subject to abatement in accordance with the provisions of chapter 8.04 of this code, as applicable.

F~~D~~. The foregoing provisions are cumulative and in addition to any other remedies or penalties authorized or imposed under any other provision of this code, including but not limited to section 13.04.270, or any other applicable law or regulation. The provisions of this article may be enforced by the department or by the department of code enforcement.

13.04.900 Appeal.

A. The owner or occupant of the premises where the violation occurred may appeal a notice of violation issued under Section 13.04.890 (A) to the director for review and determination, by filing a written notice of appeal with the director not later than thirty (30) days after the notice of violation is issued. Such notice of appeal shall specify the grounds for appeal and shall provide the appellant's address and telephone number, with a statement that the appellant agrees to accept service at such address of the written notice of the time and place of the appeal hearing and the determination of the director or the director's designee.

B. Upon receipt of a timely notice of appeal, the director or the director's designee shall set the matter for an informal hearing at the earliest practical date. Not less than seven (7) days prior to the date of hearing, the director or the director's designee shall provide written notice of the hearing to the appellant. At the hearing, the director or the director's designee shall hear any relevant evidence presented by the appellant or department staff, and may uphold, modify or rescind the notice of violation, including the penalty imposed by the notice of violation, if any. The person filing the appeal shall be provided written notice of the determination of the director or the director's designee, which shall be the city's final administrative determination of the matter.

C. The failure of the owner or occupant of the premises where the violation occurred to file a timely notice of appeal in accordance with the provisions of this section shall constitute an irrevocable waiver of the right to appeal and a failure to exhaust the owner's and occupant's administrative remedies with regard to the notice of violation.

D. Upon determination after appeal by the director or the director's designee that a penalty shall be imposed, or upon issuance of a notice of violation and penalty and expiration of the appeal period specified in subsection A with no notice of appeal being filed, the penalty amount shall be included on the bill for water service provided to the premises where the violation occurred and shall be collected in accordance with the provisions of chapter 13.12 of this code. Any penalties collected shall be used by the department to fund water conservation programs.

13.04.910 Declaration of water shortage.

In response to any condition necessitating increased water conservation, such as a water shortage due to drought, natural disaster or other reduction of water supply availability, or as may otherwise be required to protect the public health, safety and welfare, the city council may by resolution declare the existence of a water shortage and impose revised and/or additional limitations and time restrictions on outdoor water use while the water shortage remains in effect, and no person shall use, or cause to be used, city water in violation of such limitations or restrictions while the water shortage

remains in effect. Unless the resolution specifies an ending date, the declaration of water shortage shall remain in effect until rescinded or otherwise modified by subsequent resolution of the city council.

13.04.920 Access to customer premises; compliance.

A. Customer receiving city water service shall provide the department's employees and/or contractors access to and use of the premises where city water service is received as may be required by the city's employees or contractors to determine whether there is any violation of any of the provisions of sections 13.04.850 through 13.04.880, inclusive, or to abate any violation thereof. If the customer refuses to allow such access, the city ~~also~~ may seek authorization from any court of competent jurisdiction for such access and abatement.

B. Compliance with the provisions of this article shall be a condition of the customer receiving or continuing to receive city water service.

13.04.930 Fire and other emergencies.

Nothing in this article shall be construed to apply to the use of city water for purposes of extinguishing fire or any other similar emergency.

13.04.940 Consent of director.

Whenever in this article a person is authorized to obtain the consent of the director to perform~~do~~ an act otherwise prohibited, the director may give consent on such conditions as the director may specify, and the director shall give such consent only where the director determines:

A. There is no practical alternative manner in which the person may accomplish the desired result; and

B. The desired result is of substantial importance when compared with the importance of conserving water resources as set forth in this article.

13.04.950 City water use.

The city of Sacramento, and its officers, employees, and agents when acting in the course and scope of their employment, shall be exempt from the provisions of this article; provided, however, that the city manager shall promulgate administrative regulations governing water use by the city, and its officers, employees, and agents, as may be necessary for the city to achieve the conservation of water resources equal to or greater than the level of conservation achieved by the city's water service customers.

SECTION 2

The adoption of this ordinance amending Article XI of Chapter 13.04 of the Sacramento City Code is not intended to and does not affect any administrative, civil, or criminal actions or proceedings brought or to be brought to enforce the provisions of Article XI of Chapter 13.04 of the Sacramento City Code, as they existed prior to the effective date of this ordinance. The provisions of Article XI of Chapter 13.04 of the Sacramento City Code as they exist prior to the effective date of this ordinance shall continue to be operative and effective with regard to any violations or acts occurring prior to the effective date of this ordinance.

Attachment 6

Spare the Water SACRAMENTO

Comparison of Water Waste Service Requests
5-Month Season, 2008 and 2009

Months	Water Waste Calls 2008	Water Waste Calls 2009	Water Waste Calls Percent increase
May	136	203	49%
June	282	581	106%
July	217	661	205%
August	196	484	147%
September	156	366	135%
Total, 5 Months	**987**	**2,295**	**133%**

Spare the Water SACRAMENTO

Comparison:

Current Ordinance and Proposed Amendments

Proposed changes are noted in bold.

Revised Ordinance (Effective June 12, 2009)	Proposed Amendments to Ordinance (November 3, 2009)
Water run-off prohibited	No change
Odd-Even Watering Schedule: Addresses ending in an ODD number (1,3,5,7,9) may water on Tuesday, Thursday, and Saturday; Addresses ending in an EVEN number (0,2,4,6,8) may water on Wednesday, Friday, and Sunday; There is no watering on Mondays	Added: **Limitations to the watering schedule shall not apply to drip or low volume irrigation.** More specifics are added, using language from DWR's recent model landscape irrigation ordinance on drip irrigation.

Spare the Water SACRAMENTO

Comparison:

Current Ordinance and Proposed Amendments

Proposed changes are noted in bold.

Revised Ordinance (Effective June 12, 2009)	Proposed Amendments to Ordinance (November 3, 2009)
No watering between 10 a.m. and 6 p.m. on your watering day	Added: **Limitations to the watering schedule shall not apply to drip or low volume irrigation.** **No watering between 10 a.m. and 7 p.m. on your watering day.**

Spare the Water SACRAMENTO

Comparison:

Current Ordinance and Proposed Amendments

Proposed changes are noted in bold.

Revised Ordinance (Effective June 12, 2009)	Proposed Amendments to Ordinance (November 3, 2009)
Seasonal (Winter) watering schedule limits watering to 1 day per week during wet season (after daylight savings time ends) Addresses ending in an ODD number (1,3,5,7,9) may water on Saturday; Addresses ending in an EVEN number (0,2,4,6,8) may water on Sunday.	Changed Seasonal (Winter) watering schedule: Limits watering during wet season (after daylight savings time ends) **to Saturday or Sunday**. **Limitations to the watering schedule shall not apply to drip or low volume irrigation.**

Spare the Water SACRAMENTO

Comparison:

Current Ordinance and Proposed Amendments

Proposed changes are noted in bold.

Revised Ordinance (Effective June 12, 2009)	Proposed Amendments to Ordinance (November 3, 2009)
Vehicle washing is limited to Saturday for odd, Sunday for even schedule. Hoses must have an auto-shut off nozzle.	Vehicle washing is limited in Winter schedule to **Saturday or Sunday**. Hoses must have an auto-shut off nozzle.

Spare the Water SACRAMENTO

Comparison:

Current Ordinance and Proposed Amendments

Proposed changes are noted in bold.

Revised Ordinance (Effective June 12, 2009)	Proposed Amendments to Ordinance (November 3, 2009)
Violation Notifications	
1st Violation: Written notification to Property Owner and Tenant.	No Change
2nd Violation: Written notification to Owner and Tenant and $25 fine (can be waived by attending a Water Conservation Seminar).	2nd Violation: Written notification to Owner and Tenant and $25 fine (can be waived by attending a Water Conservation Seminar **provided that only one such penalty waiver shall be allowed for the premises within any twenty-four (24) month period.**

Spare the Water SACRAMENTO

Comparison:

Current Ordinance and Proposed Amendments

Proposed changes are noted in bold.

Revised Ordinance (Effective June 12, 2009)	Proposed Amendments to Ordinance (November 3, 2009)
Violation Notifications	
3rd Violation: Written notification to Owner and Tenant and $100 fine.	No Change
4th Violation: Written notification to Owner and Tenant and $500 fine.	No Change

The written notices shall provide notice of the right to appeal;
The penalties shall be imposed on the owner of the premises where the violation occurs regardless of whether the violation is committed by the owner of the premises or any other person.

CUWCC 2009 AND 2010 ANNUAL REPORTS, 2011 AB1420 SELF CERTIFICATION STATEMENT, AND 2009 WFA WATER CONSERVATION ELEMENT

(CD of CUWCC 2009 and 2010 Annual Reports to be included in Final UWMP)

Department of Utilities
Office of the Director

CITY OF SACRAMENTO
CALIFORNIA

1395 35th Avenue
Sacramento, CA 95822-2911
phone (916) 808-1400
fax (916) 808-1497/1498

January 6, 2011

Mr. Baryohay Davidoff
Department of Water Resources
Office of Water Use and Efficiency
901 P Street, Third Floor
Sacramento, CA 95814

Re: AB 1420 Self Certification Statement Tables 1 and 2

Dear Mr. Davidoff:

The City of Sacramento Department of Utilities is pleased to submit AB 1420 Self Certification Statement Tables and supporting information to substantiate the Tables for your review and approval. The City submits this AB 1420 self-certification in order to document eligibility for grant funding by demonstrating water consumption demand management.

The City seeks to comply with the California Urban Water Conservation Council (CUWCC) Memorandum of Understanding (MOU) and has developed a schedule, budget, financial plan and commitment to ultimately implement all Best Management Practices (BMPs) at a coverage level determined by the CUWCC MOU. At present, the City does not have sufficient resources to satisfy the coverage requirements and intends to file exemptions for lack of funding with the CUWCC in 2011 and 2012.

Enclosed please find:

- AB 1420 Self-Certification Statement Tables 1 and 2
- CUWCC BMP coverage reports for the 2007/2008 reporting period

Please note:

- Table 1 cannot substantiate BMP implementation at the coverage level determined by the CUWCC MOU, and, as a result, Table 2 provides a schedule and budget to demonstrate the City's commitment to achieve compliance in the future with implementation of all BMPs at the coverage level determined by the CUWCC MOU.

- The City is progressing in meeting its commitments:

- **BMP's 1.20, 1.30 and 1.40**: The City has proposed approximately $8 Million in meter retrofits for fiscal year 2011 and is currently on schedule to meet the state mandated deadline to install meters by 2024. Until then, the City is not able to identify the non-revenue water lost due to leaks and will not be able to satisfy the coverage requirements for BMP 1.20, 1.30 and 1.40 until the completion of the meter retrofit program expected in 2024.

- **BMPs 1.20, 1.30 and 1.40 (Continued)**:

  - At the beginning of the meter retrofit program, the City had approximately 110,000 service connections without meters. As of December, 2010, the City has installed approximately 40,000 meters or about 36 percent of the unmetered services.

  - The City proposed $100,000 for leak detection programs in fiscal year 2011 and spent approximately $860,000 correcting leaks in fiscal year 2010.

  - The City implemented a metered rate structure in 2008 that recovers 60 percent of its revenues by volumetric pricing as a prudent incremental step to determine customer behavior and obtain data to construct a revenue neutral rate model that complies with BMP 1.40. In the past, City customers were charged a rate that varied only by the number of rooms in their home, referred to as a flat rate. Although the City's current metered rate structure recovers a portion of its cost by volumetric pricing, the City needs to establish a rate with sufficient data to determine an appropriate pricing structure that reduces water demand, is revenue neutral, politically sustainable, and is fair to the ratepayers. The City understands that the metered rate does not comply with BMP 1.40, however the City will be re-evaluating its rate structure as more data is obtained.

- **BMPs 3.11 through 3.40**:

  - The City has progressed with the resources it has in implementing the CUWCC coverage requirements and making further reductions in future water demands; however, the City currently does not have sufficient resources to fully satisfy the coverage requirements for BMP 3.11 through 3.40 and intends to file exemptions with the CUWCC in the near future for lack of funding (such as for BMP 3.40, Residential Toilet Replacement).

The City is continuing to leverage resources, become more efficient, and employ new programs to move forward in meeting its CUWCC commitments. Of key significance, in 2009, the City began the system-wide deployment of Automated Meter Infrastructure (AMI). This system generates short interval consumption data to enhance water conservation measures, improve leak detection, reduce lost water, and manage rate structures that encourage conservation.

Please kindly contact Julie Friedman, Water Conservation Coordinator at (916) 808-7898, or Jim Peifer, Senior Engineer at (916) 808-1416 to assist you with further questions or information.

Thank you.

Sincerely,

Marty Hanneman
Director, Department of Utilities

cc: Michael Malone, Field Services Manager
Terrance Davis, Program Manager
Dan Sherry, Supervising Engineer
John Woodling, Executive Director, Regional Water Authority

Enclosures

AB 1420 Self- Certification Statement Table 1

Note: Table 1 documents Status of Past and Current BMP implementation.

Self-Certification Statement: The Urban Water Supplier and its authorized representative certifies, under penalty of perjury, that all information and claims, stated in this table, regarding compliance and implementation of the BMPs, including alternative conservation approaches, are true and accurate. This signed AB 1420 Self-Certification Statement Table 1, and Table 2 are the basis for granting funds by the Funding Agency. Falsification and/or inaccuracies in AB 1420 Self Certification Statement Table 1, and Table 2 and in any supporting documents substantiating such claims may, at the discretion of the funding agency, result in loss of all State funds to the applicant. Additionally, the Funding Agency, in its sole discretion, may halt disbursement of grant or loan funds, not pay pending invoices, and/or pursue any other applicable legal remedy and refer the matter to the Attorney General's Office.

Name of Signatory Marty Hanneman Title of Signatory Director of Utilities Signature of signatory Date January 6, 2011

Application Date:

Proposal Identification Number: CUWCC Member? Yes/No Yes

Has Urban Water Supplier submitted a 2005 Urban Water Management Plan? Yes/No Yes Is the UWM Plan Deemed Complete by DWR? Yes/No Yes

Applicant Name: City of Sacramento

Project Title:

Applicant's Contact Information: Name: City of Sacramento Dept. of Utilities Water Conservation Phone: 916.808.7898 E-mail: jfriedman@cityofsacramento.org

Participants:

Retailer (List Below)	*Wholesaler (List Below)*

C1	C2	C3	C4	C5	*C6	C7	**C8	**C9	**C10	C11	C12	C13	C14	C15	C16	C17	C18
				BMP Implemented by Retailers and/or Wholesalers / *BMP*			Compliance Options/Alternative Conservation Approaches (1)			BMP Is Exempt (2)			BMP Implementation Requirements Met				
BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs		Retailer *Yes/No*	Wholesaler *Yes/No*	Regional *Yes/No*	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	CUWCC MOU Requirement Met: Retailer *Yes/No*	CUWCC MOU Requirement Met: Wholesaler *Yes/No*	Date of BMP Report Submitted to CUWCC for (2007-2008) (MOU Signatories)	Date BMP Implementation Data Submitted to DWR in CUWCC Format (Non MOU Signatories) (3)	All Supporting Documents have been Submitted Yes/No
	✓	BMP 1 Water Survey for Single/Multi-Family Residential Customers		Yes			x						No		May-09	NA	Yes*
	✓	BMP 2 Residential Plumbing Retrofit		Yes			x						No		May-09	NA	Yes*
✓	✓	BMP 3 System Water Audits, Leak Detection		Yes			x						No	No	May-09	NA	Yes*
✓	✓	BMP 3 Leak Repairs		Yes	Yes		x						No		May-09	NA	Yes*
	✓	BMP 4 Metering with Commodity Rates for All New connections		Yes			x						No		May-09	NA	Yes*
	✓	BMP 4 Retrofit of Existing Connections		Yes			x						No		May-09	NA	Yes*

C1	C2	C3	C4	C5	*C6	C7	**C8	**C9	**C10	C11	C12	C13	C14	C15	C16	C17	C18
				BMP Implemented by Retailers and/or Wholesalers / *BMP*			Compliance Options/Alternative Conservation Approaches (1)			BMP Is Exempt (2)			BMP Implementation Requirements Met				
BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer *Yes/No*	Wholesaler *Yes/No*	Regional *Yes/No*	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	CUWCC MOU Requirement Met: Retailer *Yes/No*	CUWCC MOU Requirement Met: Wholesaler *Yes/No*	Date of BMP Report Submitted to CUWCC for (2007-2008) (MOU Signatories)	Date BMP Implementation Data Submitted to DWR in CUWCC Format (Non MOU Signatories) (3)	All Supporting Documents have been Submitted Yes/No
	✓	BMP 5 Large Landscape Conservation Programs and Incentives	Yes			x						No		May-09	NA	Yes*
	✓	BMP 6 High-Efficiency Washing Machine Rebate Programs	Yes			x						No		May-09	NA	Yes*
✓	✓	BMP 7 Public Information	Yes	Yes		x						Yes	No	May-09	NA	Yes*
✓	✓	BMP 8 School Education	Yes	Yes		x						Yes	No	May-09	NA	Yes*
	✓	BMP 9 Conservation programs for Commercial, Industrial, and Institutional (CII) Accounts	Yes			x						No		May-09	NA	Yes*
✓		BMP 10 Wholesale Agency Assistance Programs	Yes	Yes		x						Yes	Yes	May-09	NA	Yes*
	✓	BMP 11 Conservation Pricing	Yes			x						Yes		May-09	NA	Yes*
✓	✓	BMP 12 Conservation Coordinator	Yes	Yes		x						No	No	May-09	NA	Yes*
	✓	BMP 13 Water Waste Prohibitions	Yes			x						Yes		May-09	NA	Yes*
	✓	BMP 14 Residential ULFT Replacement Programs	Yes			x						Yes		May-09	NA	Yes*

***C6:** Wholesaler may also be a retailer (supplying water to end water users)
****C8, **C9, **, and C10:** Agencies choosing an alternative conservation approach are responsible for achieving water savings equal or greater than that which they would have achieved using only BMP list.

(1) For details, please see: http://www.cuwcc.org/mou/exhibit-1-bmp-definitions-schedules-requirements.aspx.
(2) BMP is exempt based on cost-effectiveness, lack of funding, and lack of legal authority criteria as detailed in the CUWCC MOU
(3) Non MOU signatories must submit to DWR reports and supporting documents in the same format as CUWCC.
*See attached coverage reports

AB 1420 Self- Certification Statement Table 2

Provide Schedule, Budget, and Finance Plan to Demonstrate Commitment to Implement All BMP's to Become in Compliance with BMP Implementation - Commencing Within 1st Year of Agreement for Which Applicant Receives Funds.

Self-Certification Statement: The Urban Water Supplier and its authorized representative certifies, under penalty of perjury, that all information and claims, stated in this table, regarding compliance and implementation of the BMPs, including alternative conservation approaches, are true and accurate. This signed AB 1420 Self-Certification Statement Table 1 and Table 2 are the basis for granting funds by the Funding Agency. Falsification and/or inaccuracies in AB 1420 Self Certification Statement Table 1 and Table 2, and in any supporting documents substantiating such claims may, at the discretion of the funding agency, result in loss of all State funds to the applicant. Additionally, the Funding Agency, in its sole discretion, may halt disbursement of grant or loan funds, not pay pending invoices, and/or pursue any other applicable legal remedy and refer the matter to the Attorney General's Office.

Name of Signatory: Marty Hanneman Title of Signatory: Director of Utilities Signature of signatory [signature] Date January 6, 2011

Application Date:

Proposal Identification Number: CUWCC Member? Yes/No: Yes

Applicant Name: City of Sacramento Is the UWM Plan Deemed Complete by DWR? Yes/No: Yes

Project Title:

Applicant's Contact Information: Name City of Sacramento Dept. of Utilities Water Conserv/Engineering Offices, 916.808.7898, 916.808.1416

Participants:	Retailer (List Below)		

C1	C2	C3	C4	C5	*C6	C7	C8	**C9	**C10	**C11	C12			C13	C14	C15	C16	C17	C18	C19
				BMP Implemented by Retailers and/or Wholesalers				Compliance Options / Alternative Conservation Approaches (1)			BMP is Exempt (2)			Implementation Scheduled to Commence within 1st Year of Agreement						
CUWCC 2010 Flex Track BMPs	BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer Yes/No	Wholesaler Yes/No	Regional Yes/No	Alternative Conservation Approaches Yes/No	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	Start Date (MM/YR)	Completion Level (%)	BMP Completion Date (MM/YR)	Budget (Dollars)	Funding Source & Finance Plan to Implement BMPs	Meets CUWCC Coverage Yes/No	Funds Requested, if Available. (See AB 1420 Compliance Table 3) Yes/No
1. Utility Operations Programs																				
1.11	✓	✓	BMP 12 Conservation Coordinator	Yes	Yes			X						7/1/2009	100%	Ongoing	$116,542	Water Rates	Yes	
1.12		✓	BMP 13 Water Waste Prohibitions	Yes				X						7/1/2009	100%	Ongoing	$184,797	Water Rates	Yes	
1.13	✓	✓	BMP 10 Wholesale Agency Assistance Programs	Yes	Yes			X						7/1/2009	100%	Ongoing	$34,909	Water Rates	Yes	
1.20	✓	✓	BMP 3 System Water Audits, Leak Detection/Repair	Yes	Yes			X						2000	Unquantifiable	12/2025	$100,000	Water Rates	No - See Cover Letter	
1.30		✓	BMP 4 Metering with Commodity Rates for All New/Retrofit of Existing connections	Yes				X						2005	36%	12/2025	$7,975,000	Water Rates, Grant	No - See Cover Letter	
1.40		✓	BMP 11 Conservation Pricing	Yes				X						7/1/2009		Ongoing	$0	Water Rates	No - See Cover Letter	
2. Educational Programs																				
2.10	✓	✓	BMP 7 Public Information	Yes	Yes			X						7/1/2009	100%	Ongoing	$37,500	Water Rates	Yes	
2.20	✓	✓	BMP 8 School Education	Yes	Yes			X						7/1/2009	100%	Ongoing	$37,500	Water Rates	Yes	
3. Residential																				
3.11		✓	BMP 1 Indoor Water Survey for Single/Multi-Family Residential Customers	Yes				X						7/1/2009	50%	Ongoing	$341,700	Water Rates	No - See Cover Letter	
3.12			BMP 1 Outdoor Water Survey for Single/Multi-Family Residential Customers	Yes				X						7/1/2009	50%	Ongoing	$0 (In 3.11 above)	Water Rates	No - See Cover Letter	
3.20		✓	BMP 2 Residential Plumbing Retrofit	Yes				X						7/1/2009	50%	Ongoing	$0 (In 3.11, 3.12 above)	Water Rates, Grant	No - See Cover Letter	
3.30		✓	BMP 6 High-Efficiency Washing Machine Rebate Programs	Yes				X						7/1/2009	25%	Ongoing	$143,320	Water Rates,Grant	No - See Cover Letter	
3.40		✓	BMP 14 Residential ULFT Replacement Programs	Yes				X						7/1/2009	30%	Ongoing	$726,775	Water Rates,Grant	No - See Cover Letter	

CUWCC 2010 Flex Track BMPs	BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	BMP Implemented by Retailers and/or Wholesalers				Compliance Options / Alternative Conservation Approaches (1)			BMP is Exempt (2)			Implementation Scheduled to Commence within 1st Year of Agreement						
				Retailer *Yes/No*	Wholesaler *Yes/No*	Regional *Yes/No*	Alternative Conservation Approaches Yes/No	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	Start Date (MM/YR)	Completion Level (%)	BMP Completion Date (MM/YR)	Budget (Dollars)	Funding Source & Finance Plan to Implement BMPs	Meets CUWCC Coverage Yes/No	Funds Requested, if Available. (See AB 1420 Compliance Table 3) Yes/No
4. Commercial, Industrial, Institutional																				
4.00		✓	BMP 9 Conservation programs for Commercial, Industrial, and Institutional (CII) Accounts	Yes				X						7/1/2009	To be determined	Ongoing	$281,309	Water Rates,Grant	No - See Cover Letter	
5. Landscape																				
5.00		✓	BMP 5 Large Landscape Conservation Programs and Incentives	Yes				X						7/1/2009	100%	Ongoing	$63,657	Water Rates	Yes	

*Compliance during grant period
*C6: Wholesaler may also be a retailer (supplying water to end water users)
**C9, ** C10, and **C11: Agencies choosing an alternative conservation approach are responsible for achieving water savings equal or greater than that which they would have achieved using only BMP list.
(1) For details, please see http://www.cuwcc.org/mou/exhibit-1-bmp-definitions-schedules-requirements.aspx.
(2) BMP is exempt based on cost-effectiveness, lack of funding, or lack of legal authority, as detailed in the CUWCC MOU.

REPORT TO COUNCIL
City of Sacramento

36

915 I Street, Sacramento, CA 95814-2604
www. CityofSacramento.org

Consent
June 23, 2009

Honorable Mayor and
Members of the City Council

Title: Approval of the Updated Water Conservation Element to the 2000 Water Forum Agreement

Location/Council District: City-wide

Recommendation: Adopt a resolution approving the updated Water Conservation Element to the 2000 Water Forum Agreement.

Contact: Julie Friedman, Water Conservation Administrator, (916) 808-7898
Marty Hanneman, Assistant City Manager, Director of Utilities, (916) 808-7508

Presenters: N/A

Department: Utilities

Division: Water Conservation

Organization No: 14001441

Description/Analysis

Issue:

The City of Sacramento, as a signatory to the 2000 Water Forum Agreement (WFA), committed to implementing a comprehensive water conservation plan. The plan consists of a series of individually negotiated Best Management Practices (BMPs) and calls for five year updates for addressing new or revised BMPs. The City and other signatories to the WFA have been working since 2004 to update the conservation element. The updated Water Conservation Element is complete; staff recommends its approval and adoption.

Policy Considerations: This recommendation is consistent with the Mayor and City Council's mission to protect, preserve, and enhance the quality of life for present and future generations. The Water Forum Successor Effort has employed the collaborative principles and methods used in developing the WFA (City Agreement No. 1999-222).

Environmental Considerations:

California Environmental Quality Act (CEQA):

CEQA applies only to projects that have the potential for causing a significant effect on the environment (CEQA Guidelines § 15061(b)(3)). Adoption of this resolution approving the updated Water Conservation Element to the 2000 Water Forum Agreement will not cause any significant environmental effects. In addition, under CEQA Guidelines § 15378(b), continuing administrative activities do not constitute a project and are therefore exempt from review.

Sustainability Considerations:

Approval of the updated Water Conservation Element for the Water Forum Agreement is consistent with the City of Sacramento's Sustainability Master Plan Goals.

Sustainability Goal No. 7 - Parks, Open Space and Habitat Conservation are promoted by the second co-equal objective of the Water Forum Agreement "To preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River."

Sustainability Goal No. 8 - Water Resources and Flood Protection is supported by the first co-equal objective of the Water Forum Agreement "To provide a reliable water supply for planned development to the year 2030."

Water conservation in the Sacramento region is important not only for maintaining and protecting our water supply during dry years, and reducing the City's carbon footprint by reducing the demand for water diversion and treatment, but also benefits California's river resources by reducing the region's surface water demand.

Commission/Committee Action: This updated Water Conservation Element has been reviewed and developed by the Water Conservation Negotiation Team of the Water Forum Successor Effort (WFSE) and approved by the WFSE on May 14, 2009.

Rationale for Recommendation: Approval of the updated Water Conservation Element will allow the City of Sacramento to continue implementation of its commitments in the 2000 Water Forum Agreement. The Water Conservation Element of the *Agreement* is essential to meeting both of the co-equal objectives of the Water Forum. It helps meet the region's water supply needs, and minimizes the need for increased groundwater pumping and increased use of surface water, including diversions from the American River. The new water conservation element makes changes to the original agreement in that signatories agree to replace current water conservation plans with the CUWCC MOU

including its BMPs, schedules, targets, procedures and requirements. As the City is currently a member of CUWCC and has agreed to implement its BMPs, this change will simplify current reporting requirements.

Financial Considerations: There will be no additional financial impact.

Emerging Small Business Development (ESBD): Not applicable.

Respectfully Submitted by: _____
Julie Friedman, Water Conservation Administrator

Approved by: _____
Marty Hanneman, Assistant City Manager, Director, Department of Utilities

Recommendation Approved:

_____
for Ray Kerridge
City Manager

Table of Contents:

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2	Resolution	pg. 6

Background Information:

In April 2000 representatives of over 40 business, environmental, public and water interests in the Sacramento region signed a Memorandum of Understanding to implement the *Water Forum Agreement (WFA).* The stakeholders agreed to a series of actions, or elements, including water conservation, to achieve the *Agreement's* two co-equal objectives:

- Provide a reliable and safe water supply for the region's economic health and planned development to the year 2030; and
- Preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River.

The Water Conservation Element of the *Agreement* is essential to meeting both of the co-equal objectives of the Water Forum. It helps meet the region's water supply needs, and minimizes the need for increased groundwater pumping and increased use of surface water, including diversions from the American River.

Each water supplier in the region committed to implementing a comprehensive water conservation plan consisting of a series of individually negotiated Best Management Practices (BMPs). Water conservation plans were designed with a three-year "ramp up" to full implementation. Several of the BMPs had a calculated number of "interventions" or actions (based on the number of customers) to be completed annually. Agencies agreed to implement the full number of interventions by year four (2004) with years one to three used to prepare staff, budget and program design.

The WFA called for five year updates to water conservation plans for addressing new or revised BMPs as a future "changed condition" discussion.

Water Forum signatories began the process of updating their conservation plans in 2004. The Water Conservation Negotiation Team was convened for the negotiations. It included members of the Water Forum business, water, environmental and public caucuses. The City of Sacramento participated as a member of the water caucus.

Between 2004 and today the negotiations have gone though several iterations, but there have been some key principles which have guided the discussions.

- All parties seek to maximize water conservation in a way that is accountable, easy to monitor and track and is effective.
- A water conservation program has merit and all Water Forum purveyor signatories agree to implement a water conservation program that is consistent with the California Urban Water Conservation Council Memorandum of Understanding (CUWCC MOU).
- Recognizing that many of our purveyors are not yet fully metered, there may need to be flexibility in how purveyors implement certain water conservation actions.
- While we are seeking a broad "universal" solution that applies to all purveyors, we recognize that each purveyor has unique water sources, decision-makers and structures, and constraints/opportunities.

New Conservation Element

- Water Forum signatories purveyors will replace current water conservation plans with the "California Urban Water Conservation Council Memorandum of Understanding Regarding Urban Water Conservation in California," (CUWCC MOU) including its Best Management Practices (BMPs), schedules, targets, procedures and requirements.
- If Water Forum signatories choose to follow the CUWCC's BMP track, they will implement all cost-effective BMPs. If a BMP is not locally cost effective, the purveyor may choose to defer implementation of that BMP and instead, invest an equivalent level of funding into another water conservation activity.
- Water Forum signatories agree to changes and modifications to CUWCC processes and BMPs as they evolve over time, including the 2008 revisions and subsequent revisions. Water Forum signatories further agree that signatory purveyors without land use authority can not be required to implement programs or processes that they do not have legal authority to implement (i.e. landscape requirements).
- Water Forum signatories are encouraged to become members of the CUWCC in order to be actively engaged in discussions regarding revisions to the MOU and the BMPs, and to take advantage of the CUWCC's resources and expertise.
- Water Forum signatories recognize that the CUWCC has existing procedures in place to enable members to request exemptions from BMPs. Water Forum signatories agree that this process does not result in a clear decision and does not ensure full compliance of BMPs. To address this shortcoming, the Water Forum will use its own procedure for considering BMP modifications known as <u>deferrals</u>.

RESOLUTION NO.

Adopted by the Sacramento City Council

WATER FORUM AGREEMENT WATER CONSERVATION ELEMENT

BACKGROUND

A. In April 2000 the City of Sacramento signed a Memorandum of Understanding to implement the *Water Forum Agreement (WFA)*. The City agreed to a series of actions, or elements, including water conservation, to achieve the *Agreement's* two co-equal objectives:

- Provide a reliable and safe water supply for the region's economic health and planned development to the year 2030; and
- Preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River.

B. The Water Conservation Element helps meet the region's water supply needs, and minimizes the need for increased groundwater pumping and increased use of surface water, including diversions from the American River.

C. The City of Sacramento committed to implementing a comprehensive water conservation plan as a signatory to the Water Forum Agreement. That plan consisted of a series of individually negotiated Best Management Practices (BMPs). The Agreement called for five year updates to water conservation plans for addressing new or revised BMPs as a future "changed condition" discussion. The City and other signatories to the Agreement have been working since 2004 to update conservation plans.

BASED ON THE FACTS SET FORTH IN THE BACKGROUND, THE CITY COUNCIL RESOLVES AS FOLLOWS:

Section 1. The Updated Water Conservation Element to the 2000 Water Forum Agreement is adopted and approved.

To view the updated Water Forum Water Conservation Element, please access the City of Sacramento's website at www.cityofsacramento.org or to view a hard copy, please visit the City Clerk's office.

RESOLUTION NO. 2009-433

Adopted by the Sacramento City Council

June 23, 2009

WATER FORUM AGREEMENT WATER CONSERVATION ELEMENT

BACKGROUND

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- Provide a reliable and safe water supply for the region's economic health and planned development to the year 2030; and
- Preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River.

B. The Water Conservation Element helps meet the region's water supply needs, and minimizes the need for increased groundwater pumping and increased use of surface water, including diversions from the American River.

C. The City of Sacramento committed to implementing a comprehensive water conservation plan as a signatory to the Water Forum Agreement. That plan consisted of a series of individually negotiated Best Management Practices (BMPs). The Agreement called for five year updates to water conservation plans for addressing new or revised BMPs as a future "changed condition" discussion. The City and other signatories to the Agreement have been working since 2004 to update conservation plans.

BASED ON THE FACTS SET FORTH IN THE BACKGROUND, THE CITY COUNCIL RESOLVES AS FOLLOWS:

Section 1. The Updated Water Conservation Element to the 2000 Water Forum Agreement is adopted and approved.

Adopted by the City of Sacramento City Council on June 23, 2009 by the following vote:

Ayes: Councilmembers Cohn, Fong, Hammond, McCarty, Pannell, Sheedy, Tretheway, Waters, and Mayor Johnson.

Noes: None.

Abstain: None.

Absent: None.

Mayor Kevin Johnson

Attest:

Shirley Concolino, City Clerk

V. WATER CONSERVATION ELEMENT

A. Introduction

The Water Conservation Element of the Water Forum Agreement is essential to meeting both of the co-equal objectives of the Water Forum. It helps meet the region's water supply needs, and minimizes the need for increased groundwater pumping and increased use of surface water, including diversions from the American River. Each water supplier in the region is committed to implementing a comprehensive water conservation plan.

Continued commitment to water conservation will benefit water purveyors, customers, and the environment because it:

- Reflects growing public support for the conservation of limited natural resources and adequate water supplies.
- Allows water districts to optimize the use of existing facilities.
- Delays or reduces the capital investments required for capacity expansion of water and wastewater treatment facilities even though the service area may grow.
- Is essential for the state and federal agency approvals which will be required for specific projects.

MUNICIPAL AND INDUSTRIAL WATER CONSERVATION

B. Intent

Water Forum Water signatories have generally agreed upon the following broad objectives for water conservation in the region:

- All parties seek to maximize water conservation in a way that is accountable, easy to monitor and track and are effective.
- A water conservation program has merit and all Water Forum purveyor signatories agree to implement a water conservation program that is consistent with the California Urban Water Conservation Council Memorandum of Understanding (Council MOU).
- Recognizing that many of our purveyors are not yet fully metered, there may need to be flexibility in how purveyors implement certain water conservation actions.
- While we are seeking a broad "universal" solution that applies to all purveyors, we recognize that each purveyor has unique water sources, decision-makers and structures, and constraints/opportunities.

C. Key Elements

1. Water Forum signatories agree to update the Water Conservation Element of the Water Forum Agreement by replacing current water conservation plans with the "California Urban Water Conservation Council Memorandum of Understanding Regarding Urban Water Conservation in California," (Council MOU) including its Best Management Practices (BMPs), schedules, targets, procedures and requirements. Variations from the Council practices are noted in the following text.
2. Water Forum signatories agree that in replacing their 2000 Water Conservation Plans with Council MOU, they are agreeing to changes and modifications to

Council processes and BMPs as they evolve over time, including the 2008 revisions and subsequent revisions. Water Forum signatories further agree that signatory purveyors without land use authority can not be required to implement programs or processes that they do not have legal authority to implement (i.e. landscape requirements).

3. Water Forum signatories are encouraged to become members of the Council in order to be actively engaged in discussions regarding revisions to the MOU and the BMPs, and to take advantage of the Council's resources and expertise.
4. Water Forum signatories recognize that the Council has existing procedures in place to enable members to request exemptions from BMPs. Water Forum signatories agree that this process does not result in a clear decision and does not ensure full compliance of BMPs. To address this shortcoming, the Water Forum will use its own procedure for considering BMP modifications; known as deferrals.
5. Consistent with the assurances and caveats listed in Section Four of the Water Forum Agreement, it is recognized that over time there will be changed circumstances that are not currently foreseen. Therefore, signatories agree when the need arises to meet and confer on how best to respond.

D. Pre-Determined Deferrals on Meter-Based BMPs
(The following apply regardless of which Council track is implemented)

1. For BMP 4 (metering), at a minimum we accept the pace of residential meter retro-fit by each of those Water Forum purveyors not yet fully metered, as stated in Appendix J of the 2000 Water Forum Agreement, or the pace required by State law, whichever controls. This deferral recognizes that several Water Forum water purveyors are not yet metered and are investing in water meter and retrofit programs at a pace that is feasible but which may not be the rate stated in the Council MOU.
2. For BMP 1 (Residential Audits), targets are based on the purveyor's number of metered residential accounts; so, as an agency becomes more fully metered, its "population" of potential audit customers increases. It is understood that this is a pre-determined "deferral." Audit programs must still be in place, but targets are proportional to metered accounts.

E. Additional Deferral Requests

1. If a water purveyor wants to request any other deferral from a standard BMP target, or a change in schedule or practice, the following procedure will be followed:
    a. Water Forum signatories will follow the Council analysis and modeling tool. The analysis will be submitted to the Water Forum Water Conservation Negotiation Team (WCNT) who will have a technical review completed by an independent third party. The WCNT is composed of one representative from each Water Forum caucus (business, environmental, water, and public) and from each size and type of water purveyor in the region (publicly owned, investor owned, etc.)
    b. Water Forum staff would develop a list of water conservation professionals based on qualifications and criteria agreed upon by the WCNT. This list of

qualified candidates will be vetted through the WCNT. The list needs to be long enough to ensure that purveyors have adequate choices and can maintain reasonable costs. The list could also include Council staff reviewers.

c. The water conservation professional and water purveyor staff will conduct a review of the analysis for adequacy and compliance with the Council BMP. The review/technical validation will include checking data adequacy and accuracy, and will explore whether or not changes or modifications to the program design, would affect the outcome. The water conservation professional may suggest new partners or funds that might be available to assist the purveyor in implementing the BMP. This analysis with suggested changes will then be forwarded to the Water Conservation Negotiation Team for its review and discussion.
d. After completion of the review/technical validation, if the BMP is found to have a benefit-cost ratio of 1 or greater (there is a greater benefit to the program than the cost to implement it), no deferral will be allowed.
e. If a BMP is found to have a benefit-cost ratio of less than 1 (this is expected to be uncommon), then the purveyor will have the choice of continuing with the BMP or deferring that BMP and substituting an alternative program as described below. However, prior to selecting an alternative program, .the purveyor will offer to meet with Water Forum stakeholders to discuss deferral/substitution options. The intent of the meeting will be to have an open discussion about the advantages and disadvantages of the deferral/substitution options, provide interested stakeholders with relevant information, and provide stakeholders an opportunity to weigh in on the deferral/substitution options. Deferral options under discussion at this meeting will include, among other things, methods for redesigning the potentially-deferred BMP. This open discussion is not intended to prolong the BMP planning process or second-guess the independent technical review.
f. Water Forum signatories agree that for any program or BMP that is deferred, the water purveyor will apply the program costs that were reported in the BMP deferral analysis toward the implementation of another BMP with the intent of achieving as much if not more water savings through expanding one or more of the remaining BMPs. Water Forum signatories agree to take into account existing acceleration of a BMP on a case-by-case basis.
g. Water Forum signatories agree that any benefit-cost analysis performed will include an environmental cost of water of $75 per acre-foot, adjusted annually for inflation using the same method outlined in the Water Forum Agreement to adjust annual contributions to the Habitat Management Element. This $75 amount was negotiated by members of the WCNT and is based on historical purchases of water from the region for the CALFED Environmental Water Account.
h. Water Forum signatories agree that deferrals will be granted for a period of two years, in accordance with the reporting cycle of the Council. After this time, purveyors would either resume the BMP or seek another deferral using the same process outlined above.

F. Assurances and Reporting

1. Water Forum signatories recognize that some purveyors may need to seek support for certain conservation program by their boards and decision-makers. If requested, Water Forum signatories agree to publicly support conservation programs and any rate adjustments that are needed to implement the water conservation plans.

2. Reporting
    a. Water purveyors will submit biennial reports on the implementation of water conservation activities pursuant to the reporting requirements of the Council. These reports will be shared with the Water Forum Successor Effort.

    b. The biennial reports will include a comparison of total and per capita water use with original projections as published in the 2000 Water Forum Agreement Appendix J. In addition, the Water Forum will revisit the method used to estimate GPCD in the 2000 Agreement so that it is consistent with approaches used by other agencies and organizations, including the Council, the Legislature, and the Department of Water Resources.

    c. If there were any significant differences from what water conservation activities or results were planned, an explanation of the differences will be included. If water conservation results were significantly less than anticipated, an indication of how the results will be achieved in the future will be described. Water purveyors have the option of reporting this information in the Council database comment field

3. Assurances
   The Water Forum Successor Effort will do the following in order to facilitate compliance with water conservation implementation:
    a. Publicize the biennial BMP implementation CUWCC reports that are submitted by Water Forum signatories. This can include distribution of the reports to all Water Forum signatories, boards, elected officials and the media.
    b. Water Forum signatory organizations may submit letters to the State Water Resources Control Board, Department of Water Resources or other funding and/or regulatory agencies stating their support or opposition to requests or actions of other signatory organizations based upon progress of water conservation program implementation.
    c. Water Forum signatory water purveyors will notify their customers as to agency progress toward water conservation program implementation through already established means of communication such as newsletters, customer bill inserts or water purveyor web sites. This will be consistent with the biennial reporting timeframe of the water conservation report.

G. Other Agreements

1. **Florin County Water District and Del Paso Manor County Water District.** It is recognized that residential water meter retrofit along with quantity based pricing are important tools for improving the efficiency of water use. This helps extend the supply while also reducing the need for increased groundwater pumping or diversions from the American River.

It is also recognized that these two relatively smaller water purveyors currently rely totally on groundwater and will not realize immediate water supply benefits from participating in the *Water Forum Agreement*. Therefore until such time as these two purveyors need discretionary approvals for new or expanded surface water supplies, an active voluntary meter retrofit with incentives is acceptable. Nothing in the *Water Forum Agreement* prevents purveyors from deciding to undertake a more rapid meter retrofit program.

At such time as any of these purveyors needs discretionary approvals for new or expanded surface water supplies they agree to annually retrofit at least 3.3% - 5% of the total number of un-metered residential connections and read and bill as set forth below.

If in the future any of these purveyors receives benefits from another agency's conjunctive use program, it agrees to discuss its meter retrofit program with the Water Forum Successor Effort.

2. Water Forum signatories would not implement local meter retrofit on resale, or any other requirements that would impose escrow or disclosure responsibilities on realtors. All purveyors would retain the ability to implement incentives for a voluntary meter retrofit at time of resale that would not impose escrow or disclosure requirements.

3.. If requested, all signatories to the *Water Forum Agreement* will actively support the California Public Utilities Commission (CPUC) allowing investor-owned utilities to recover all costs of meter retrofit through rates.

4. A purveyor's agreed upon Water Forum water conservation plan shall be implemented for its entire service area including future changed boundaries.

AGRICULTURAL WATER CONSERVATION

In 1990, agriculture in Sacramento County contributed to nearly 48% of the water demand for the area. It is projected that the future water demand for agriculture will drop to approximately 29% by 2030. This is due to a number of reasons including the conversion of agricultural land to urban uses as anticipated by the adopted General Plans. Another reason for water use reduction is that agriculture in Sacramento County is projected to become more water efficient. By the year 2030 irrigation efficiencies are expected to increase by 5%.

The amount of water used by agriculture is determined by the crops grown, the type of irrigation system, and the incentives or regulations in place to increase irrigation efficiencies.

In the northwest section of Sacramento County the principal crop is rice. Water is supplied by the Natomas Central Mutual Water Company (NCMWC) which is a Central Valley Project (CVP) contractor. NCMWC has been conserving water since 1986 through the installation of recirculation systems which reduce water diversions while growing the same amount of crops. These systems have reduced water use in rice fields by 26%. In the future, NCMWC will continue to conserve surface water by conjunctive use. By pursuing this additional method, it is expected that another 5% could be saved. Other efforts, such as lined canals in sandy soil, tiered pricing, and other controls are expected to gain additional efficiencies.

In the southern section of Sacramento County, water is supplied principally through the pumping of groundwater. One incentive to reduce agricultural water use in this area has been the cost of electricity to pump groundwater. Since the early 1950's the south County agricultural irrigation districts (Galt, Clay, Omochumne-Hartnell) have been practicing water conservation by installing recirculating systems so water would not be lost at the end of the fields and drip irrigation systems for certain row crops. It is estimated that these methods have reduced water use by up to 50% compared to field irrigation. By implementing additional conservation measures it is expected that another 5% could be saved by 2030.

Much of the surface water currently used by agriculture in the Sacramento region is from the Central Valley Project (CVP). In addition, as provided for in the PSA for South Sacramento County Agriculture, the agricultural irrigation districts (Galt, Clay, Omochumne-Hartnell) in the southern section of Sacramento County plan to divert and use up to 35,000 acre-feet from Folsom-South Canal in years when the projected March to November unimpaired inflow to Folsom Reservoir is greater than 1,600,000 acre-feet. This will augment its groundwater supplies. This surface water most likely will come from the CVP. Surface water from the CVP for agricultural use is subject to the conservation requirements of the CVP Improvement Act of 1992 including criteria for BMPs for Agricultural Contractors.

Support for this diversion is linked to successful negotiation of an agricultural water conservation program. Specifics on the Water Forum's agricultural water conservation program will be negotiated by the Water Forum Successor Effort.

Appendix I

2010 INTERIM WATER CONSERVATION PLAN

City of Sacramento Interim Water Conservation Plan

Department of Utilities
Field Services Division
Water Conservation Office

October 2009 (Revised January 2010)

Prepared by:
Mark Roberson
Sacramento Area Water Forum

and
Julie Friedman, Water Conservation Coordinator
City of Sacramento

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List of Acronyms

ac-ft/yr	acre-feet per year
BMP(s)	Best Management Practice(s)
CII	Commercial, Industrial, and Institutional
CUWCC	California Urban Water Conservation Council (Council)
DOU	City of Sacramento Department of Utilities
ETo	Reference evapotranspiration
gpf	gallons per flush
gpm	gallons per minute
HET	high-efficiency toilet
HEW	high-efficiency clothes washing machine
MOU	CUWCC Memorandum of Understanding
RWA	Regional Water Authority
SMUD	Sacramento Municipal Utilities District
SRCSD	Sacramento Regional County Sanitation District
ULFT	Ultra low flow toilet
USBR	United States Bureau of Reclamation
RAC	Department of Utilities Rate Advisory Commission
Water Forum	Sacramento Area Water Forum
WEP	Water Efficiency Program

EXECUTIVE SUMMARY

Water conservation in the City of Sacramento (City) has multiple benefits – it can make more water available to improve American River flow conditions, it can improve the water quality in the American and Sacramento Rivers and the Delta, it can improve the long-term reliability of the region's water supply, and it can lower the cost of water service to the City's customers. This water conservation plan (Plan) is intended to be a living document that communicates the City's approach to implementing water conservation thereby fulfilling the commitments the City has made to its customers, the Water Forum Agreement (WFA) and the California Urban Water Conservation Council (Council).

This Plan is based on the outcome of an evaluation of each best management practice (BMP) listed in the California Urban Water Conservation Council Memorandum of Understanding (Council & MOU) that are currently being implemented or scheduled for implementation by the City. This Plan quantifies the number of conservation targets the City needs to implement, the cost of implementing the targets and the expected savings. The City supplied demographic information and other input data. Savings assumptions were taken from Council studies and City staff experience.

This Plan is considered interim because future infrastructure cost information, that is required to determine the monetary benefits of conservation, is unavailable. However, this information is being developed through the City's water master planning effort. When the required cost information is available, staff intends to conduct a cost-effectiveness analysis and finalize the Plan. In addition, this Plan will be updated on a periodic basis to reflect changes that arise from legal requirements, economics and program efforts.

Under both the MOU and the Water Forum Agreement (WFA) the City is committed to implement the Foundational BMPs (Table 1) at a cost of $613,035. In addition, the City is required to implement up to eight programmatic BMPs (Table 2) if they are locally cost-effective[1]. However, as discussed above a cost-effective analysis has not yet been conducted therefore all programmatic BMPs will be implemented. Although the cost-effective analysis was not completed, the cost per acre-foot of savings could be used to prioritize program efforts. This approach would suggest that the City focus on outdoor water savings first followed by CII and then rebates for WaterSense toilets and High-effeciency clothes washers. Costs for the Progammatic BMPs are $1,679,995, and the total costs for Foundational and Programmatic BMPs in 2009 are $2,293,030.

[1] Locally cost-effective means that the benefits of the BMP are greater than the costs.

Savings resulting from implementation efforts in 2009 are expected to be 1,869 acre-feet. Although the life-time of an individual conservation measure varies, the cumulative, life-time savings from program costs in 2009 are expected to result in up to 28,528 acre-feet with the majority of that amount coming from metering.

Other sections of this Plan include an analysis of past performance, a description of future reporting and an implementation Plan.

Table 1. Foundational best management practices.

Foundational Best Management Practice	**Council Based Program[1]**		**Cost and Conservation[2]**				
			Cost		Savings in 2009	Life-Time Savings	Unit Cost
	Annual Targets & Unit		Capital $	$/yr	AF/yr	AF	$/AF
1. Utility Operations Programs							
Coordinator	1	Personnel	n/a	111,280	Savings are not quantifiable		
Water Waste Prevention	1	Program	n/a	tbd			
Wholesale Assistance	1	Program	n/a	tbd			
System Audits	1	Program	n/a	Assumed to be 10%			
Meter Retrofit (Single Family)[3]	5,736	Meters installed	6,252,513	404,879	482	7,716	840
Meter Retrofit (Multi Family)[3]	481		524,222	33,946	395	6,315	86
Meter Retrofit (CII)[3]	183		199,674	12,930	143	2,281	91
Retail Conservation Pricing	Volumetric pricing implemented Jan-2010[4]					3,704	
2. Educational Programs							
Public Info	1	Program	n/a	25,000	Savings are not quantifiable		
School Education	1	Program	n/a	25,000			
Total All Foundational			6,976,409	613,035	1,019	20,016	

[1]Target development details are in Section 2 of the document.
[2]Cost and conservation details are in Section 3 of the document.
[3]Meter retrofits assume are the annual number required to complete metering by 2024.
[4]Savings are estimated based on the use of volumetric pricing when meters are used for billing. Costs included with retrofits.

Table 2. Programmatic best management practices.

Programmatic Best Management Practice	**Council Based Program[1]**		**Cost and Conservation[2]**				
			Cost		Savings in 2009	Life-Time Savings	Unit Cost
	Annual Targets & Unit		Capital $	$/yr	AF/yr	AF	$/AF
3. Residential							
Res. Assistance Program	2,594	House calls	n/a	112,175	73	476	236
Res. Landscape Surveys	2,064	Surveys	n/a	127,530	338	2,215	58
High Eff. Clothes Washers	1,136	Rebates	n/a	92,966	18	220	423
Water Sense Toilet	5,624	Rebates	n/a	1,009,396	199	3,176	318
Water Sense Specifications	Rebates & Info.		n/a		Data unavailable		
4. Commercial, Industrial and Institutional							
CII Program	performance based		n/a	281,309	95	1,248	225
5. Landscape							
Dedicated Meter3	120	Water Budgets	n/a	23,492	100	1,004	23
Mixed Use CII	244	Survey & Incentives	n/a	33,127	27	174	190
Total All Programmatic				1,679,995	850	8,512	197

[1]Target development details are in Section 2 of the document.
[2]Cost and conservation details are in Section 3 of the document.

Findings and Recommendations

In addition to the outcomes of the analysis the following are findings and recommendations for improving the program.

- Cost-effectiveness analysis – An analysis of the cost-effectiveness of the programmatic BMPs has not yet been conducted for this Plan. When the avoided cost analysis for future infrastructure needs has been completed (currently under way through the water master plan update) it is recommended that a cost-effectiveness analysis be conducted on the programmatic BMPs.

- Data access – Data of high quality is collected by the City however, it is difficult to access. It is recommended that procedures should be put in place that allow ready access and standardization of data queries.

- Metering and water use information – Because the City has a limited number of metered residential connections, there is limited information on residential use. As metering is implemented this accuracy will improve; however, it should be understood that the residential use estimates may contain errors.

- Public information – It is recommended that the City communicate this Plan with its customers and stakeholders.

- Future updates – As the City improves its understanding of future demands and conservation potential, they should be reflected in this Plan.

- Society perspective – This plan was analyzed from the City's point of view and does not capture all of the costs and benefits to the City's customers. An analysis that includes societal costs and benefits would be informative and could potentially save the ratepayers more money. Among other information, this would require input from the Sacramento Regional Sanitation District.

The City will continue to support its responsibility as a good steward of water resources and of the American and Sacramento rivers. As the City continues implementation of BMPs, water conservation planning is crucial to improving the City's efforts.

SECTION 1. INTRODUCTION

Why does the City of Sacramento have a water conservation program?

When standing on a bridge in Sacramento looking at the American or the Sacramento River it is hard to imagine the need to conserve water. However, improving the in-stream conditions in these rivers is a primary reason for conserving water. Water conservation improves river habitat by making more water supply available to flow down the river and it preserves a supply of cold water for use at strategic times to improve aquatic habitat (Fig.1.1). Also important is that by diverting less water out of the river, there is less return flow. This is important because the temperature of the return flow is higher and typically contains pollutants such as nitrogen. Elevated water temperatures and pollutants are both potentially detrimental to aquatic habitat. These benefits are articulated in the Water Forum Agreement (WFA) that the City of Sacramento (City) signed in 2000.

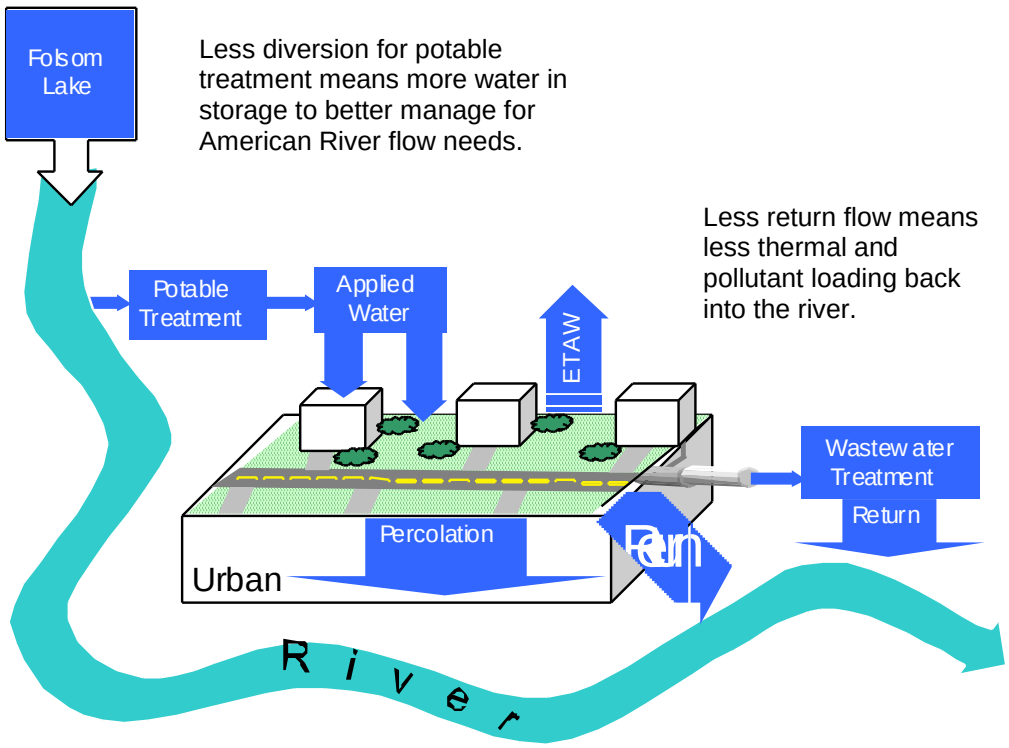

Figure 1.1. Simplified schematic showing water conservation's connection to the river.

In addition to improving conditions in the river, water conservation makes sense from an economic point of view. In the short-term, conserving water means that the City needs to spend less money on energy to pump and distribute water and

less money for chemicals to treat the water. In the long-term, the City can potentially avoid capital infrastructure costs by reducing the number of groundwater wells that need to be constructed and avoid or reduce the need for new river diversions and other infrastructure. The balance between costs and benefits to the City are examined through a cost-effectiveness analysis.

A concern that is often voiced about water conservation is that if the City is not using water the City may jeopardize its water rights, as using less may be seen as needing less. However, the State of California considers water conservation a beneficial use of water and therefore a reduction in its use cannot be seen as the City "giving up" its rights to divert, use, and consume water.

The City has a goal of being the water conservation capitol. To jumpstart this goal the City recently updated its water conservation ordinance. This ordinance established outdoor water use requirements to help customers increase water conservation. This ordinance is designed to be an effective, responsible, and reliable approach to assist customers in achieving an increase in water use efficiency.

This plan is intended to help the City meet its commitments to its customers, the WFA and the Council. Portions of this plan will be updated on a periodic basis to reflect changes that arise from legal requirements, economics and program efforts.

1.1. Background

The City joined the California Urban Water conservation Council (Council) in 1995 (REF) as both a retail water purveyor and as a supplier of wholesale water within the American River place of use. The Council, governed by a memorandum of understanding (MOU), was created to increase efficient water use through partnerships among urban water agencies, public interest organizations, and private entities. When the City joined the Council it pledged to implement the BMPs that are articulated in the MOU. The Council's goal is to integrate BMPs into the planning and management of California's water resources. The MOU is available at www.cuwcc.org.

The Council amended its MOU in December 2008. The Council's initial 14 best management practices (BMPs) are now organized into five categories as listed in Table 1.1. Because they are considered essential water conservation activities, two categories, utility operations and education, are designated as foundational BMPs. These categories were adopted for implementation by all signatories to the MOU as ongoing practices. The remaining BMPs are programmatic and are organized into residential; commercial, industrial, and institutional (CII), and landscape.

As a member of the Water Forum, the City has agreed to implement the Water Forum Agreement's water conservation element. The water conservation element was updated in 2009. The update calls for the signatories to replace old Water Forum BMPs with the Council MOU. One exception is that for any BMP found to be not-cost effective there is a negotiated process for deferring the BMP and substituting an alternative program. Another exception is that the number of Residential Assistance Surveys is dependent on the number of metered connections. Finally, a benefit of $75 per acre-foot to the purveyors was included as an environmental benefit that is to be included as an agency benefit when analyzing the cost-effectiveness of a BMP.

1.2. Document Scope and Organization

The scope of this document is to convey the City's water conservation plan to its customers and interested stakeholders. The Plan is divided into nine sections;

1. Introduction – Background information on the City and it water conservation efforts.
2. Demographics – Data on accounts and water use information.
3. Past Perfromance – Data on historic water conservation efforts.
4. Water Conservation Targets – An analysis of targets based on the Council's MOU.
5. Program Cost – Information on the costs of implementing the water conservation program.
6. Benefits – Information on the benefits of implementing the water conservation program. This section only includes the savings component, cost savings cannot be determined at this time. When information on future infrastruce is available it will be used to estimate cost savings.
7. Cost-effectiveness Analysis – An analysis that compares the cost to the benefits of water conservation. Note this section has been delayed until additional information on future infrastructure is available.
8. Implementation Plan – The Citys plan for meeting the targets of the plan.
9. Reporting – Reports on the Citys progress in implementing the Plan and on the water savings performance.

Table 1.1. Council BMPs and brief description of their implementation actions. All information is based on the amended 2008 MOU.

Management Practice	Description of Action
Foundational *1. Utility Operations Programs*	
Coordinator	Provide single personnel to design and administer conservation program.
Water Waste Prevention	Develop, enact, and enforce ordinances that prohibit wasting of water.
Wholesale Assistance	Provide financial and technical assistance to wholesale customers.
System Audits	Audit delivery system to ensure no more than 10% system-wide losses. Requires meters.
Meter Retrofit	Based on meeting State Law – straight-line of existing unmetered connections by 2024.
Retail Conservation Pricing	Included with meter retrofit.
2. Educational Programs	
Public Information	Provide info. to public regarding program includes media campaigns, mailers, website etc.
School Education	Provide information for school education.
Programmatic *3. Residential*	
Residential Assistance Program	Conservation personnel survey interior of residences to assess water savings potential. Provide appropriate information and hardware (shower heads, aerators etc).
Residential Landscape Surveys	Conservation personnel survey exterior of residences to assess water savings potential Provide appropriate information and hardware.
High Efficiency Clothes Washers	Provide rebates or other incentives to replace inefficient clothes washers.
WaterSense Toilet	Provide rebates or other incentives to replace 3.5 gpf toilets.
WaterSense Specifications for new construction	Provide information and incentives for water conserving appliances and landscape for new construction.
4. CII	
CII Savings	Program to reduce CII water use by 10% below 2008 water use.
5. Landscape	
Dedicated Landscape Meters	Prepare water budgets with max applied water to be no greater than 70% of evapotranspiration.
Mixed Use CII with Landscape	Conservation personnel survey exterior of CII to assess water savings potential. Provide appropriate information and hardware.

SECTION 2. DEMOGRAPHICS

This section covers City data and information on connections, metering, customer class, water use, and other demographic information. This information is used in subsequent sections to develop implementation targets and to estimate costs and benefits.

2.1. Customer Class, and Premise Type

Accurate and timely information is essential to effective planning, management, and evaluation of the City's water conservation program. The City's computer information system (CIS) is a key tool to providing this information. City staff use custom queries to extract the following data from the CIS:

Customer class and premise type – water users are divided into end user types (Table 2.1) based on water use characteristics. This information is used to establish which BMPs to apply to a customer class.

Number of connections and metered connections (Table 2.2) – provides information on the number of users in any given customer class. This information is used to establish the number of BMP targets for a customer class.

Water use by customer class - for connections with meters (Table 2.3) an analysis can be performed to determine water use per metered account and to estimate indoor to outdoor use. This information is then used to estimate the benefit of a BMP.

Table 2.1. Customer classes, premise type and applicable BMPs.

Customer Classes and Premise Type	**Applicable Council BMP**
Single Family 1 Single Family Dwelling Multi Family 2 Apts 3 Duplex 4 Triplex 5 Fourplex 6 Mobil Home Park 7 Condo	*Foundational > Utility Operations Programs* Meter Retrofit Retail Conservation Pricing *Programmatic > Residential* Res. Assistance Res. Landscape Surveys High Eff. Clothes Washers Water Sense Toilet Water Sense Specifications
Commercial 8 Office 9 Retail 10 Warehouse	*Foundational > Utility Operations Programs* Meter Retrofit Retail Conservation Pricing *Programmatic > Commercial, Institutional and Industrial*

11 Hotel/Motel 12 Mixed Use - Residential & Commercial 13 Cemetary/Mortuary Institutional 14 Church 15 Public School 16 Private School 17 Hospital 18 Boarding/Shelter/Convent/Group Home 19 Fire Station 20 Parking Lot Industrial Accounts can only be identified with premise notes and note sub-types. This is done manually in the CIS.	CII *Programmatic > Landscape* Dedicated Landscape Meters Mixed Use CII with Landscape
Landscape Irrigation 21 Median 22 Irrigation 23 Park 24 Golf Course	*Programmatic > Landscape* Dedicated Landscape Meters Mixed Use CII with Landscape
Other Premise Types 25 Drain Inlets 26 Ficticious Premise 27 Hydrant Permit 28 Other 29 Truck Permit 30 Undetermined Premise Type 31 Vacant Lot	these premise types will be assigned to one of the customer classes

Table 2.2. Connections, meters and accounts billed by meter by customer class as of 2008.

Customer Class	Connections	Connections w/ Meters	Accounts Billed By Meters	Unmetered Connections
Commercial & Industrial	7,838	5,798	5,787	2,040
Institutional	901	563	559	338
Landscape	1,311	1,247	1,247	64
Multi Family	8,988	1,293	436	7,695
Other	85	56	53	29
Single Family	116,740	24,960	132	91,780

2.2. Water Use by Customer Class

Water use information, by customer class, is required to estimate the potential savings that can be achieved through water conservation. To arrive at an average use for all metered and unmetered connections an estimate was developed, based on total water production and use per metered connection. Metered water use accounted for 49,080 acre-feet in 2008 (Table 2.3). Total production, except wholesale, was 143,910 acre-feet therefore, 94,830 acre-feet (Table 2.4) were not metered.

Table 2.3. Metered water use for 2008.

Customer Class	Use	Average Use per Meter
	acre-feet	
Commercial & Industrial	17,125	2.95
Institutional	4,807	8.54
Landscape Irrigation	6,637	5.32
Multi Family	5,306	4.10
Other premise type	1,992	35.6
Single Family	13,214	0.53
Total	49,080	

Water use for unmetered connections, was determined using the average use per meter (Table 2.3) times the number of unmetered connections (Table 2.2). This approach was applied to all customer classes except single-family residential. Unmetered, single-family residential use was assumed to be the residual (38,579 AF) of all other metered and unmetered uses. Using this approach, the total single-family use is 51,793 AF for 116,740 connections (Table 2.5) or just under 0.45 AF/connection.

Table 2.4. Unmetered water use by customer class for 2008.

Water Use Category	Use	Note
	acre-feet	
Conveyance loss	14,391	Assume 10% of total
Commercial	6,025	= metered rate x number of unmetered connections by customer class
Institutional	2,886	
Landscape Irrigation	341	
Multi Family	31,577	
Other premise type	1,031	
Single Family	38,579	= total production – metered – other unmetered
Total	94,830	

Table 2.5. Total and per connection water use and by customer class.

Water Use Category	Use	Average Use per Connection
	acre-feet	
Conveyance loss	14,391	
Commercial & Industrial	23,150	2.95
Institutional	7,692	8.54
Landscape Irrigation	6,977	5.32
Multi Family	36,883	4.10
Other premise type	3,023	35.57
Single Family	51,793	0.45
Total	143,910	

The split between indoor and outdoor use was determined by assuming that the minimum water use month, February (Fig 2.1) was for indoor purposes. The split between indoor and outdoor is used to estimate savings from outdoor water conservation. A split of indoor to outdoor was developed for each customer class from the metered water use (Table 2.6). For analysis purposes the indoor, single-family use was assumed to be the metered rate (0.12 AF/connection) and using the per connection use from the metered plus unmetered accounts the outdoor was assumed to be 0.33 AF/connection.

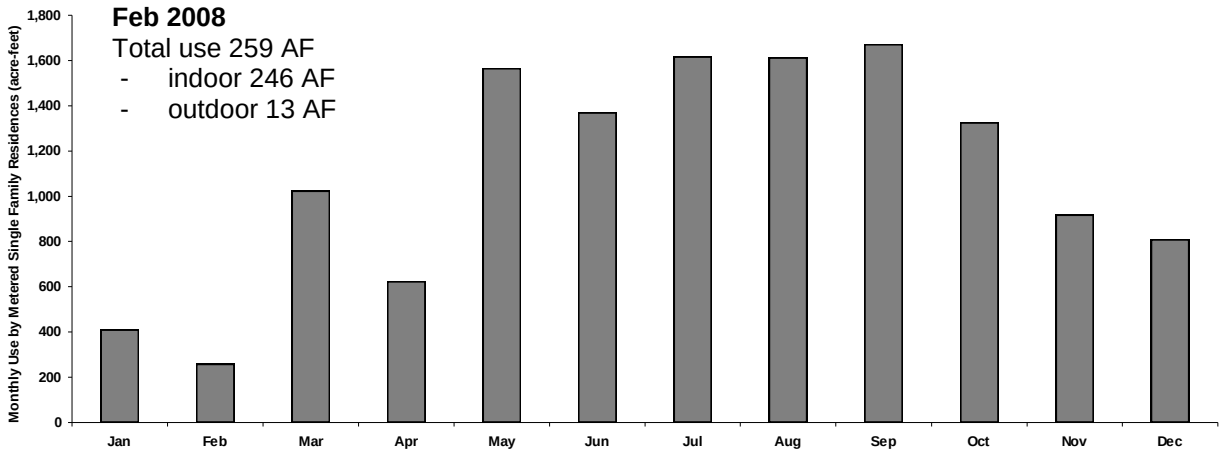

Figure 2.1. Monthly use by all metered single-family accounts in 2008. February had the lowest water use in 2008.

Table 2.6. Average indoor and outdoor water use by customer class for 2008 water production data for accounts with meters. Total use for metered accounts is given in Table 2.3.

Customer Class	Average Use per Metered Account	
	Outdoor	Indoor
	acre-feet	
Commercial	1.54	1.41
Institutional	6.05	2.49
Landscape Irrigation	4.73	0.59
Multi Family	3.03	1.08
Single Family	0.40	0.12

Indoor use for landscape accounts is potentially due to water use in park bathrooms, drinking fountains, and other buildings. Currently the City is inventorying and updating these accounts to separate landscape use from other park uses.

2.3. Growth of Water User Connections

Planning for water conservation activities and budgets requires an estimate of the growth in customers and their water needs. The source for determining growth in the number of end-user connections is the City's 2005 Urban Water Management Plan (Ref). Table 6.10 in the Plan lists connections on five-year increments through 2030. For this effort the accounts were linearly interpolated between these time periods and then scaled based on the 2008 account information. Projected accounts are given in Table 2.7 for the residential, CII and landscape customer classes.

Table 2.7. Connections by customer class and year through 2030. Data is scaled based on actual 2008 accounts.

Year	Single Family	Multi Family	Commercial, Industrial & Institutional	Landscape
2005	108,299	8,561	10,228	1,257
2006	111,112	8,703	10,554	1,275
2007	113,926	8,846	10,880	1,293
2008	116,740	8,988	11,206	1,311
2009	119,554	9,130	11,532	1,329
2010	122,368	9,273	11,858	1,347
2011	124,810	9,402	12,201	1,362
2012	127,253	9,531	12,544	1,377
2013	129,695	9,661	12,888	1,393
2014	132,138	9,790	13,231	1,408
2015	134,581	9,920	13,574	1,424
2016	137,224	10,036	13,935	1,437
2017	139,867	10,153	14,296	1,449

2018	142,510	10,270	14,657	1,462
2019	145,154	10,386	15,019	1,475
2020	147,797	10,503	15,380	1,488
2021	150,450	10,607	15,758	1,498
2022	153,104	10,711	16,137	1,509
2023	155,757	10,814	16,516	1,519
2024	158,411	10,918	16,895	1,529
2025	161,064	11,022	17,273	1,539
2026	163,828	11,120	17,681	1,548
2027	166,592	11,217	18,088	1,557
2028	169,356	11,315	18,495	1,565
2029	172,120	11,412	18,902	1,574
2030	174,885	11,510	19,309	1,583

2.4. Other Demographics

Other demographics for the City are listed in Table 2.8. This information is used to develop targets for some of the BMPs. The City covers 62,208 acres (2008, General Plan)

Table 2.8. Other City demographics.

Demographic	Single Family	Multi Family
1992 housing stock (units)	96,055	55,625
Units with 3.5+ gpf Toilets in 2008	50,154	29,044
Average resale rate	4.91%	10.40%
Average persons per unit	2.90	2.00
Percent of 1992 housing stock with pre 1980 toilets	50%	50%
Housing demolition (% of remaining stock)	0.50%	0.50%
Average units per connection	1	6

SECTION 3. PAST PREFORMANCE

3.1. Targets and Actual Implementation

The City joined the Council in 1995 and signed the WFA in 2000. Since this time the City has maintained a water conservation program. This section of the document accounts for the City's previous efforts. The primary source of data for the counts of actions, such as the number of ultra low flow toilet rebates provided, is the annual report that the City submits to the Water Forum. To generate the amount of water saved, the savings assumptions provided in Section 6 of this document were used. Also, only the quantifiable BMPs are included in this section. A summary of the targets and actual actions implemented for the City is shown in Table 3.1.

Table 3.1. Summary of Council BMPs targets and actual implementation counts from 2001-2008.

CUWCC BMP (Water Forum name)	2001-2008	
	Targets	Actual
Meter Retrofit (Residential Meter Retrofit)	0	2,618
Meter Retrofit (Non-Residential Meter Retrofit)	4,952	464
Residential Assistance Program (Single Family Water Audits)	19,775	3,081
Residential Assistance Program (Multi Family Water Audits)	6,826	320
Residential Assistance Program (Plumbing Retrofits)	60,668	13,537
WaterSense Clothes Washers (Washing Machines)	voluntary	238
WaterSense Toilets (ULF Residential)	voluntary	3,110
CII (Commercial and Industrial Conservation Audits)	1,391	645
CII (Institutional Water Audits)	0	116
CII (ULF Commercial)	32,284	1,410
CII (ULF Institutional)	0	10
Mixed Use CII with Landscape (Large Landscape Audits)	984	155

3.2. Performance

The estimate of the yearly conservation for the targets and actual number of actions is shown in Figure 3.1. The yearly data represents the amount of conservation that is expected to occur during the year of implementation.

Worksheets for each BMP are in Appendix A (to be completed). For each BMP, information is provided on, the benefits of each target implemented, the life and

decay of each and City demographic data that is used in the analysis. The savings estimates are provided for each year of implementation along with the incremental and annual rollup of the targets.

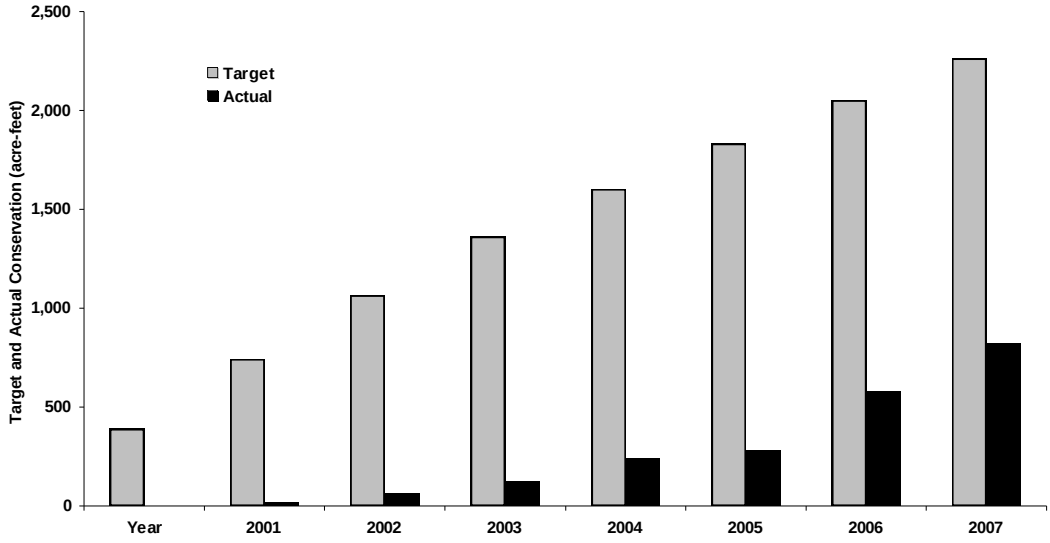

Figure 3.1. Target and actual yearly water conservation for the Water Forum BMPs from 2001 to 2008.

SECTION 4. WATER CONSERVATION TARGETS

The previous section of this document presented City demographics this section discuss how customer class information is translated into water conservation targets. A target is an action such as replacing an existing toilet with one that uses less water. Several of the BMPs do not have numerical targets rather their coverage requirement is to provide a certain type of service such as a water conservation coordinator.

This section provides information on how each BMP applies to the City. For each BMP with a numerical target a table is provided, in Appendix B, that has the annual and cumulative targets over the applicable time period. Figure B.1 illustrates the worksheets that are used to present the targets associated with quantitative BMPs. For some BMPs there is a requirement to include past efforts when determining targets. A discussion on historical conservation efforts and savings is provided in Section 3 of this document.

4.1. MOU Coverage Requirement

The MOU coverage requirements along with a brief summary of each BMP is given in Table 4.1. For quantifiable BMPs the coverage requirements dictate the number of targets that must be done or the rate of water conservation that must be achieved over a given time period. Depending on the BMP, the coverage requirement is applied to the number of connections or units. In addition, the coverage requirements for some BMPs decrease after a prescribed number have been implemented.

Table 4.1. MOU BMPs and a summary of their coverage requirements.

Management Practice	**Summary of Coverage Requirements**
Foundational	
1. Utility Operations Programs	
Coordinator	City will annually provide a dedicated person to serve as the coordinator
Water Waste Prevention	City will enact and enforce ordinances and regulations that prohibit the waste of water.
Wholesale Assistance	City will provide technical, financial support as well as a shortage contingency plan.
System Audits	City will maintain an active distribution system auditing program.
Meter Retrofit	Meter all connections by 2025.
Retail Conservation Pricing	Follows metering by 1 year.

2. Educational Programs	
Public Info	City will maintain an active public information program to educate customers.
School Education	City will maintain an active public information program to educate students..
Programmatic *3. Residential*	
Res. Assistance	Provide surveys to 15% of current single-family accounts and multi-family units by year 10, then decrease to 0.75%.
Res. Landscape Surveys	Provide surveys to 15% of current single-family accounts by year 10, then decrease to 0.75%.
Water Sense Clothes Washers	Provide incentives to 1% of current single-family accounts.
WaterSense Toilet	Provide incentives to replace 3.5 gpf or greater toilets until market saturation is 75% or greater.
WaterSense Specifications –new construction	Provide incentive to all new residential development to adopt WaterSense specification appliances etc.
4. CII	
CII Savings	10% reduction in 2008 CII use. Up to 50% credit given for savings prior to 2008.
5. Landscape	
Dedicated Landscape Meters	Establish water budgets for 90% of accounts.
Mixed Use CII with Landscape	Complete surveys for not less than 15% of CII accounts.

An example of how the coverage requirement is applied for the Residential Assistance Program BMP, to generate a target, is given in Table 4.2. In 2008 the City had 173,252 single and multi-family residential units. Based on when the City joined the Council (1997) the coverage requirement for the Residential Assistance Program is to survey 0.75% of the highest water users per year or 1,300 surveys (targets) for 2009.

Table 4.2. Coverage requirements for 2009 for Residential Assistance Program.

Customer Class	**Housing Units**	**Coverage Requirement**	**Annual Target**
Single Family	119,444	0.75%	896
Multi Family (Avg 6 units/account)1	53,808	0.75%	404
Total	173,252		1,300

[1]Multi-family housing units are determined by multiplying the number of multi-family connections by the average units per connection. In 2008 the average was six units per multi-family connection.

The remaining portion of this section discusses the targets for each BMP. Table 4.3 is a summary of all targets. The tables presented in Appendix B provide detail on how the targets for each BMP were developed.

Table 4.3. Ten year summary of BMPs targets under the Council MOU.

CUWCC Based BMP	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Foundational (ongoing and required by all Council members)										
1. Utility Operations Programs										
Coordinator	fund coordinator position									
Water Waste Prevention	update ordinance as necessary									
Wholesale Assistance	provide assistance									
System Audits	follow system audit procedures									
Meter Retrofits	6,400 for residential and non-residential, annually through 2024									
Retail Conservation Pricing	follows metering by one year									
2. Educational Programs										
Public Info	fund public information program									
School Education	fund school education program									
Programmatic (subject to cost-effective analysis)										
3. Residential	Implementation Targets									
Res. Asst. Prog. (surveys)	2,594	2,622	2,647	2,671	2,695	2,719	2,743	2,769	2,794	2,819
Res. Land Surveys	2,064	2,085	2,103	2,122	2,140	2,158	2,177	2,196	2,216	2,236
High Eff. Clothes Washers	1,136	1,162	1,248	1,273	1,297	1,321	1,346	1,372	1,399	1,425
WaterSense Toilet	5,624	5,624	5,624	5,624	5,624	5,624	5,624	5,624	5,624	5,624
Water Sense Specifications	rate based on new home construction									
4. CII (Performance Based)										
CII Savings (acre-feet)	94		453		811		1,208		1,698	
5. Landscape										
Dedicated Land. (budgets)	120	121	121	121	121	121	121	121	121	119
Mixed Use CII	244	246	249	252	254	257	259	262	265	267

4.2. Foundational > Utility Operations Programs

These BMPs apply to all MOU signatories and are considered foundational to a water conservation program.

Coordinator – The City funds a full time Water Conservation Office Coordinator. In addition, the City has three water waste inspectors (two seasonal and one full-time), three water conservation specialists and a clerk.

Water Waste Prevention – An updated water waste ordinance went into affect in June 2009. A copy of the ordinance is available at: *www.sparesacwater.org*

Wholesale Assistance – Currently the City has four wholesale agreements with other purveyors within the American River place of use. The City provides these purveyors with assistance in meeting their BMPs, serving as a liaison with the Water Forum Successor Effort, helping customers accept BMP assistance, and improving awareness in water conservation.

System Audits – The City has two approaches for auditing system losses, one for areas that are fully metered and one for unmetered areas.

In unmetered areas the City completes and maintains:

1. An annually updated system map of type, size and age of pipes, pressures, and leak history.
2. Installation of devices such as pressure recorders or use of other methods designed to identify area with greater than ten percent loss.
3. An ongoing meter calibration and replacement program for all production and distribution meters.
4. An ongoing leak detection and repair program focused on high probability leak areas identified by the system map.
5. A complete system-wide leak detection program, repeated at least every ten years, unless there are special circumstances, such as age of system or planned main replacement.

In metered areas the City completes and maintains:

1. An annual system water audit, determining the difference between production and sales.
2. An annually updated system map of type, size and age of pipes, pressures, record of leaks, etc. with historic data.
3. An ongoing meter calibration and replacement program.
4. An ongoing leak detection and repair program focused on high probability leak areas identified by map.
5. A complete system wide leak detection program, repeated when the system water audit determines losses to be greater than ten percent or when the losses are less than ten percent if the program is determined to be cost effective.

Once the City is fully metered auditing procedures will be updated to reflect the Council MOU.

Meter Retrofits – The City is implementing meter retrofits through the Department of Utilities' Field Services Division Meter Shop. Given that the City signed the MOU in 1995, the City would have been required to retrofit all unmetered connections by July 1, 2009 however, due to the City charter this criteria did not apply. Assembly Bill 2572 (AB 2572) requires the installation and use of water meters by 2025, across the state, including the City of Sacramento. This law supersedes the City charter, was signed into law by Governor Arnold Schwarzenegger on September 29, 2004 and took effect January 1, 2005.

Table 4.3 lists the metering targets for unmetered connections. As of 2008 there were 99,475 single and multi-family residential connections without meters and were 2,471 unmetered Commercial, Industrial and Institutional (CII) and landscape connections. A straight-line method was used to prepare the annual retrofits targets so that all meters will be installed by 2024. The Council requires that all meters be installed one year prior to the state's 2025 deadline.

Retail Conservation Pricing – This BMP requires that the City set volumetric rates for water service. Under the CUWCC there are two options 1) rates that recover 70% of the cost through volume sold and 2) a rate design consistent with the model included in the Municipal Water and Wastewater Rate Manual published by the Canadian Water and Wastewater Association (REF).

Currently, the City's metered water rates include charges that are projected to generate cost recovery of approximately 60 percent based on customer water use and 40 percent for service charges that represent fixed costs that do not vary based on water use. The MOU allows for a phase-in period of four years. The City is committed to meeting the full requirements. A copy of the City's current rate plan is available at www.XX.org

In addition the City intends to implement a tiered water rate structure within the next five years. While moving metered customers from flat rates to metered rates provides a financial incentive for water conservation, tiered rates may provide further incentive. In response to direction from the Utilities Rate Advisory Commission, the City will report on possible tiered rate strategies and timelines. As more meters are installed, the City will monitor water usage characteristics of residential customers to ensure any new water rate structure is fair to customers and adequately recovers costs.

Customers with meters installed prior to January 1, 2009 will be switched to metered billing January 1, 2010. Those with meters installed after January 1, 2009 will receive one calendar year of comparative billing before being switched

to a metered rate. Those who receive their water meter after January 1, 2010 will have one year of comparative billing. During the comparative billing period, customers are only responsible for paying the flat rate. Comparative billing enables customers to see how their flat rate measures up to the metered rate.

4.3. Foundational > Educational Programs

Public Information –The City maintains a public information program to educate customers, through billing inserts, media campaigns, workshops, and presentations to homeowner and business groups.

School Education – The City maintains a program to educate students. The City participates in school outreach and works with its regional and statewide partners supporting and implementing the objectives of the Water Forum. As a member of the Regional Water Authority (RWA), the City participates in the water efficiency program designed to implement BMPs on a regional basis. These partnerships provide multiple resources and outlets for public education, including but not limited to school education in the classroom, media campaigns, and regional and City-wide special events.

The City supports three school education programs. One is the Newspaper in Education program that involves the Sacramento Bee newspaper and local teachers. The second involves the Sacramento Theater Company, which performs water conservation skits at school assemblies. The third is the annual tour, booth, and classes at the Recycling Facility for elementary through high school students. Additionally, "Water from Here to Eternity", and Eco-Guide educational material is provided for all elementary through high school students.

4.4. Programmatic > Residential

Residential Assistance Program – The purpose of this BMP is to provide site-specific leak detection assistance that may include, but is not limited to, the following: a water conservation survey, water efficiency suggestions, and inspections. Showerheads and faucet-aerators that meet the current water efficiency standard as stipulated in the WaterSense specifications are provided as needed.

Table 4.3 lists the residential assistance targets. These targets apply to both single and multi-family residences. Prior to the 2008 MOU, this BMP was split into two BMPs; residential audits and plumbing retrofits. In addition to the targets established under the MOU, the City has unmet targets originating from its 1995 base year with the CUWCC. The unmet targets are provided in the worksheet portion of Table B.3.

Under the WFA the targets for residential assistance are based on the number of installed meters and not the number of connections. As of 2008 the City has 26,253 meters on single and multi-family residences. Table B.4 lists the residential assistance targets based on the Water Forum criteria.

Landscape Water Survey – The purpose of this BMP is to provide site-specific landscape water surveys that include, but are not limited to, the following: check irrigation system and timers for maintenance and repairs needed; estimate or measure landscaped area; develop customer irrigation schedule based on precipitation rate, local climate, irrigation system performance, and landscape conditions; review the scheduling with customer; provide information packet to customer; and provide customer with evaluation results and water savings recommendations.

Table 4.3 lists the landscape water survey targets. These targets only apply to single-family residences. The completed and cumulative completed targets account for previous City efforts. The unmet targets are provided in the worksheet portion of Table B.5.

Under the WFA the targets for Residential Landscape Surveys are based on the number of installed meters and not the number of connections. As of 2008 the City has 24,960 meters on single-family connections.

High-efficiency Clothes Washers – The purpose of this BMP is to provide incentives or institute ordinances requiring the purchase of high efficiency clothes washing machines that meet an average water factor value of 5.0. However, if the WaterSense specification changes, then the average water factor value will change to that amount.

Table B.6 lists the high-efficiency clothes washer targets. These targets only apply to single-family residences.

WaterSense Specification Toilets – The purpose of this BMP is to provide incentives or ordinances requiring the replacement of existing toilets using 3.5 or more gpf (gallons per flush) with a toilet meeting WaterSense specification. This is an ongoing BMP that continues until 75% of the existing high volume flush toilets, within the City, have been replaced with toilets meeting the WaterSense specification.

Table B.7 lists the targets for WaterSense specification toilets. Although not shown, the annual targets were determined using the Councils coverage calculator and updating it to 2008.

WaterSense Specification for Residential Development – The purpose of this BMP is to provide incentives such as rebates, recognition programs, reduced connection fees or ordinances requiring residential construction meeting

WaterSense specification for all new residential housing until a local, state or federal regulation is passed requiring water efficient fixtures. The City uses the approach provided by the EPA at:
http://www.epa.gov/WaterSense/docs/home_rev-draftspec508.pdf

4.5. Programmatic > Commercial, Industrial and Institutional (CII)

CII – The purpose of this BMP is to implement measures to achieve the water savings goal for CII accounts of ten percent of the baseline water use over a ten-year period. Baseline water use is defined as the water consumed by CII accounts in the agency's service area in 2008. Credit for prior activities, as reported through the BMP database, is given for up to 50% of the goal; in this case, coverage will consist of reducing annual water use by CII accounts by an amount equal to the adjusted goal within ten years. The water conservation target in Table B.8 accounts for past efforts. Details on previous efforts are in Section 3 of this document.

4.6. Programmatic > Landscape

Dedicated Landscape Meters – The purpose of this BMP is to prepare water use budgets based on the California Model Water Efficient Landscape Ordinance (DWR, 2009). This ordinance requires that the prepared water budget be no more than 70% of reference evapotranspiration (ETo). Exceptions to this include recreational areas such as turf areas in 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. These special landscape areas may have budgets with up to 100% ETo. The unmet targets are provided in the worksheet portion of Table B.9.

Reference ETo is available from the California Irrigation Management Information System (CIMIS) station in Fair Oaks (131). This station is the closest to the City and has been operation since April 1997. The historical average monthly ETo (Table 4.4) at this station ranges from a low of 1.59” in December and January to a high of 8.67” in July. If the landscape ordinance is revised, this BMP will be revised to reflect the change.

Table 4.4. Average monthly and total reference evapotranspiration (ETo), in inches, for the Fair Oaks CIMIS (station.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1.59	2.20	3.66	5.08	6.83	7.80	8.67	7.81	5.67	4.03	2.13	1.59	57.06

Mixed Use Landscape Meters – The purpose of this BMP is to develop and implement a strategy for providing large landscape water use surveys to CII accounts with mixed-use meters. For connections without meters this BMP is to actively market landscape surveys to existing accounts with large landscapes that have been determined by the purveyor not to be water efficient. The unmet targets are provided in the worksheet portion of Table B.10.

SECTION 5. PROGRAM COST

This section of the document analyzes the costs for implementing the BMPs. This analysis is done from the agencies perspective and does not consider the societal costs of implementing the BMPs. Society costs include what the home or business owner would have to pay to support the BMP. For example, purchasing and installing a WaterSense Toilet may cost a homeowner $400 however the City's only covers $125 leaving the homeowner to pay the $275 difference.

Costs are divided into two categories; labor and BMP implementation cost. Labor costs cover what the City pays personnel to manage and implement the water conservation program. Cost for BMP implementation covers expenses associated with each action such as faucet aerators, advertising, and outside services. All cost information is based on the City's experience in implementing their water conservation program.

5.1. Cost Assumptions

Cost assumptions were developed using information obtained from the following offices in the Department of Utilities: The Water Conservation Office, Engineering, Field Services - Metering Shop, and Business Services. All information reflects the 2008 fiscal year. Details on all costs are provided in Appendix C. A summary of cost per BMP is provided in Table 5.1.

Labor costs include personnel costs for implementing and managing the BMPs. These costs include overhead.

Metering costs include the cost to retrofit existing connections and to manage meter reading and billing. Because state law (AB 2572) requires that all water purveyors that serve more than 3,000 connections must be fully metered. The estimate to retrofit all connections is $110,000,000 or about $1,090 per connection (Cap to Cap, 2008).

Costs for implementing the Residential Assistance Program, Residential Landscape Surveys, CII, and Mixed Use Landscape Surveys include administrative time and cost to manage the program, labor costs for providing the survey to the homeowner or business owner, material costs for aerators, nozzles etc, publicity costs for advertising the service and costs associated with monitoring or evaluating the service. Labor to provide the service includes driving time and staff time to document the visit. Program cost share is any financial assistance that is provided by other agencies. It is anticipated that the Residential Assistance Program and the Residential Landscape Survey will be

completed on the same, single-family home visit. Each survey is expected to take 1.5 hours.

Table 5.1. Summary of program costs using CUWCC targets.

BMP	2009 $	Note
Foundational (ongoing and required by all Council members)		
1. Utility Operations Programs		
Coordinator	111,280	
Water Waste Prevention	to be determined	
Wholesale Assistance	to be determined	
System Audits	to be determined	
Meter Retrofit (installs)	451,755	
Retail Conservation Pricing	to be determined	
2. Educational Programs		
Public Info	25,000	
School Education	25,000	
Foundational sub-total	613,035	
Programmatic (subject to cost-effective analysis)		
3. Residential		
Res. Asst. Prog. (surveys)[1]	112,175	
Res. Land Surveys	127,530	
High Eff. Clothes Washers	92,966	
Water Sense Toilet	1,009,396	includes $100,730 cost share
Water Sense Specifications	to be determined	
4. CII		
CII	281,309	includes $102,518 cost share
5. Landscape		
Dedicated Land. (budgets)	23,492	
Mixed Use CII with Landscape	33,127	
Programmatic sub-total	1,679,995	
Total	2,293,030	

Costs for implementing the High-efficiency Clothes Washers and WaterSense Toilets include administrative time and cost to manage the program, washer rebate, rebate processing costs, publicity costs for advertising the rebates and costs associated with monitoring or evaluating the service. The rebate amount was set through the Regional Water Authority's, Water Efficiency Program. Program cost share is any financial assistance that is provided by other agencies or through a grant.

Costs for implementing the Dedicated Landscape Meter BMP include administrative time and cost to manage the program, labor costs for, developing and maintaining water budgets, follow up site visits and costs associated with monitoring or evaluating the service. Labor to provide the service to the participant includes driving time and staff time to document the visit. Program cost share is any financial assistance that is provided by other agencies or departments within the City.

SECTION 6. BENEFITS

Benefits are based on the amount of water conservation, the life of the water conservation action and the cost savings that occur from implementing a BMP. Water conservation benefits can occur through either or both behavioral and passive change. For example, when a 3.5 gallon pre minute (gpm) faucet aerator is replaced with a 2.2 gpm aerator there is a passive savings of 1.3 gallons for every minute the faucet is operated. If, in addition to the aerator change, the faucet is used less (behavior change), such as turning the water off when brushing teeth, then the savings are even greater. An exact quantification of the savings for each water conservation action is not feasible; however, there are numerous case studies that have generated reliable estimates of the benefits of implementing conservation actions. For this analysis the estimates that are suggested by the Council are used, unless site or action specific information is available. An example of a benefit to the homeowner for implementing a BMP might be that after low-flow showerheads are installed there is a reduction in the homeowner's energy cost for heating water.

The agency benefits are what the costs the City avoids due to conservation. This is based on the cost to produce and deliver an acre-foot of water, the marginal cost for additional supply, and the avoided cost for new infrastructure, including a discount rate for capital expenses.

6.1. Cost of Water and Conservation

In the City, the cost to develop, treat and deliver an acre-foot is just under $500 per acre-foot (Table 6.1) (City, 2008). Of the costs to produce water only the variable costs for chemicals to treat the water and energy to pump and distribute water are considered for the cost-effective analysis. In 2008 chemical costs were $11.47/AF and energy was $32.10/AF for a total variable cost of $43.57/AF. A seasonal and source basis analysis was done to capture the marginal costs for energy and chemicals. Energy information was available and it indicates that groundwater is slightly more expensive to pump than surface water. Also, there was no significant difference in the seasonal costs for energy. Because the City does not provide wastewater service, this is not a cost for consideration from the City's perspective.

Table 6.1. Summary of the unit water production costs for 2008 and which components are affected by conservation.

Water Production Cost component	Cost	Affected By Conservation
	$/AF	
Labor	142.25	No
Administration	99.75	No

Capital Improvement Program	172.69	No
subtotal	414.69	
Operations		
Utilities	32.10	Yes
Operations Equipment	2.68	No
Direct Operations Supplies	34.00	No
Chem & Gases	11.47	Yes
subtotal	79.55	
Total	494.24	

The remaining cost that the City could consider is the avoided cost of new infrastructure for capacity and distribution. The avoided capacity costs that can be considered for water conservation benefit analysis is the infrastructure that does not need to be built or could be delayed, due to water conservation. For example, due to the odd-even water ordinance the City may be able to reduce the number or capacity of peaking storage tanks that are required. The cost difference between what is required with and without water conservation is what can be attributed to the avoided capacity costs.

Currently the City is preparing a water master plan that will, in part, develop avoided capacity cost information. Once this information is available the value will be used to complete the monetary benefits of conservation.

An additional item when determining benefits under the Water Forum is the environmental benefit of conserving an acre-foot of water. Water Forum members assume that the benefit is $75/acre-foot (2009) indexed for inflation. Table 6.2 presents the benefit cost components for both the MOU and the WFA.

Table 6.2. Benefit cost components for MOU and WFA.

Component	MOU Benefit	WFA Benefit
	$/acre-foot	
Utilities	32.10	32.10
Chem & Gases	11.47	11.47
Avoided Supply Cost	3.16	3.16
Avoided Capacity Cost	To be determined	
Environmental Benefit	0	75
Total	46.73 + avoided capacity cost	121.73 + avoided capacity cost

6.2. Water Conservation Benefit

Benefits are the positive results of implementing an action that is designed to conserve water or increase water use efficiency. Benefits can be determined by measuring how much water is used pre and post intervention. Some benefit information is very easy to access - for example, toilets installed in 1980 were

typically 5.0 gpf conversely, the maximum tank volume of toilets that are available in the United States today are 1.6 gpf. When a 5 gpf toilet is replaced with a 1.6 gpf toilet the savings is 3.4 gpf. Other benefit information is more difficult to obtain such as with the toilet exchange - did the number of flushes remain constant? If they did then all an analyst needs to know is how many flushes a typical house makes in a day. Fortunately there have been many technical studies to determine the benefits associated with a particular action and associated behavior.

The main sources of benefit information for this analysis are the Council publications, City water metering data, and professional estimates. Data for the Council publications were developed from technical studies designed to determine the benefit of a conservation measure. These studies are typically based on field level investigations that are controlled to determine the affect of the conservation action. In addition, these studies are typically peer reviewed. Sources are noted for all benefit assumptions. Table 6.3 presents a summary of the water conservation benefit assumptions. Details on benefit assumptions are in Appendix C.

Table 6.3. Summary of water conservation benefit assumptions, by BMP.

BMP	Benefit/Target	Life	Note
Foundational (ongoing and required by all Council members)			
1. Utility Operations Programs			
Coordinator	not quantifiable		
Water Waste Prevention	not quantifiable		
Wholesale Assistance	not quantifiable		
System Audits	assume 10% of production		Council estimate
Meter Retrofit	assume 20%/meter	20 years	Council estimate
Retail Conservation Pricing	Rolled into Meter Retrofit BMP		
2. Educational Programs			
Public Info	not quantifiable		
School Education	not quantifiable		
Programmatic (subject to cost-effective analysis)			
3. Residential			
Res. Asst. Prog.	25 gpd/survey	15% decay/year	Council estimate
Res. Land Surveys	0.17 AF/yr/site	25% decay/year	Council estimate, City use
High Eff. Clothes Washers	5,280 g/year	12 years	Council estimate
Water Sense Toilet	27.4 gpd (single) 44.0 gpd (multi)	25 years	City estimate
Water Sense Specifications	not quantified		
4. Commercial, Industrial and Institutional			
CII	various depending on measure		
5. Landscape			
Dedicated Land. (budgets)	0.82 AF/yr/site	ongoing	Council estimate, City use
Mixed Use CII with Landscape	.27 AF/yr/site	15% decay/year	Council estimate

Benefits associated with implementing the Meter Retrofit and Conservation Pricing BMPs are based on the Council's generalized assumption of 20% savings. Since metering and volumetric pricing are thought to constitute the majority of the conservation in the region it would be beneficial to closely monitor water use changes that occur with implementation of metering and billing by meter.

The Residential Assistance Program BMP covers indoor and outdoor device and behavior modification. The benefit assumptions for indoor water use (Table CX) cover fixtures such as aerators and showerheads and the repair of leaking pipes and fixtures. The benefit assumptions for outdoor use are derived from hardware changes, such as replacing sprinkler heads and improving the performance of an automatic irrigation timer.

The outdoor use estimate for single-families is 0.33 AF/year (Tables 2.5 and 2.6) for an area of .057 acres. This equates to 5.78 AF/Ac/yr. It is assumed that this could be reduced by 50% to equate to 70% of ETo.

The benefits of a high-efficiency washers and toilet rebates are based on multiple studies with a variety of toilets and serve as defaults in the Council cost-effective worksheets. Toilets have a potential behavioral component as well because they are subject to multiple flushing. However, this information was collected as part of the technical studies that were used to develop the conservation estimate.

One of the updates to the 2008 MOU was to change the CII BMP coverage to a performance criterion of ten percent reduction from the 2008 CII water use. In addition, there is no prescription of what actions to implement. Accepted water savings benefits by device are used to document the savings (Table C.13). If the City implements other conservation measures then the savings per device information will be used as appropriate to determine conservation.

Water savings from implementing the Mixed Use Landscape Survey BMP can accrue from a reduction in the amount of water applied for landscaping use. Consumptive savings can occur through a reduction in the amount of water evapotranspired by plants. Non-consumptive savings can occur through reducing runoff or deep percolation. Over time a decay in savings occurs due to a decrease in equipment performance, changes in plant material, and leaks.

The savings estimates that occur through a water budget for landscape sites with dedicated meters is through a reduction in both consumptive use and a reduction in runoff and deep percolation. Unlike the Mixed Use Landscape Survey BMP, dedicated landscape meters can be physically tied to a defined use for the water and the actual plant needs can be met based on an irrigation system's performance. Additional guidance for developing water use budgets for

dedicated landscape meters is taken from the Model Landscape Ordinance developed by the DWR (ref).

SECTION 7. COST EFFECTIVENESS ANALYSIS

The balance between costs and benefits to the City are examined through a cost-effectiveness analysis. In this analysis the benefits and costs of conservation to the City (Table 7.1) are considered and compared. Section 5 covered costs and section 6 covered the benefits.

Table 7.1. Costs and benefits of water conservation – to the City, adapted from the Council's 1999 MOU.

Benefits of Conservation to Sacramento
a. Costs avoided for constructing water production, transport, storage, and distribution capacity facilities. b. Operating costs, including but not limited to chemicals, energy and labor associated with water deliveries that no longer need to be made. c. Avoided costs of water purchases. d. Environmental benefits and avoided environmental costs. e. Revenues from other entities for the sale of conserved water or financial incentives from other entities.
Costs of Conservation to Sacramento
a. Capital expenses for equipment of conservation devices. b. Financial incentives to other water suppliers or retail customers. c. Operating expenses for staff to plan, design or implement the program. d. Costs to the environment.

When all benefit information is available (see Section 6.1), the cost and benefit analysis will be done. One of the outcomes of the cost-benefit analysis is a determination as to whether a BMP is locally cost-effective to implement. BMPs that are found to be not cost-effective are eligible for an exemption under the Council and a deferral under the Water Forum Agreement

SECTION 8. IMPLEMENTATION PLAN

This section to be completed by City water conservation staff

SECTION 9. REPORTING

This section to be completed

SECTION 10. REFERENCES

City of Sacramento, 2008 Water production costs – Excel spreadsheet, (M. Fahy, 2009).

City of Sacramento, Urban Water Management Plan, 2006.

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California Urban Water Conservation Council. Cost-effectiveness spreadsheets; http://www.cuwcc.org/resource-center/technical-resources/bmp-tools/cost-effectiveness-models.aspx

Department of Water Resources, California Irrigation Management Information System; http://wwwcimis.water.ca.gov/cimis/welcome.jsp. 2009.

Department of Water Resources. Model water efficient landscape water ordinance. http://www.water.ca.gov/wateruseefficiency/landscapeordinance/ 2009.

SECTION 11. APPENDICIES

APPENDIX A. PAST PERFORMANCE

APPENDIX B. TARGETS by BMP

APPENDIX C. COST AND BENEFIT ASSUMPTIONS

APPENDIX A. PAST PERFORMANCE

This appendix will contain an accounting of each BMP the City has implemented and the amount of savings.

A rollup of historical savings is presented in Section 3 of the document. The following tables were prepared under the 1999 MOU which

NOTE – RECONCILE WITH OTHER FILES BEFORE SENDING

Table A.1. Historical savings from residential Metering.

Year	Targets		Savings[1]	
	Incremental	Cumulative	Incremental	Cumulative
	count		acre-feet	
2001	0	0	0	0
2002	0	0	0	0
2003	0	0	0	0
2004	0	0	0	0
2005	0	0	0	0
2006	0	0	0	0
2007	1,509	1,509	134	134
2008	1,109	2,618	232	366

1 Based on 0.44 AF/connection and 20% annual reduction in use with 20 year life.

Table A.2. Historical savings from non-residential Metering.

Year	Targets		Savings[1]	
	Incremental	Cumulative	Incremental	Cumulative
	count		acre-feet	
2001	0	0	0	0
2002	95	95	17	17
2003	39	134	24	40
2004	73	207	37	77
2005	10	217	38	115
2006	11	228	40	155
2007	155	383	68	223
2008	81	464	82	305

1 Based on 3.5 AF/connection and 5% annual reduction in use with 20 year life.

Table A.3. Historical savings from residential audits – interior and exterior.

Year	Targets		Savings[1]	
	Incremental	Cumulative	Incremental	Cumulative
	count		acre-feet	
2001	10	10	1	1
2002	217	227	16	17
2003	209	436	28	45
2004	1,022	1,458	96	142
2005	961	2,419	143	285
2006	497	2,916	152	437
2007	236	3,152	146	583
2008	249	3,401	141	724

1 Based on 20 gpd indoor savings per audit and 0.0495 AF/yr outdoor savings with 15% decay.

Table A.4. Historical savings from plumbing kits.

Year	Targets		Savings[1]	
	Incremental	Cumulative	Incremental	Cumulative
	count		acre-feet	
2001	0	0	0	0
2002	606	606	1	1
2003	3,400	4,006	4	5
2004	3,170	7,176	7	12
2005	1,086	8,262	7	20
2006	2,000	10,262	9	28
2007	2,710	12,972	10	39
2008	565	13,537	9	48

1 Based on 20 gpd indoor savings per kit, 5% install probability and 15% decay per year.

Table A.5. Historical savings from high-efficiency washer rebates.

Year	Targets		Savings[1]	
	Incremental	Cumulative	Incremental	Cumulative
	count		acre-feet	
2001	0	0	0	0
2002	0	0	0	0
2003	0	0	0	0
2004	0	0	0	0
2005	0	0	0	0
2006	238	238	3	3
2007	0	238	3	7
2008	0	238	3	10

1 Based on 5,280 gallons/yr/dwasher, 12 year life.

Table A.5. Historical savings from toilet rebates.

Year	Targets		Savings[1]	
	Incremental	Cumulative	Incremental	Cumulative
	count		acre-feet	
2001	0	0	0	0
2002	0	0	0	0
2003	0	0	0	0
2004	0	0	0	0
2005	573	573	17	17
2006	964	1,537	44	62
2007	940	2,477	68	130
2008	633	3,110	80	210

1 Based on 29.75 gallons/day/toilet, 25 year life, 10% free-riders.

Table A.6. Historical savings from CII audits and toilet rebates.

Year	Targets		Savings[1]	
	Incremental	Cumulative	Incremental	Cumulative[2]
	count		acre-feet	
2001	0	0	0	0
2002	0	0	0	0
2003	170	170	33	33
2004	96	266	46	79
2005	936	1,202	118	197
2006	99	1,301	119	316
2007	56	1,357	113	429
2008	814	2,171	143	572

1 Based on 0.04 AF/yr for toilet rebates and 10% reduction in CII use from audit with 15% decay/yr.
2 Only 50% (286 AF) of 2008 savings can be applied under new MOU for past credit.

Table A.7. Historical savings from mixed use meters, landscape audits.

Year	Targets		Savings[1]	
	Incremental	Cumulative	Incremental	Cumulative
	count		acre-feet	
2001	0	0	0	0
2002	0	0	0	0
2003	18	18	3	3
2004	72	90	12	15
2005	37	127	16	31
2006	16	143	16	47
2007	5	148	14	61
2008	7	155	13	74

1 Based on 0.14 AF reduction per account with 15% decay per year.

APPENDIX B. TARGETS BY BEST MANAGEMENT PRACTICE

Tables in this section present the Council based targets for metering and all programmatic BMPs. Timeline for each target is based on MOU criteria with most having a ten year horizon. Also included with each table are the savings per year and cumulative savings over time.

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Worksheet to determine unmet targets from 1999 to 2008.

								Note
Housing Stoc (CUWCC bas			Targets				Savings for	
Single-family								
Multi-family (units)	10,534	15%	1,580	320	1,260	126	48	

For applicable BMPs there is a worksheet that accounts for past activity and savings Several BMPs require that unmet targets be met in ongoing efforts. This section quantifies the unmet targets and previous savings. More detail on savings is provided in Section 3.

TARGETS worksheet based on 2008 MOU

HOUSING STOCK	Calendar Year and (Year of Implementation)									
	2009		2011	2012	2013	2014	2015	2016	2017	2018 (10)
Single-fam										142,510
Multi-family (units)	53,928	54,782	55,636	56,413	57,189	57,965	58,741	59,517	60,217	60,918
TARGETS	CUWCC Coverage Requirement[3] and Annual and Cumulative Targets[1]									
	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%
Single-famil										1,069
Multi-family										457
Annual Tota										2,819
Cummulative Total	2,594	5,216	7,863	10,534	13,229	15,948	18,691	21,460	24,254	27,073
Annual										
Cumulative										3,401
SAVINGS	Annual and Cumulative Savings (Acre-feet)[4, 5]									
Annual										
Cumulative	288	288	288	288	288	288	288	288	288	288

This section quantifies the connections that will be used to determine the targets.

This section applies the MOU coverage requirement to the number of connections to determine the annual targets.

This is to report on target implementation progress. Section 8 of the document discusses reporting.

This is to report on savings for implemented targets. It includes historical information as well as annual savings. Section 3 of the document discusses historical savings, and Section 9 discusses reporting.

Figure B.1. MOU coverage requirement target worksheet.

Table B.1. Targets for Meter (residential) Retrofits BMP.

Residential Accounts	Calendar Year and (Year of Implementation)									
	2009 (1)	2010 (2)	2011 (3)	2012 (4)	2013 (5)	2014 (6)	2015 (7)	2016 (8)	2017 (9)	2018 (10)
	Connections[1]									
Total Connections	125,728	128,684	131,640	134,212	136,784	139,356	141,928	144,500	147,260	150,020
Unmetered Connections	99,475	93,258	87,041	80,823	74,606	68,389	62,172	55,955	49,738	43,520
TARGETS	Coverage Requirement (continues through 2024)[2]									
Annual	6,217	6,217	6,217	6,217	6,217	6,217	6,217	6,217	6,217	6,217
Cumulative Targets	6,217	12,434	18,652	24,869	31,086	37,303	43,520	49,738	55,955	62,172
Metered Accounts[3]	26,253	35,426	44,600	53,389	62,178	70,967	79,756	88,545	97,523	106,500

1. Mixed use residential-commercial are not included in these estimates.
2. A straight line approach was used to retrofit all unmetered residential connections by 2024 .
3. Includes new construction. All metered accounts will be charged based on commodity rates.

Table B.2. Targets for Meter (non-residential) Retrofits BMP.

Non-Residential Accounts	Calendar Year and (Year of Implementation)									
	2009 (1)	2010 (2)	2011 (3)	2012 (4)	2013 (5)	2014 (6)	2015 (7)	2016 (8)	2017 (9)	2018 (10)
	Estimated Connections[1]									
Total Connections	12,517	12,861	13,205	13,563	13,922	14,281	14,639	14,998	15,372	15,746
Unmetered Connections	2,931	2,748	2,565	2,381	2,198	2,015	1,832	1,649	1,466	1,282
TARGETS	Coverage Requirement[2]									
Annual	183	183	183	183	183	183	183	183	183	183
Cumulative Targets	183	366	550	733	916	1,099	1,282	1,466	1,649	1,832
Metered Accounts[3]	9,586	10,113	10,640	11,182	11,724	12,265	12,807	13,349	13,906	14,463

1. Mixed use residential-commercial are not included in these estimates.
2. A straight line approach was used to retrofit all unmetered residential connections by 2024.
3. Includes new construction. All metered accounts will be charged based on commodity rates.

Table B.3. Targets for Residential Assistance Program based on CUWCC criteria.

Worksheet to determine unmet targets from 1999 to 2008.								**Note**
Housing Stock in 1999 (CUWCC base year)	**Conn-ections**	**Coverage Rate**	**Targets**				**Savings for Completed Targets(AF)**	
			Cum-ulative	**Comp-leted**	**Remain-ing**	**Annual makeup1**		
Single-family	**98,357**	**15%**	**14,754**	**3,081**	**11,673**	**1,167**	**240**	
Multi-family (units)	**10,534**	**15%**	**1,580**	**320**	**1,260**	**126**	**48**	

TARGETS worksheet based on 2008 MOU										
HOUSING STOCK	**Calendar Year and (Year of Implementation)**									
	2009 (1)	**2010 (2)**	**2011 (3)**	**2012 (4)**	**2013 (5)**	**2014 (6)**	**2015 (7)**	**2016 (8)**	**2017 (9)**	**2018 (10)**
	Estimated Connections2									
Single-family	**119,554**	**122,368**	**124,810**	**127,253**	**129,695**	**132,138**	**134,581**	**137,224**	**139,867**	**142,5**
Multi-family (units)	**53,928**	**54,782**	**55,636**	**56,413**	**57,189**	**57,965**	**58,741**	**59,517**	**60,217**	**60,91**
TARGETS	**CUWCC Coverage Requirement3 and Annual and Cumulative Targets1**									
	0.75%	**0.75%**	**0.75%**	**0.75%**	**0.75%**	**0.75%**	**0.75%**	**0.75%**	**0.75%**	**0.75%**
Single-family	**897**	**918**	**936**	**954**	**973**	**991**	**1,009**	**1,029**	**1,049**	**1,069**
Multi-family	**404**	**411**	**417**	**423**	**429**	**435**	**441**	**446**	**452**	**457**
Annual Total1	**2,594**	**2,622**	**2,647**	**2,671**	**2,695**	**2,719**	**2,743**	**2,769**	**2,794**	**2,819**
Cumulative Total	**2,594**	**5,216**	**7,863**	**10,534**	**13,229**	**15,948**	**18,691**	**21,460**	**24,254**	**27,07**

1. Represent unmet targets between 1999-2008 and are added in a straight line to current targets.
2. Mixed use residential-commercial are not included in these estimates.
3. 2009 coverage requirement is based on the 2008 CUWCC MOU.
4. Cumulative targets completed in 2009 and cumulative savings in 2009 includes cumulative amounts from 1999-2008.
5. Annual savings are calculated assuming that each survey results in a savings of 25 gpcd with a 15% decay (Council, 2005).

Table B.4. Targets for Residential Assistance Program based on Water Forum Agreement criteria.

Housing Stock	**Calendar Year and (Year of Implementation)**									
	2009 (1)	**2010 (2)**	**2011 (3)**	**2012 (4)**	**2013 (5)**	**2014 (6)**	**2015 (7)**	**2016 (8)**	**2017 (9)**	**2018 (10)**
	Metered Connections[1]									
Single-family	24,960	33,510	42,060	50,239	58,418	66,597	74,775	82,954	91,334	99,713
Multi-family	1,293	1,916	2,540	3,150	3,760	4,371	4,981	5,591	6,189	6,786
	Water Forum Coverage Requirement[2] and Annual and Cumulative Targets									
TARGETS	12% of the top 20% of water users are targeted annually - only applies to metered connections									
Single-family	599	804	1,009	1,206	1,402	1,598	1,795	1,991	2,192	2,393
Multi-family (units)	31	46	61	76	90	105	120	134	149	163
Annual Total	630	850	1,070	1,281	1,492	1,703	1,914	2,125	2,341	2,556
Cummulative Total	630	1,480	2,551	3,832	5,324	7,028	8,942	11,067	13,407	15,963

1 Estimated metered connections are based on the City's CIS and planned metering program.
2 See the water conservation element of the 2009 Water Forum Agreement for further details.
3 Annual savings are calculated assuming that each survey results in a savings of 25 gpcd with 15% decay (Council 2005).

Table B.5. Targets for the Residential Landscape Water Surveys.

Worksheet to determine unmet targets from 1999 to 2008.								Note
Housing Stock in 1999 (CUWCC base year)	Conn-ections	Coverage Rate	Targets				Savings for Completed Targets(AF)	
			Cum-ulative	Comp-leted	Remain-ing	Annual makeup[1]		
Single-family	98,357	15%	14,754	3,081	11,673	1,167	671	

TARGETS worksheet based on 2008 MOU										
Single-family	**Calendar Year and (Year of Implementation)**									
	2009 (1)	**2010 (2)**	**2011 (3)**	**2012 (4)**	**2013 (5)**	**2014 (6)**	**2015 (7)**	**2016 (8)**	**2017 (9)**	**2018 (10)**
	Estimated Connections[2]									
	119,554	122,368	124,810	127,253	129,695	132,138	134,581	137,224	139,867	142,510
TARGETS	**CUWCC Coverage Requirement[3] and Annual and Cumulative Targets[1]**									
	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%
Single-family	897	918	936	954	973	991	1,009	1,029	1,049	1,069
Annual Total[1]	2,064	2,085	2,103	2,122	2,140	2,158	2,177	2,196	2,216	2,236
Cumulative Total	2,064	4,149	6,252	8,374	10,514	12,672	14,849	17,045	19,262	21,498

1. Represent unmet targets between 1999-2008 and are added in a straight line to current targets.
2. Connections are based on the City's CIS and includes single and multi-family accounts. Mixed use residential-commercial are not included in these estimates.
3. 2009 coverage requirement is based on the 2008 CUWCC MOU.

Table B.6. Targets for high-efficiency clothes washers.

Housing Stock	Calendar Year and (Year of Implementation)									
	2009 (1)	2010 (2)	2011 (3)	2012 (4)	2013 (5)	2014 (6)	2015 (7)	2016 (8)	2017 (9)	20 (1
	Estimated Connections[1]									
Single-family	119,554	122,368	124,810	127,253	129,695	132,138	134,581	137,224	139,867	142
	CUWCC Implementation Rate[2] and City Targets									
TARGETS	0.95%	0.95%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1
Single-family	1,136	1,162	1,248	1,273	1,297	1,321	1,346	1,372	1,399	1
Cummulative Total	1,136	2,298	3,546	4,819	6,116	7,437	8,783	10,155	11,554	12

1. Connections are based on the City's CIS and includes single and multi-family accounts. Mixed use residential-commercial are not included in these estimates.
2. 2009 coverage requirement is based on the 2008 CUWCC MOU.

Table B.7. Targets for WaterSense specification toilets.

Worksheet to determine unmet targets from 1999 to 2008.			
1992 housing stock	96,055	55,625	Note
Natural replacement (% of remaining stock)	4.0%	4.0%	From 1999-2008, 3,110 toilets were installed
Housing demolition (% of remaining stock)	0.5%	0.5%	
Units with 3.5+ gpf Toilets in 2008	50,154	29,044	
Average resale rate	4.9%	10.4%	
Percent of 1992 housing stock with pre 1980 toilets	50%	50%	

TARGETS worksheet based on 2008 MOU										
Housing Stock	**Calendar Year and (Year of Implementation)**									
	2009 (1)	**2010 (2)**	**2011 (3)**	**2012 (4)**	**2013 (5)**	**2014 (6)**	**2015 (7)**	**2016 (8)**	**2017 (9)**	**2018 (10)**
	Estimated Eligible Units[1]									
Single-family	50,154	46,499	42,843	39,187	35,532	31,876	28,221	24,565	20,909	17,254
Multi-family (units)	29,044	27,076	25,107	23,139	21,170	19,202	17,234	15,265	13,297	11,328
Targets	**Council Coverage Requirement**									
Single-family	3,656	3,656	3,656	3,656	3,656	3,656	3,656	3,656	3,656	3,656
Multi-family (units)	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968
Annual Total	5,624	5,624	5,624	5,624	5,624	5,624	5,624	5,624	5,624	5,624
Cumulative Total	5,624	11,248	16,872	22,496	28,120	33,744	39,368	44,992	50,616	56,240

1. Estimated connections are based on the Council's coverage calculator.
2. Annual savings are calculated assuming that each results in a savings of 27.4 gpd/single-family and 44 gpd/multi-family rebate.

Table B.8. Targets for commercial, industrial and institutional (CII) water conservation.

Worksheet to determine pre 2008 CII credit, up to 50% of past performance given as credit.

CII Categoty	2008 Water Use	Target (10% of 2008 Use)	Credit for pre 2008[1]	Adjusted Target	Note
Comm + Indus:	16,879 AF	1,688 AF	222 AF	1,466	
Institutional:	4,849 AF	485 AF	64 AF	421	
Total	21,728 AF	2,173 Af	286 AF	1,887	

TARGETS	Calendar Year and (Year of Implementation)											
	2009 (1)	**2010 (2)**	**2011 (3)**	**2012 (4)**	**2013 (5)**	**2014 (6)**	**2015 (7)**	**2016 (8)**	**2017 (9)**	**2018 (10)**	**2019 (11)**	**2020 (12)**
	Coverage Requirements and City Targets[2]											
	0.5%		2.4%		4.3%		6.4%		9.0%		10.0%	
	acre-feet (based on coverage requirement and adjusted target)											
Commercial + Industrial	73		352		630		938		1,319		1,466	
Institutional	21		101		181		270		379		421	
Cumulative	94		453		811		1,208		1,698		1,887	

1. Discussion on pre 2008 efforts are documented in section 3 of the document.
2. CUWCC considers a purveyor on track if they achieve the percent savings per reporting period.

Table B.9. Targets for ETo based water budgets for dedicated landscape meters.

Worksheet to determine unmet targets from 1999 to 2008.								Note
Dedicated Landscape Meters	Conn-ections	Coverage Rate	Targets				Savings for Completed Targets(AF)	
			Cum-ulative	Comp-leted	Remain-ing	Annual makeup[1]		
	1,329	90%	1,196	0	1,196	120	0	

TARGETS worksheet based on 2008 MOU										
	Calendar Year and (Year of Implementation)									
	2009 (1)	**2010 (2)**	**2011 (3)**	**2012 (4)**	**2013 (5)**	**2014 (6)**	**2015 (7)**	**2016 (8)**	**2017 (9)**	**2018 (10)**
	Metered Connections									
	1,329	1,347	1,362	1,377	1,393	1,408	1,424	1,437	1,449	1,438
TARGETS	**Council Coverage Requirement[3] and Annual and Cumulative Targets[1]**									
	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Dedicated Meters	0	2	1	1	1	1	1	1	1	-1
Annual Total[1]	120	121	121	121	121	121	121	121	121	119
Cumulative Total	120	241	362	483	604	725	846	967	1,088	1,207

1. Represent unmet targets between 1999-2008 and are added in a straight line to current targets.
2. 2009 coverage requirement is based on the 2008 CUWCC MOU.
3. Cumulative targets completed in 2009 and cumulative savings in 2009 includes cumulative amounts from historical savings.
4. Annual savings are calculated assuming that each budget results in 0.82 AF of savings per year.

Table B.10. Targets for CII customers with mixed use meter.

Worksheet to determine unmet targets from 1999 to 2008.								Note
Mixed Use CII Accounts	Conn-ections	Coverage Rate	Targets				Savings for Completed Targets(AF)	
			Cum-ulative	Comp-leted	Remain-ing	Annual makeup[1]		
	11,532	15%	1,730	155	1,575	157	13	

TARGETS worksheet based on 2008 MOU										
Mixed Use CII Accounts	**Calendar Year and (Year of Implementation)**									
	2009 (1)	**2010 (2)**	**2011 (3)**	**2012 (4)**	**2013 (5)**	**2014 (6)**	**2015 (7)**	**2016 (8)**	**2017 (9)**	**2018 (10)**
	Estimated Connections									
	11,532	11,858	12,201	12,544	12,888	13,231	13,574	13,935	14,296	14,657
TARGETS	**CUWCC Coverage Requirement[2] and Annual and Cumulative Targets[1]**									
	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%
Mixed Use	86	89	92	94	97	99	102	105	107	110
Annual Total[1]	244	246	249	252	254	257	259	262	265	267
Cummulative Total	244	490	739	991	1,245	1,502	1,761	2,023	2,288	2,555

1. Represent unmet targets between 1999-2008 and are added in a straight line to current targets.
2. 2009 coverage requirement is based on the 2008 CUWCC MOU.

APPENDIX C: COST AND BENEFIT ASSUMPTIONS

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Table C.1. Labor costs for implementing and managing the BMPs.

Cost Component		Note or Source
Administration Costs		
Staff hourly rate, with overhead	$53.50 /hr	
Field Labor Costs		
Field labor hourly rate, with overhead	$43.30 /hr	
Seasonal labor rate with overhead	/hr	
Staff Management of Landscape Budget Program		
Staff hourly rate, with overhead	$53.50 /hr	

Table C.2. Costs for implementing Residential Assistance Program BMP.

Cost Component			Note or Source
Administration Costs			
Staff hours to administer the retrofit program	80	hrs/yr	
Materials Costs (aerators, showerheads etc)			
Unit cost of materials- single family	$12	/unit	
Unit cost of materials- multi-family	$12	/unit	
Publicity Costs			
Marketing collateral cost	$4,583	/yr	Publicity costs is lump sum and apportioned for each BMP.
Advertising cost	$4,583	/yr	Publicity costs is lump sum and apportioned for each BMP.
Evaluation and Followup Costs			
Labor & Consultant costs	$0	/yr	currently none
Program Cost Sharing			
Cost Share from Others	$0	/yr	currently none

Table C.3. Costs for implementing Residential Landscape Surveys BMP.

Cost Component			Note or Source
Administration Costs			
Staff hours to administer the retrofit program	80	hrs/yr	
Materials Costs (aerators, showerheads etc)			
Unit cost of materials- single family	$12	/unit	
Unit cost of materials- multi-family	$12	/unit	
Publicity Costs			
Marketing collateral cost	$4,583	/yr	Publicity costs is lump sum and apportioned for each BMP.
Advertising cost	$4,583	/yr	Publicity costs is lump sum and apportioned for each BMP.
Evaluation and Followup Costs			
Labor & Consultant costs	$0	/yr	currently none
Program Cost Sharing			
Cost Share from Others	$0	/yr	currently none

Table C.4. Costs for implementing WaterSense washers BMP.

Cost Component			Note and Source
Administration Costs			
Staff hours to administer the retrofit program	80	hrs/yr	if labor is covered by coordinator , enter 0
Washing Machine Rebate Costs			
Rebate (or utility incentive cost)	$50	/rebate	
Rebate Processing Costs			
Average rebate processing cost	$20	/rebate	
Publicity Costs			
Marketing collateral cost	$4,583	/yr	Publicity costs is lump sum and apportioned for each BMP.
Advertising cost	$4,583	/yr	Publicity costs is lump sum and apportioned for each BMP.
Evaluation and Followup Costs			
Labor & Consultant costs	$0	/yr	currently none
Program Cost Sharing			
Cost Share from Others	$0	/yr	currently none

Table C.5. Costs for implementing WaterSense Toilets BMP.

Cost Component				Note and Source
Administration Costs				
Staff hours to administer the retrofit program	80	hrs/yr		
ULFT Rebate Costs	Single-family	Multi-family		
ULFT Cost	$175	$175	/rebate	
Rebate Processing Costs	Single-family	Multi-family		
Average rebate processing cost	$20	$20	/rebate	
Publicity Costs				

Marketing collateral cost	$4,583	/yr	Publicity costs is lump sum and apportioned for each BMP.
Advertising cost	$4,583	/yr	Publicity costs is lump sum and apportioned for each BMP.
Evaluation and Followup Costs			
Labor & Consultant costs	$0	/yr	currently none
Program Cost Sharing			
Cost Share from Others	$100,730	/yr	DWR Prop 50, SRCSD

Table C.6. Costs for implementing the Commercial, Industrial and Institutional BMP.

Cost Component			Note and Source
Administration Costs			
Staff hours to administer the retrofit program	240	hrs/yr	
Rebate Costs			
Toilets	$175	/unit	RWA rebate amount
Urinals	$175	/unit	RWA rebate amount
Washers	$175	/unit	RWA rebate amount
Outside Services Costs			
Consulting services costs	$0	/yr	
Publicity Costs			
Marketing collateral cost	$4,583	/yr	Publicity costs is lump sum and apportioned for each BMP.
Advertising cost	$4,583	/yr	Publicity costs is lump sum and apportioned for each BMP.
Evaluation and Followup Costs			
Labor & Consultant costs	$0	/yr	currently none
Program Cost Sharing			
Cost Share from Others	$102,518	/yr	DWR Prop 50, SRCSD

Table C.7. Costs for implementing Dedicated Landscape Meter BMP.

Cost Component			Note and Source
Budget Development Costs			
Landscape Measurement	$106/ site for measuring		CUWCC default
Establish Customer Notice/Billing System			
Link budgets to billing or customer notice system	$2,000		one-time setup cost
Staff Management of Budget Development			
Staff hours to manage budget development tasks	160	hrs/yr	
Staff Management of Budget Program (post development)			
Staff hours to manage budget program	24	hrs/yr	
Customer Followup Costs			
Percent of sites receiving follow up assistance	10	%/yr	
Per site follow up cost	200	/site	
Evaluation and Follow up Costs			
Labor & Consultant costs	$0	/yr	
Program Cost Sharing			
Cost Share from Others	$0	/yr	
Cost Share for Program Operation	$0	/yr	

Table C.8. Benefits of implementing Meter Retrofit and Conservation Pricing BMPs.

Meter Installation			Note and Source
Average annual water use by unmetered accounts in 2008		AF	
Average reduction in annual water use	20	%	CUWCC 2008 pg 27

Table C.10. Benefits of implementing the Residential Assistance Program BMP.

Indoor Savings Estimates	Single-family		Multi-family		Note and Source
Reduction in use	25	gpd	25	gpd	CUWCC 2005 pg 2-48
Savings Decay	15	%/yr	15	%/yr	CUWCC 2005 pg 2-48

Table C.11. Benefits of implementing the Residential Landscape Survey BMP.

Outdoor Savings Estimates			Note and Source
Average area surveyed	0.06	acres	Professional judgment
Average water use per acre	5.74	AF/acre/yr	2008 City data & professional estimate
Reduction in use	50	%	CUWCC default
Savings decay	25	%/yr	CUWCC 2005 pg 2-48

Table C.1B. Benefits of implementing the WaterSense Clothes Washer BMP.

WaterSense washers savings estimates			Note and Source
Savings per machine	5,085	gallons/year	CUWCC 2005 pg 2-13
Useful Life	12	yrs	CUWCC default
Percent free-riders	5	%/yr	Professional judgment

Table C.12. Benefits of implementing the WaterSense Toilet BMP.

Toilet Savings Estimates	Single-family		Multi-family		Note and Source
Daily savings per toilet	27.4	gpd	44	gpd	Increased CUWCC default by 20% for HET.
Natural replacement rate	4	%/yr	4	%/yr	Sacramento Co Census data
Free-riders	5	%	5	%	Professional judgment

Table C.13. Savings estimates per conservation component and component life for the Commercial, industrial, and institutional (CII) BMP (CUWCC, 2008).

Conservation Component	Annual Savings	Life
	acre-feet	years
High-efficiency toilets	0.042	25
High-efficiency urinals	0.069	25
Ultra low volume urinals	0.081	25
Zero consumption urinals	0.092	25
Commercial high-efficiency washers	0.117	10
Cooling tower conductivity controllers	1.032	5
Cooling tower pH controllers	C.982	5
Connectionless food steamers per compartment	0.250	10
Medical equipment steam sterillzers	1.538	20
Water-efficient ice machines	0.835	10
Pressurized water broom	0.153	5
Dry vacuum pumps	0.640	7

Table C.14. Benefits of implementing the Mixed Use Landscape Survey BMP.

Mixed use outdoor savings estimate			Note and Source
Average area surveyed	.05	acres	2008 City estimate
Average water use per area	4.2	AF/acre/yr	2008 City estimate
Reduction in use	15	%	CUWCCC default
Savings decay	5	%/yr	CUWCCC default

Table C.15. Benefits of implementing the Dedicated Landscape Meter BMP.

Dedicated Landscape Meters			Note and Source
Average use by sites with dedicated irrigation meters	6.38	AF	2008 City estimate
Reduction in annual use	20	%/yr	CUWCC default

Appendix J

AUTOMATED METER INFRASTRUCTURE PLAN

REPORT TO COUNCIL
City of Sacramento

915 I Street, Sacramento, CA 95814-2604
www. CityofSacramento.org

Staff
November 4, 2010

Honorable Mayor and
Members of the City Council

Title: Automated Meter Infrastructure (AMI) and Water Conservation

Location/Council District: Citywide

Recommendation: Receive and File

Contact: Michael Malone, Field Services Manager, 808-6226
Terrance Davis, Program Manager, 808-4929
Julie Friedman, Water Conservation Coordinator, 808-7898

Presenters: Terrance Davis, Program Manager

Department: Utilities

Division: Field Services

Organization No: 14001451

Description/Analysis

Issue: Staff is bringing forward a workshop on the Automated Meter Infrastructure (AMI) for discussion relative to current program deployment and water conservation benefits. With the implementation of AMI beginning in 2009, the Department of Utilities is progressing toward further reductions in future water demands. The AMI generated data provides the Department with the ability to enhance water conservation measures and discourage leaks.

Policy Considerations: Metered water service billing, in and of itself, provides customers with a financial incentive to avoid water waste. Indoor water conservation education will help the City manage its potable water supply in the short and long-term and help to reduce the effects of drought and water supply shortage within the City. Recent State legislation (SBX7 7) will require the City to achieve at least a 20% reduction in per capita water use by 2020.

Environmental Considerations:

California Environmental Quality Act (CEQA): The policy direction sought in this report does not constitute a "project" and, therefore, is exempt from CEQA review [CEQA Guidelines section 15378(b)(2)]. Moreover, reducing water waste and increasing water conservation through indoor water conservation regulations would not have any significant adverse environmental effects necessitating CEQA review [CEQA Guidelines Section 15061(b)(3)].

Sustainability Considerations: The implementation of AMI promotes sustainability by allowing the City to collect meter reads accurately and bill based on water consumption, thereby providing incentives for City customers to use water more efficiently. Additionally, the promotion of water conservation regulations is consistent with the Sustainability Master Plan goals of improving water conservation and water conservation awareness.

Commission/Committee Action: Not applicable

Rationale for Recommendation: AMI technology provides an opportunity for staff and customers to accurately account for water consumption and therefore serves as an excellent water conservation tool. Implementation of effective water conservation regulations and education will promote water efficiency and encourage the repair of indoor leaky or substandard fixtures.

Financial Considerations: None.

Emerging Small Business Development (ESBD): Not applicable as no goods or services will be purchased as a result of the proposed actions in this report.

Respectfully Submitted by: _____
Michael Malone
Manager, Field Services

Approved by: _____
Marty Hanneman
Director, Department of Utilities

Recommendation Approved:

_____
GUS VINA
Interim City Manager

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Attachments

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3	Pg	8	City of Sacramento AMI Leak Investigation Pilot Results
4	Pg	11	City Customer Leak Investigation Letter
5	Pg	12	PowerPoint Presentation

APPROVED AS TO FORM:

_____
CITY ATTORNEY

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Attachment 1

BACKGROUND

Automated Meter Infrastructure (AMI) System

On June 28, 2009, City Council approved Resolution 2009-501 authorizing the City Manager to sign agreements with Ferguson Waterworks and Datamatic, Ltd. to begin the implementation of the water meter reading automation system. The deployment of this system, also referenced as Automated Meter Infrastructure (AMI), allows the City to collect meter reads wirelessly through a radio signal. The system captures data for volumetric billing and additional consumption data including customer leaks, meter tampers and spikes in usage. Over time, the use of AMI-generated short interval data as a conservation tool will help enforce indoor water conservation regulations.

In October 2009, the City embarked on an ambitious project to deploy AMI technology to all new water meter installations and replacements. In addition, AMI installations have begun on the 32,000 existing drive-by Automated Meter Reading (AMR) devices currently in operation. In Fiscal Year (FY) 2010/11 the Department of Utilities plans to replace 9,000 existing drive-by units with AMI technology. In subsequent years an additional 5,000 replacements are planned for completion.

The full City-wide deployment of this technology will take several years to complete. However, the City is already taking advantage of the capabilities of this system in American Recovery and Reinvestment Act (ARRA) funded meter project areas and has installed the technology on 13,000 water service connections to date (as of October 2010). After the completion of thorough testing, 7,600 connections are currently in production, meaning that active data collection is occurring and being transmitted to the City's utility billing system. The remaining connections will be transitioned into production in phases upon the completion of full quality assurance testing.

Using a subset of 2,360 accounts as a pilot group, staff used AMI generated data and field investigations to identify customer- side leaks at 216 residences (9% of pilot accounts) located in Natomas and South Sacramento. The results of the pilot determined projected annual water losses at these 216 sites of 142,352 gallons per month. Attachment 3 shows the areas evaluated and provides additional detail of the estimated water losses.

Indoor Water Conservation Programs

As previously indicated, the AMI system includes several leak indicators that are triggered when predetermined thresholds of continuous water consumption are detected. Staff receive AMI email notifications of leak alarms and conduct field investigations to assess the validity of the leak. Upon the conclusion of the field investigation, tenants and/or property owners receive an informational letter (see Attachment 4) and a tip card offering an invitation for free water conservation services such as a Water Wise House Call (WWHC) and rebates for high efficiency toilets and washers.

Staff has also researched AMI and indoor water conservation policies of other agencies. A brief summary of these is provided in Attachment 2. The main elements of these policies are:

- Many agencies envision future potential of AMI given their declining water supply and they envision utilizing data to move toward proactive enforcement of water waste in the next one to two years. It was found that indoor water waste is not strictly enforced unless or until an agency has drought conditions. Many of the agencies researched use warnings and/or incentives (rebates) and are not bringing this to the penalty stage yet, but are planning to do so.

- Two of the surveyed agencies plan to have more aggressive enforcement with drought conditions. Currently, indoor leak repairs are voluntary.

- Some agencies viewed most internal leaks, under normal supply conditions, as an economic issue for the owner. They intended to use the AMR/AMI data for enforcing water waste if or when needed. Currently their rules are sufficient for enforcement of water waste supported by the data.

- Agencies are looking to improve leak detection, reduce lost water and manage rate structures that encourage conservation. They find they can work smarter and more efficiently with AMI while protecting clean drinking water. They find there are savings in production costs for the customer as well as for the agency. They can identify leaks before they become a significant issue for them and for the customer.

Attachment 2

Indoor Water Conservation, Cities in California and United States

AMI technology is replacing the historical means of using the meter leak indictor with a "zero read test" where an on-site auditor would shut-off all water use and see if the meter was still running to indicate a leak (see Figure 1, below).

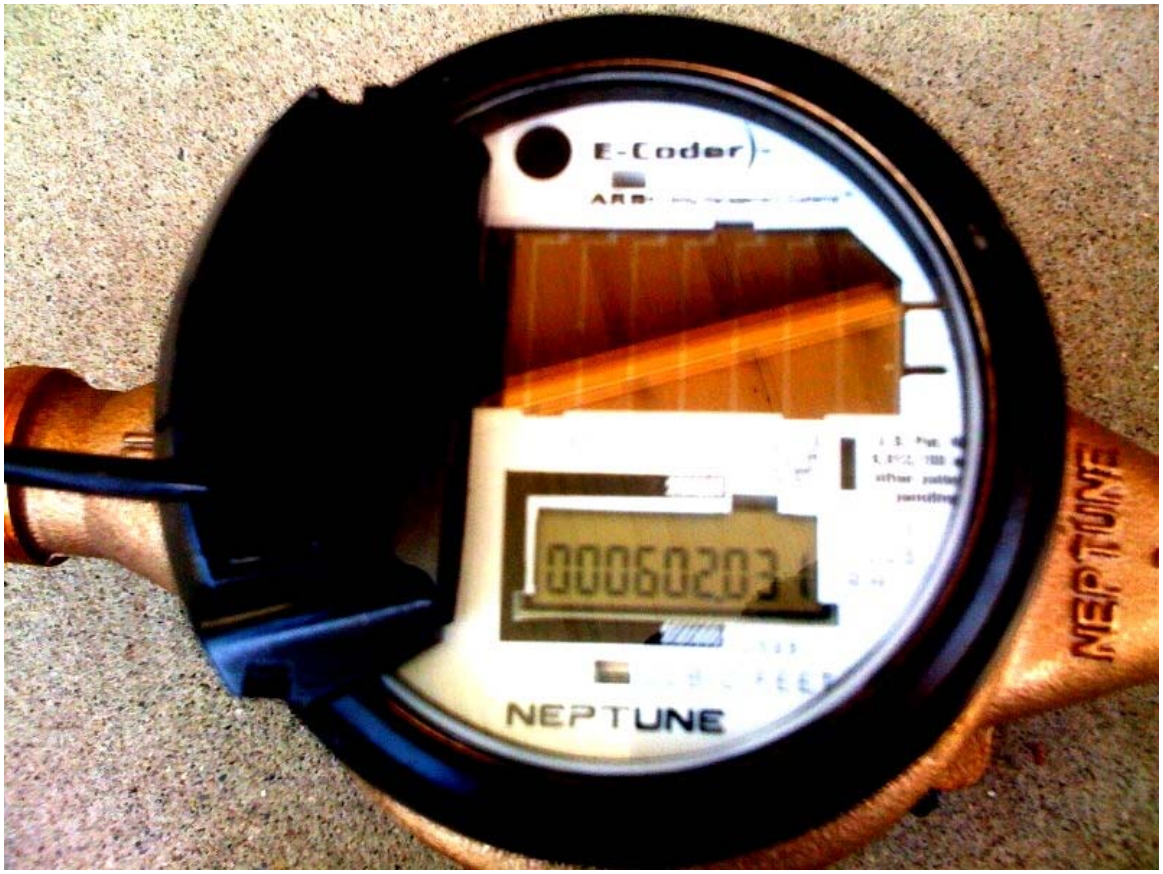

FIGURE 1. Manual Meter Read of Leak Indicator

With the capabilities of AMI with remote data collection and computer post-processing, staff now have a much more time efficient (and thus less costly) means to determine continual flow through a meter as a possible leak and target customers for a Water Wise House Call to help address their water waste.

A number of agencies are looking to reduce water waste and are investigating the use of AMI for leak detection on the customer side of the meter. A brief summary of some agencies with indoor conservation policies that are currently in place is provided in Table 1.

Table 1. Summary of Indoor Conservation Programs for Agencies with AMI

City/Water Agency	Number of Metered Service Connections	Indoor Conservation Incentives[1]	Action for Indoor Leakage
City of Folsom, CA	24,500	Yes	None currently
East Bay Municipal Utility District (EBMUD), CA	375,500	Yes	Beta-testing; email notification to customers
Lake Arrowhead CSD, CA	8,300	Yes	Staff contact or written if not available
Cucamonga Valley Water District, CA	49,000	Yes	Email notification to customers
City of Sacramento, CA	136,636	Yes	Targeted customer notification
Las Vegas Valley Water District, NV	360,000	Yes	Targeted customer notifications from "Trickle Report"
Denver Water, CO	303,900	Yes	Targeted customer notifications
City of New York, NY	830,000	Yes	Future email notification to customers

[1] Indoor conservation incentives programs such as rebates and water wise house calls

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Attachment 3

AMI Leak Investigation Pilot Results

Water Conservation Staff has completed a pilot investigation of a sample of 216 customer accounts in the Natomas Gateway West and the South Sacramento Valley Hi neighborhoods. Figure 1 shows the approximate locations of the sample project sites. The Summary Report, Leak Investigations in 2010 follows.

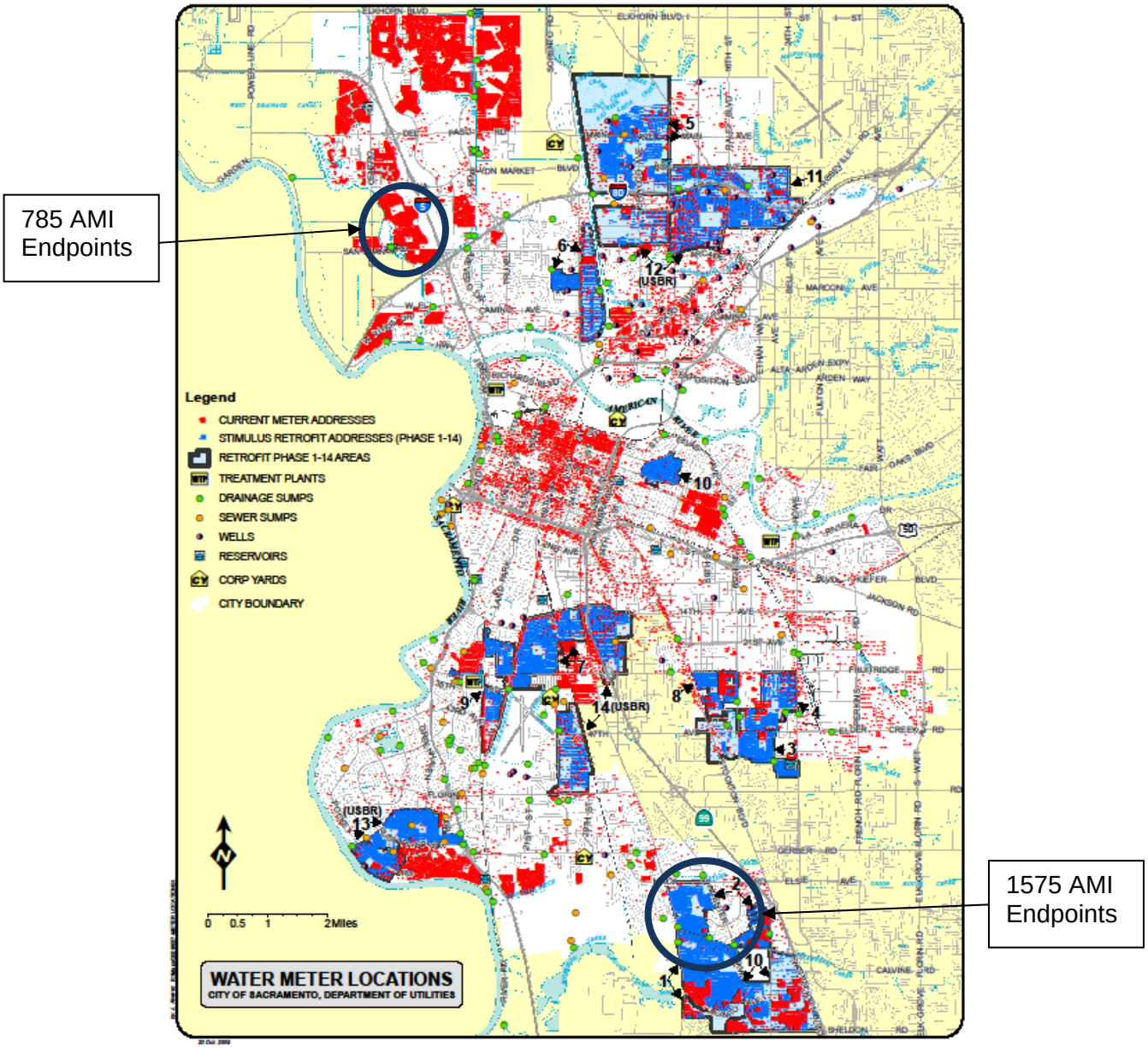

FIGURE 1. AMI Leak Investigation Pilot Locations

Summary Report, Leak Investigations in 2010

From AMI data, Water Conservation Specialists investigated irregular water usage for possible indoor or outdoor leaks at 19 Single Family Residential Homes (SFR's), one commercial site, and one multi-family apartment complex in North Natomas in January and February 2010. In May and June, 2010, 197 SFR's in South Sacramento were investigated. The tenants and property owners in these two areas received an informational letter and a tip card offering an invitation for free water conservation services such as a Water Wise House Call (WWHC) and rebates for high efficiency toilets and washers. Outdoor water waste issues were addressed with a Notice of Violation (NOV).

Information with door tags was left at the properties; however, some of the homes are rental property and needed information sent to the property owners. Since the initial pilot investigation in January, staff developed and sent a letter to the property owners, as well as leaving a door hanger and letter at the tenant's door about the unusual water usage and will see if this helps in aiding repairs (see Attachment 4).

Leak Investigation Results in Natomas, Gateway West (January, February 2010)
Of the 19 SFR's investigated, 14 (or 73%) were verified to have issues. The following describes the results of the field investigations:

- 16 SFR's (84%) were verified to have leaks – 3 SFR's had outdoor leaks (16%) and were issued a NOV**.** [2]
- One commercial site included a grocery store with regular water use because of a cooling tower and sprinkler system for the produce department.
- One apartment complex (241 units) indicated continual water use, but field investigations did not find leaks; further investigation is needed via Water Wise House Calls (WWHC's) for potential toilet leaks.
- Five WWHC's were conducted.

Estimate of Water Saved
Staff estimates a savings of approximately 4,400 aggregate gallons of water per day by addressing three verified irrigation leaks; 25 percent of customers investigated pursued a WWHC.

Estimate of Water Loss
Of the initial 19 SFR's identified for issues, 16 SFR's (84%) continued to indicate a leak in February, 2010. Water Conservation Staff estimated that approximately 10,000 aggregate gallons per day was being lost.

[2] Determination of indoor leak made by visual inspection and isolation of the house valve to check if meter stopped registering

Leak Investigation Results in South Sacramento, Valley Hi (May, June 2010)

Of the 197 SFR's investigated, 140 (or 71%) were verified to have issues. The following describes the results of the field investigations:

- 57 SFR's (30%) did not indicate a leak.
- 140 SFR's (70%) were verified to have leaks - 12 SFR's (9%) had outdoor leaks and were issued a NOV.
- 6 WWHC's were provided.

Estimate of Water Saved

Staff estimates a savings of 13,000 aggregate gallons of water per day by providing WWHC's for addressing leaks; nine percent of customers investigated pursued a WWHC.

Estimate of Water Loss

Water Conservation Staff estimated that approximately 29,000 aggregate gallons per day was potentially lost during the May-June, 2010 investigation, at a cost of $750 per month.

Of the initial 197 SFR's identified for issues, one-third of the homes (65 SFR's or 33%) continued to indicate a leak in July, 2010. Even with the WWHC's offered and the information left at the door, it is still up to the resident or business owner to either repair the "leak" or notify property owners or management to repair the issue.

City Customer Leak Investigation Letter **Attachment 4**

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DEPARTMENT OF UTILITIES

WATER CONSERVATION

CITY OF SACRAMENTO
CALIFORNIA

2260 GLEN ELLEN CIRCLE
SACRAMENTO, CA
95822-3634

PH 916-264-5011
FAX 916-808-5655

Date: _____

Dear Customer:

The Department of Utilities automated water meter read system indicated irregular water use at _____. Following a visual inspection of the water meter servicing the property by a Water Conservation Inspector, an approximate water loss of _____ gallons per day has been estimated.

Irregular use is often an indication of an indoor leak (such as a possible leaky toilet) or outdoor irrigation system leak (such as a leaky valve). We would like to assist you further in identifying the reason for the irregular water usage and recommend that you call us to schedule a free Water Wise House Call. Once the free house call is scheduled, a Water Conservation Inspector will visit your home or business bringing water-efficient products, tools and information to help evaluate your system and water use. Recommendations for using water wisely, indoors and out, will also be provided.

The following table provides a conversion of gallons to cubic feet for the estimated water loss, based upon the irregular use:

Gallons/Day Loss	**Gallons/Month Loss**	**Cubic Foot (CF) conversion** (gallons divided by 7.48 equals CF)
100	3,100	414.438
250	7,750	1036.096
400	12,400	1657.754

We are here to assist you in identifying ways to save money by saving water. To schedule a free water wise house call appointment, please call 311 or 916-264-5011.

Sincerely,

Water Conservation Office

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Attachment 5

Spare the Water SACRAMENTO

Outline

- Overview of Automated Meter Infrastructure (AMI)
- Update on AMI Implementation Status
- Water Conservation Benefits
- Questions

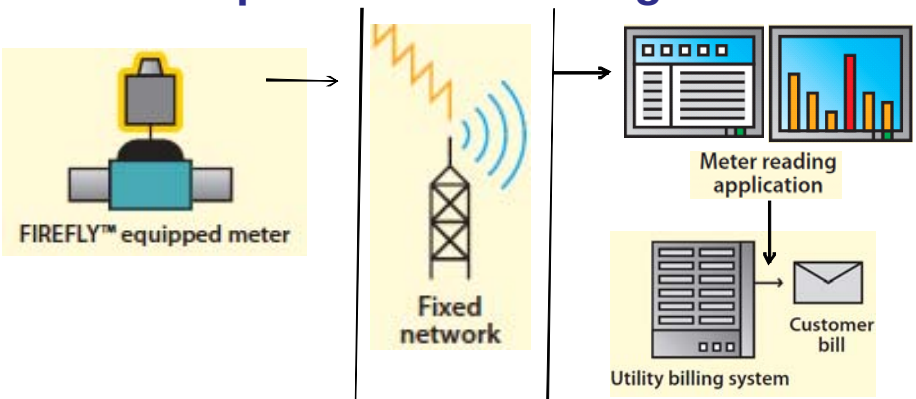
Spare the Water SACRAMENTO

Automated Meter Infrastructure (AMI) Project Background

- Program was approved by City Council on July 28, 2009
- City evaluated multiple options and purchased a mesh fixed network solution
- AMI enhances operational efficiency by eliminating manual and drive-by read collection systems

Spare the Water SACRAMENTO

AMI Components and Design



Meter Interface Units (MIUs) | **Gateways Repeaters** | **Reading and Billing Applications**

Spare the Water SACRAMENTO

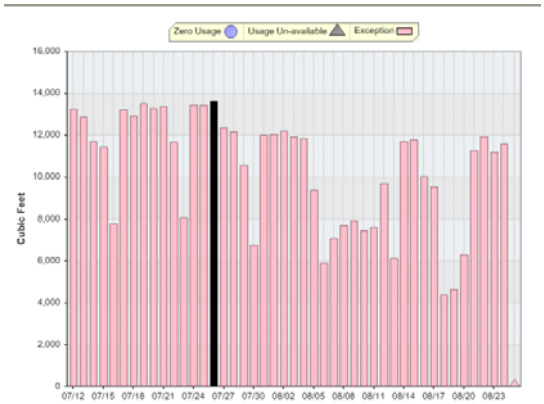
MOSAIC Meter Reading Application

Available Data

- Billing Reads
- Customer Data
- Mapping Links

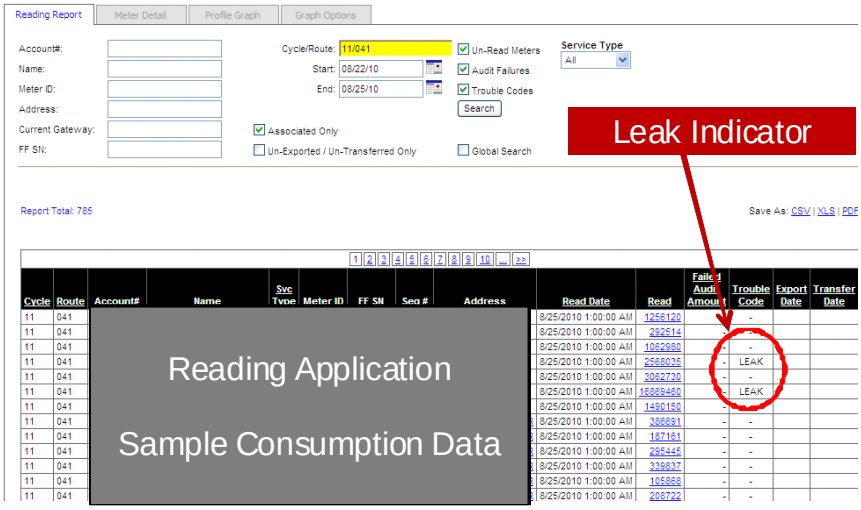
System Alarms

- Leak Detection
- High Flow
- Meter Tampering



Spare the Water SACRAMENTO

MOSAIC Meter Reading Application



Spare the Water SACRAMENTO

Current AMI Project Implementation

- American Recovery and Reinvestment Act funding accelerated implementation
- 13,000 meter interface units (MIUs) have been installed (as of October 2010)
- 9,000 additional MIUs scheduled for installation by April 2011
- 9,000 MIUs planned for FY11/12 installation as replacements and new meter retrofits

Spare the Water SACRAMENTO

Leak Detection Pilot Results

- **2,360 AMI installations reviewed Dec to June 2010**
  - 216 (9%) single family residences exhibited leak alarms (24 hours of continuous consumption)
  - Aggregate water loss for 216 leaks projected at 142,352 gallons per month
  - Staff conducted field investigations to verify leaks and sent letters to customers to offer water conservation services
  - As of July 2010, 35% of leak alarms remained

Spare the Water SACRAMENTO

Water Conservation Benefits

- **Improve Leak Detection**
  - Manage before significant issue, reduce lost water
- **Enforce Water Waste**
  - Provides an additional tool for enforcement of City code
- **Improve Customer Water Efficiency**
  - In the future customers will be able to monitor daily consumption via website

Spare the Water SACRAMENTO

Questions?

Appendix K

DRAFT WATER EFFICIENT LANDSCAPE ORDINANCE

REPORT TO COUNCIL
City of Sacramento 8

915 I Street, Sacramento, CA 95814-2671
www. CityofSacramento.org

CONSENT
December 15, 2009

Honorable Mayor and
Members of the City Council

Title: Water Efficient Landscape Ordinance M09-042

Location/Council District: Citywide

Recommendation: Adopt an **Ordinance** repealing and adding Chapter 15.92 to the Sacramento City Code relating to water efficient landscape and irrigation.

Contact: Joy Patterson, Principal Planner, (916) 808-5607

Presenter: Not Applicable

Departments: Community Development, Parks, Utilities and Transportation

Divisions: Building

Organization No: 21001211

Description/Analysis:

Issue: The City is required to adopt a new water efficient landscape ordinance by January 1, 2010. If the City fails to adopt an ordinance by that date, the updated model water efficient landscape ordinance approved by the State Department of Water Resources (DWR) will apply within the City as a matter of law.

In 1992, Chapter 15.92 was added to the Sacramento City Code (Ord. No. 92-064) to establish requirements for water conservation in landscaping for industrial, commercial, office, and multi-family residential developments, common areas, and parks and other public recreation areas. This chapter established standards and procedures for the design, installation, and management of landscapes for the purpose of avoiding excessive water demands and minimizing landscape vulnerability to periods of severe drought.

Chapter 15.92 was adopted in response to the enactment of the State Water Conservation in Landscaping Act in 1990. That law directed the State Department of Water Resources (DWR) to prepare a model water efficient landscape ordinance and required cities and counties to either adopt a local landscape water conservation ordinance or adopt findings that a water efficient

landscape ordinance was unnecessary due to local topographical, geographic or climatic conditions, or water supply. Chapter 15.92 was likely based on DWR's original model ordinance.

More recently, the State legislature adopted the Water Conservation and Landscaping Act of 2006 that directed DWR to prepare an updated model water efficient landscape ordinance by January 1, 2009. Similar to the earlier statute, the 2006 Act requires cities and counties to adopt either DWR's model ordinance or its own ordinance that is at least as effective as the model ordinance in regard to water conservation (opting out is no longer provided for). If the City fails to adopt an ordinance as described, DWR's updated model ordinance will apply within the City as a matter of law. The deadline for the City to act is January 1, 2010. The City must notify DWR by January 31, 2010 as to whether it is subject to the updated model ordinance or, if not, submit to DWR a copy of its local ordinance.

Because DWR did not approve and distribute the updated model ordinance until October of this year, staff has not had an opportunity to thoroughly evaluate the updated model ordinance. However, the January 1, 2010 deadline for adoption must still be met. For this reason, the draft ordinance presented for the committee's consideration and recommendation has made minimal changes to the updated model ordinance, with modifications limited to those needed to conform the model ordinance to the City's code and organizational structure. No changes have been made to any of the performance measures or standards for landscape and irrigation water efficiency. Staff recommends that the proposed ordinance be adopted to meet the January 1, 2010 deadline. Once in place, staff can monitor its implementation and, if further revisions are needed to make it more workable based on feedback from City staff, stakeholders, or per State direction, this can be done during 2010 or later as needed.

Attachment 1 contains background and explanatory materials provided by DWR on the updated model ordinance and the requirements of the Water Conservation and Landscaping Act of 2006. Attachment 2 is a copy of the current Chapter 15.92. Attachment 3 is a copy of the proposed ordinance.

Policy Considerations: The proposed ordinance is consistent with the City's Strategic Plan goal to achieve sustainability and livability in the City of Sacramento.

Environmental Considerations:

California Environmental Quality Act (CEQA): The proposed ordinance is not subject to the provisions of CEQA pursuant to Section 15061(c)(2). This section states that an activity that will not result in a direct or reasonably foreseeable indirect physical change in the environment is not subject to CEQA.

Sustainability Considerations: Water conservation and efficient water use is important for maintaining and protecting the water supply during dry years and minimizing the City's carbon footprint by reducing the demand for water diversion and treatment. The City's efforts benefit California's river resources by reducing the region's surface water demand.

Committee/Commission Action: The Law and Legislation Committee heard this item on December 1, 2009, and by a vote of four (4) ayes and zero (0) noes recommended approval and forwarded it to Council.

Rationale for Recommendation: The proposed ordinance updates the City's water conserving landscape requirements in Chapter 15.92 to conform with State law.

Financial Considerations: None.

Emerging Small Business Development (ESBD): No goods or services are being purchased under this report.

Respectfully Submitted by: David W. Kwong
David Kwong
Planning Manager

Approved by: David W. Kwong
David Kwong
Acting Director of Community Development

Recommendation Approved:

For RAY KERRIDGE
City Manager

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	Report	Pg	1
Attachments:			
1	State Department of Water Resources materials on updated model ordinance and the requirements of the Water Conservation and Landscaping Act of 2006.	Pg	4
2	Sacramento City Code Chapter 15.92 (Existing) Landscaping Requirements for Water Conservation	Pg	8
3	Water Efficient Landscape Ordinance	Pg	18

Attachment 1

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

OCT 0 8 2009

Cities and Counties:

Adoption of the Updated Model Water Efficient Landscape Ordinance

Your action is required to conserve water supplies and comply with State law. The Water Conservation in Landscaping Act of 2006 (Assembly Bill 1881, Laird) requires cities and counties, including charter cities and charter counties, to adopt landscape water conservation ordinances by January 1, 2010. In accordance with this law, the Department of Water Resources (DWR) has prepared an updated Model Water Efficient Landscape Ordinance (MWELO) for your use, please see Enclosure 1. Text of the updated MWELO is also posted on DWR's Water Use and Efficiency Branch website at http://www.water.ca.gov/wateruseefficiency/landscapeordinance/. All local agencies (cities, counties, cities and counties, charter cities and charter counties) have until January 1, 2010, to adopt DWR's updated MWELO or their own local water efficient landscape ordinance. If a local agency has not adopted its own ordinance on or before January 1, 2010, the updated MWELO shall apply within the jurisdiction of that local agency as of that date.

DWR is working with local agencies and governments to conduct outreach activities including workshops to assist implementation of water efficient landscape ordinances. For October and November workshops, please see Enclosure 2. For questions on the updated MWELO and information on DWR's outreach activities, please e-mail mweo@water.ca.gov or contact us at (877) 693-5610 (877-MWELO10), so that a member of our staff can provide personalized service.

Each local agency has until January 31, 2010, to either notify DWR that it has adopted DWR's updated MWELO; or submit to DWR a copy of its adopted water efficient landscape ordinance, a copy of its findings, and evidence that its water efficient landscape ordinance is at least as effective at conserving water as DWR's updated MWELO. Please submit all notifications and documents to:

Mr. Simon Eching
California Department of Water Resource
Water Use and Efficiency Branch
Post Office Box 942836
Sacramento, California 94236-0001

Cities and Counties
OCT 08 2009
Page 2

In California's warm, dry climate, more than half of urban water supplies may be used for landscape irrigation. Ensuring efficient landscapes in new developments and reducing water waste in existing landscapes are among the most cost-effective ways to stretch our limited water supplies and ensure that we continue to have the water we need. Other benefits include reduced irrigation runoff, reduced pollution of waterways, drought resistance, and less green waste.

Thank you for your help conserving California's water supplies.

Sincerely,

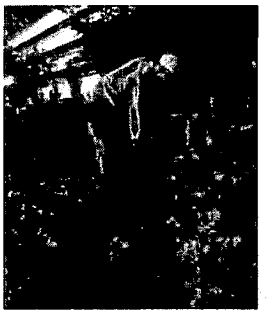
Lester A. Snow
Director

Enclosures

cc: California Urban Water Suppliers

The Updated Model Water Efficient Landscape Ordinance

CALIFORNIA DEPARTMENT OF WATER RESOURCES



Landscapes are essential to the quality of life in California. They provide areas for recreation, enhance the environment, clean the air and water, prevent erosion, offer fire protection and replace ecosystems lost to development.

California's economic prosperity and environmental quality are dependant on an adequate supply of water for beneficial uses. In California, about half of the urban water used is for landscape irrigation. *Ensuring efficient landscapes* in new developments and reducing water waste in existing landscapes are the most cost-effective ways to stretch our limited water supplies and ensure that we continue to have sufficient water for California to prosper.

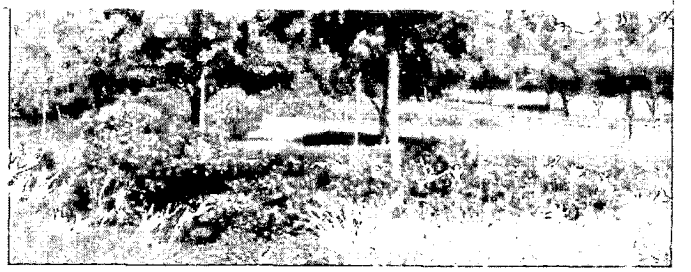
The Water Conservation in Landscaping Act of 2006 (Assembly Bill 1881, Laird) requires cities, counties, and charter cities and charter counties, to adopt landscape water conservation ordinances by January 1, 2010. Pursuant to this law, the Department of Water Resources (DWR) has prepared a Model Water Efficient Landscape Ordinance (Model Ordinance) for use by local agencies. The Model Ordinance was approved by the Office of Administrative Law on September 10, 2009. The Model Ordinance became effective on September 10.

All local agencies must adopt a water efficient landscape ordinance by **January 1, 2010**. The local agencies may adopt the state Model Ordinance, or craft an ordinance to fit local conditions. In addition, several local agencies may collaborate and craft a region-wide ordinance. In any case, the adopted ordinance must be as effective as the Model Ordinance in regard to water conservation.

For more information, please visit our web site at
http://www.water.ca.gov/wateruseefficiency/landscapeordinance/

DWR October 2009

Model Water Efficient Landscape Ordinance
CALIFORNIA DEPARTMENT OF WATER RESOURCES



Important points to consider...

Water purveyors have an important role.
The enabling statute was directed to local agencies that make land use decisions and approve land development. Active participation by water purveyors can make the implementation, enforcement and follow-up actions of an ordinance more effective.

Most new and rehabilitated landscapes are subject to a water efficient landscape ordinance. Public landscapes and private development projects including developer installed single family and multi-family residential landscapes with at least 2500 sq. ft. of landscape area are subject to the Model Ordinance .

Homeowner provided landscaping at single family and multi-family homes are subject to the Model Ordinance if the landscape area is at least 5000 sq. ft

Existing landscapes are also subject to the Model Ordinance.
Water waste is common in landscapes that are poorly designed or not well maintained. Water waste (from runoff, overspray, low head drainage, leaks and excessive amounts of applied irrigation water in landscapes is prohibited by Section 2, Article X of the California Constitution.

Any landscape installed prior to January 1, 2010, that is at least one acre in size may be subject to irrigation audits, irrigation surveys or water use analysis programs for evaluating irrigation system performance and adherence to the Maximum Applied Water Allowance as defined in the 1992 Model Ordinance with an Evapotranspiration Adjustment Factor (ETAF) of 0.8. Local agencies and water purveyors (designated by the local agency) may institute these or other programs to increase efficiency in existing landscapes.

All new landscapes will be assigned a water budget.
The water budget approach is a provision in the statute that ensures a landscape is allowed sufficient water. There are two water budgets in the Model Ordinance; the Maximum Applied Water Allowance (MAWA) and the Estimated Total Water Use (ETWU).

The MAWA, is the water budget used for compliance and is an annual water allowance based on landscape area, local evapotranspiration and ETAF of 0.7. The ETWU is an annual water use estimation for design purposes and is based on the water needs of the plants actually chosen for a given landscape. The ETWU may not exceed the MAWA.

Water efficient landscapes offer multiple benefits.
Water efficient landscapes will stretch our limited water supplies. Other benefits include reduced irrigation runoff, reduced pollution of waterways, less property damage, less green waste, increased drought resistance and a smaller carbon footprint.

The Department of Water Resources will offer technical assistance.
The Department plans to offer a series of workshops, publications and other assistance for successful adoption and implementation of the Model Ordinance or local water efficient landscape ordinances. Information regarding these resources may be found on the DWR website: **http://www.water.ca.gov/wateruseefficiency/landscapeordinance/**
Questions on the Model Ordinance may be sent by e-mail to DWR staff at: **mweo@water.ca.gov.**

Attachment 2

Chapter 15.92 LANDSCAPING REQUIREMENTS FOR WATER CONSERVATION

15.92.010 Purpose.

The purpose of this chapter is to define the standards and procedures for the design, installation, and management of landscapes in order to utilize available plant, water, land, and human resources to the greatest benefit of the people of the city. Skillful planting and irrigation design, appropriate use of plants, and intelligent landscape management can assure landscape development that avoids excessive water demands and that is less vulnerable to periods of severe drought. The regulations contained in this chapter shall be known as the city "water conserving landscape requirements." (Prior code § 9.30.1400)

15.92.020 Applicability.

These requirements shall be applicable to new and rehabilitated landscaping for industrial, commercial, office and institutional developments; to parks and other public recreational areas; to multi-family (four or more units) residential and PUD common areas; to model home complexes with three or more model homes; and to city road medians and corridors. (Prior code § 9.30.1401)

15.92.030 Implementation.

To assure that the purpose of this chapter is carried out, improvement plans and building permits will not be approved until a submittal conforming to the specific provisions of this chapter shall have been approved by the city department of planning and development. A fee set by resolution of the city council shall accompany the submittal. (Prior code § 9.30.1402)

15.92.040 Exceptions.

The director may authorize conditional exceptions to any of the design and improvement standards in this chapter. Such exceptions may be granted if the director finds in writing that the proposed design or improvement is in substantial compliance with the purpose and intent of the standard to be excepted.

This chapter shall not be applied so as to modify landscaping requirements set forth as a condition on a special permit or other land use entitlements. (Prior code § 9.30.1403)

15.92.050 Definitions.

Unless the context specifically indicates otherwise, the meaning of terms used in this chapter shall be as defined in this section.

"Amendment" means any material added to the soil to alter the pH or improve the physical properties of the soil.

"Application rate" means the rate of irrigation (inches/hour or gallons per minute) at which water is applied by an irrigation system.

"Automatic control valve" means a valve in an irrigation system which is activated by an automatic electric controller via an electric control wire.

"Automatic irrigation system" means an irrigation system that can be controlled without manual manipulation and which operates on a preset program.

"Contour" means a line drawn on a plan which connects all points of equal elevation above or below a known or assumed reference point.

"Controller" means an automatic timing device with enclosure, which signals automatic valves to open and close on a preset program.

"Conversion factor" means the number 0.62 is used to convert the maximum applied water allowance from acre-inches per acre per year to gallons per square foot per year.

"Coverage" is a general term used with respect to the spacing of sprinkler heads, which defines the manner in which water is applied.

Cycle. In irrigation, the complete operation of a controller station.

"Designer" means a person authorized to practice landscape architecture pursuant to Business and Professions Code Division 3, Chapter 3.5.

"Director" means the director of the planning and development department, or the director's designee.

"Drip irrigation" means low volume irrigation.

"Estimated applied water use" means the amount of annual applied water recommended in the irrigation schedule.

ET Adjustment Factor. The number 0.8 is used to adjust for plant factors and irrigation efficiency when determining the amount of water that needs to be applied to the planting area.

"Grading" means earthwork performed to alter the natural contours of an area to be planted.

"Hydrozone" means a portion of the planting area having plants grouped according to water need.

"Infiltration rate" means the rate (inches per hour) in which water moves through soil under natural conditions.

"Irrigation system" means a complete connection of system components, including the water distribution network and the necessary irrigation equipment and downstream from the backflow prevention device.

"Maximum applied water allowance" means the desired limit of annual applied water for the established planting area.

"Median" means a planted area which separates two roadways or divides a portion of a road into two or more lanes.

"Mulch" means materials such as bark or sawdust placed on the soil surface to retain moisture, retard weed growth, or prevent erosion.

"Overspray" means water which is discharged from a pop-up or spray head which lands outside of the planting area.

"P.S.I" means pounds per square inch gauge water pressure.

"Percolation" means the movement of water through soil.

"Permeability" means the quality of a soil which allows water and air to pass through it.

"Planting area" means the parcel area less building pad(s), driveway(s), patio(s), deck(s), walkway(s) and parking area(s). Planting area includes water bodies (i.e., fountains, ponds, lakes) and natural areas.

"Planting plan" means a plan showing the features, contours, and dimensions of a plot of land, along with the location and dimensions of elements to be constructed.

"Point of connection" means the point at which the irrigation system is connected to the public water system. This location is normally identified by the point at which a water meter is located or will be installed.

"Precipitation rate" means the amount of water, in inches per hour, discharged by a group of sprinkler heads.

"Rain shutoff" means a feature of an automated irrigation system which interrupts the normal irrigation cycle when it detects a significant amount of rainfall.

"Reference evapotranspiration" or "ETo" means an estimate of the annual evapotranspiration of a large field of four-inch to seven-inch tall, cool-season grass that is well watered. For the city of Sacramento, the ETo is 51.9.

"Rehabilitated landscape" means any planting area in which fifty (50) percent of existing landscape materials are replaced or modified within any twelve (12) month period. Examples include a change of plants or ground cover, installation of a new irrigation system, and grading modifications.

"Runoff" means water which is not absorbed by the soil to which it is applied. Runoff usually occurs when water is applied at too great a rate or when water is applied to a steep slope.

"Station" means a position on an automatic irrigation controller which indicates the control point of automatic irrigation valves.

"Tensiometer" (or "moisture sensor") means an instrument for measuring the moisture content of the soil and capable of interrupting the irrigation cycle when excessive or adequate moisture is detected.

"Toe of slope" means a horizontal section located at the base of a slope.

"Turf" means a surface layer of earth containing grass with its roots. (Prior code § 9.30.1404)

15.92.060 Submittals.

The following shall be submitted to the city, planning and development department, for review and approval:

A. Planting Plan. The planting plan shall be drawn on project base sheets in a clear and legible fashion.

1. A scale of no smaller than 1 inch = 40 feet shall be used.

2. Plan. The planting plans shall accurately and clearly identify:

a. Landscape materials, trees, shrubs, ground cover, turf, etc. Planting symbols shall be clearly drawn and plants labeled by botanical name, common names, container size, spacing and quantities of each group of plants indicated;

b. Property lines;

c. Streets, driveways, walkways, and other paved areas;

d. Building and structures including elevation if applicable;

e. Natural features: rock outcropping, existing oak and ornamental trees, shrubs, etc., to remain;

f. Tree staking, soil preparation details, and any other applicable details.

B. Irrigation Plan. The irrigation plan shall be drawn on project base sheets in a clear and legible fashion.

1. The scale shall be equal to that used for the planting plan.

2. Plan. The irrigation plan shall accurately and clearly identify:

a. Flow rate and P.S.I. at the point of connection;

b. Coverage of all components of the irrigation system, including main and lateral lines;

c. Valves;

d. Controllers;

e. Heads;

f. Quick couplers;

g. Head precipitation rates;

h. Meter size;

i. Moisture sensor devices;

j. Rain switches;

k. Backflow prevention device.

C. Sloped Areas. Sloped areas shall be indicated by contour lines (this may be shown on grading plan).

D. Soils Report. Unless excused pursuant to Section 15.92.110 of this chapter, a soils report shall be prepared by a soil testing company and submitted with the plans. Soil samples shall be sufficiently numerous to account for any soil variations that may be present in the planting area. As a minimum, the following shall be included:

1. Soil infiltration;

2. Soil texture test;

3. Cation exchange capacity;

4. Soil fertility, including tests for nitrogen, potassium, phosphorous, pH, organic matter, and specific conductance (E.C.).

Amendments shall be added to correct for problems as noted by the soils report. A copy of the soils report shall be attached to the irrigation schedule which will be delivered to the owner and controller operator.

E. Irrigation Schedule. An annual irrigation program with a minimum four-season water schedule shall be required for both the plant establishment period and established landscape. The water schedule shall include run time and frequency of irrigation for each station. The estimated applied water use shall not exceed the maximum applied water allowance. A copy of the schedule shall be delivered, along with as-builts and any other information normally forwarded to the owner and controller operator. (Prior code § 9.30.1405)

15.92.070 Irrigation system design criteria.

A. Irrigation systems shall be designed so that the application rate does not exceed the infiltration rate of the soil and will minimize overspray and runoff. The designer shall refer to Section 15.92.120 of this chapter, Soil infiltration rates, and the results of the soil tests to meet these design criteria. In general, low volume sprinkler heads, drip emitters and pressure compensation bubblers shall be used throughout the system.

B. Irrigation stations shall be separated (e.g., drip vs. overhead spray systems). Additional control valves shall be installed to account for different site specific characteristics (i.e., full sun/full shade, level/sloping, shrubs/lawns, street trees, etc.).

C. Maximum sprinkler spacing for both turf and non-turf areas shall be fifty (50) percent of the diameter of the throw. (Example: thirty (30) foot diameter nozzle should be no more than fifteen (15) feet apart.) Spacing of sprinklers shall take into account on-site wind conditions.

D. All irrigation systems shall be operated by an automatic controller. At a minimum, each controller shall have a rain shutoff operation, a seven-day calendar, two independent programs, and three cycles/day capabilities.

E. The irrigation schedule shall provide a complete watering cycle that avoids runoff and overspray.

F. All turf areas shall utilize either pop-up rotary impact heads or spray heads with a minimum riser height of six inches. (Prior code § 9.30.1406)

15.92.080 Maximum applied water allowance—Estimated applied water use—Turf and plant selection.

A. Maximum Applied Water Allowance. A landscape's maximum applied water allowance shall be calculated using the following formula:

MAWA = (ETo) (0.8) (PA) (0.62) where:

MAWA = Maximum applied water allowance (gallons per year)

ETo = Reference evapotranspiration (inches per year)

0.8 = ET adjustment factor

PA = Planting area (square feet)

0.62 = conversion factor (to gallons per square foot)

Example: Assume a planting area of 50,000 square feet.

MAWA = (ETo) (.8) (PA) (.62)

= (51.9 inches) (.8) (50,000 square feet) (.62)

Maximum applied water allowance = 1,287,120 gallons per year (or 1.721 hundred-cubic-feet per year: 1,287,120/748 = 1,721)

B. Estimated Applied Water Use.

1. The estimated applied water use shall not exceed the maximum applied water allowance.

2. A calculation of the estimated applied water use shall be submitted with the planting plan. It may be calculated by totaling the amount of water recommended in the irrigation schedule.

C. Turf Selections and Use.

1. Turf shall not be permitted in areas six feet or less in width or in median strips.

2. Under no circumstances shall turf be installed on slopes greater than twenty (20) percent. The toe of any sloping section shall be a minimum of twenty-four (24) inches behind a curb or sidewalk.

3. Turf areas which exceed two thousand five hundred (2500) square feet are required to use soil moisture sensors and rain shutoff devices as a part of the irrigation system. Device type and installation shall be per manufacturer's recommendations.

4. Turf shall not be installed within ten (10) feet of the dripline of native oak trees.

5. Turf shall be of a variety well suited to the local climate.

D. Non-Turf Selections.

1. Plants selected for use in non-turf areas should be well suited or adaptable to the climate of this region. Plants should be grouped in hydrozones according to their water needs and irrigated separately. To use species other than those listed by the director pursuant to Section 15.92.130 of this chapter, the designer may provide the city with information indicating the water requirements of the species. Information may include the listing of a plant in an acceptable reference stating its water requirement characteristics, comparing it to a species in the plant list, field data, etc.

2. A minimum of two inches of an organic mulch shall be placed in shrub areas on the soil surface after planting. Nonporous materials shall not be placed under the mulch. (Prior code § 9.30.1407)

15.92.090 Landscape certificate.

Upon completion of the installation of the landscaping, the designer shall certify that the landscape complies with all requirements of this chapter. Certification shall be accomplished by completion of a landscape certificate on a form approved by the director. Failure to submit a complete and accurate landscape certificate will delay final approval of the project and/or discontinue water service. (Prior code § 9.30.1408)

15.92.100 Model home landscape criteria.

A. For each subdivision with three or more model homes, the developer shall submit a landscape plan and install landscaping for one model home which incorporates the requirements of this chapter. The intent of this requirement is to demonstrate to prospective home buyers the feasibility and aesthetic qualities of water conserving landscape design. The landscape plan shall be reviewed and approved by the director prior to the opening of the model home complex.

B. Signs identifying aspects of the water conserving landscape design and irrigation system shall be placed around the model. All signage shall be reviewed by the director as part of the model home complex/temporary sales office permit. All signage shall be installed prior to the opening of the model home complex. These signs should be clearly marked on the landscape plan for the model. The following criteria shall be used in developing and placing the signs.

1. Front Yard Sign Identifying Model. A sign large enough to be visible from the street and sidewalk (minimum size two feet by two feet, maximum size three feet by three feet) shall be located in front of the model home. The sign shall indicate that the model is landscaped with water conserving plant materials and irrigation systems.

2. Other Exterior Signs. A sign shall be placed within the landscaped area identifying the irrigation system used, the different sub-areas of the landscape, and any other features that contribute to the overall water conserving theme.

3. Interior Signs or Displays. A drawing, or combination of drawings, shall be displayed inside the model providing a schematic of the landscape. These drawings

shall include a key identifying the plants in the yards. The drawings may be a simplified rendering of the landscape plan itself, using common names rather than the Latin names for the plants. The drawing(s) should be colorful and easy to read. A one-page handout of the schematic (black and white acceptable) shall be available at the model or the sales office.

Literature describing water conserving landscapes shall be available to individuals touring the model. Copies of all literature and handouts shall be placed on file with the city planning division. (Prior code § 9.30.1409)

15.92.110 City soil map.

No soils report shall be required if the soil type can be determined by reference to the city soil map maintained by the director and the soil is amended as required by the director; provided, however, that a soils report shall be required if substantial amounts of soil are imported to the property. (Prior code § 9.30.1410)

15.92.120 Soil infiltration rates.

Soil Texture, Type	**Percent of Slope Infiltration Rate (IR) Inches/Hour**				
	0—4%	5—8%	8—12%	12—16%	Over 16%
Coarse Sand	1.25	1.00	.75	.50	.31
Medium Sand	1.06	.85	.64	.42	.27
Fine Sand	.94	.75	.56	.38	.24
Loamy Sand	.88	.70	.53	.35	.22
Sandy Loam	.75	.60	.45	.30	.19
Fine Sandy Loam	.63	.50	.38	.25	.16
Very Fine Sandy Loam	.59	.47	.35	.24	.15
Loam	.54	.43	.33	.22	.14
Silt Loam	.50	.40	.30	.20	.13
Silt	.44	.35	.26	.18	.11
Sandy Clay	.31	.25	.19	.12	.08
Clay Loam	.25	.20	.15	.10	.06
Silty Clay	.19	.15	.11	.08	.05
Clay	.13	.10	.08	.05	.03
	Note: Rates based on full cover. These figures decrease with time and percent of cover. Derived from USDA information.				

(Prior code § 9.30.1411)

15.92.130 List of relative water requirements of commonly used plants.

The director shall develop a list of plants that are commonly used in landscape designs with water requirement classifications of low, medium, and high to assist landscape designers to group species of similar water demands to facilitate efficient irrigation. Upon the request of a landscape designer, the director shall classify any plant not included on the director's list as low, medium, or high water use. (Prior code § 9.30.1412)

Attachment 3

ORDINANCE NO.

Adopted by the Sacramento City Council

Date Adopted

AN ORDINANCE REPEALING AND ADDING CHAPTER 15.92 TO THE SACRAMENTO CITY CODE RELATING TO WATER EFFICIENT LANDSCAPE AND IRRIGATION AND MAKING FINDINGS (M09-042)

BE IT ENACTED BY THE COUNCIL OF THE CITY OF SACRAMENTO:

SECTION 1.

Chapter 15.92 of the Sacramento City Code is repealed.

SECTION 2.

Chapter 15.92 is added to Title 15 of the Sacramento City Code, to read as follows:

Chapter 15.92 WATER EFFICIENT LANDSCAPE REQUIREMENTS

15.92.010 Purpose.

A. The Water Conservation in Landscaping Act, California Government Code §§ 65591 et seq., requires local agencies to adopt one of the following, on or before January 1, 2010:

1. The updated model water efficient landscape ordinance issued by the California Department of Water Resources on October 8, 2009, and set forth in Chapter 2.7 of Division 2 of Title 23 of the California Code of Regulations; or

2. A water efficient landscape ordinance that is, based on evidence in the record, at least as effective in conserving water as the updated model water efficient landscape ordinance issued by the California Department of Water Resources.

B. In the Water Conservation in Landscaping Act, the State Legislature made the following findings:

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; and

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.

C. Consistent with these legislative findings, the purpose of this chapter is to comply with the Water Conservation in Landscaping Act by adopting an ordinance based on the provisions of the updated model water efficient landscape ordinance issued by the California Department of Water Resources, and to:

1. Promote the values and benefits of landscapes while recognizing the need to invest water and other resources as efficiently as possible;

2. Establish a structure for planning, designing, installing, maintaining and managing water efficient landscapes in new landscape and rehabilitated landscape projects;

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; and

5. Promote the benefits of consistent landscape ordinances with neighboring local and regional agencies.

15.92.020 Applicability.

A. This chapter shall apply to all of the following landscape projects:

1. New landscape projects and rehabilitated landscape projects with a landscape area equal to or greater than 2,500 square feet that are installed by or under the direction of the City, or by or under the direction of another public agency for which a city-issued building or landscape permit, plan check, plan review, or design review is required under this code;

2. Developer-installed new landscape projects and rehabilitated landscape projects with a landscape area equal to or greater than 2,500 square feet and for which a city-issued building or landscape permit, plan check, plan review, or design review is required under this code;

3. Owner-installed new landscape projects and rehabilitated landscape projects with a landscape area equal to or greater than 2,500 square feet and for which a city-issued building or landscape permit, plan check, plan review, or design review is required under this code;

4. Homeowner-installed landscape project that is a new landscape project with a landscape area equal to or greater than 5,000 square feet for which a city-issued building or landscape permit, plan check, plan review, or design review is required under this code.

B. Existing landscapes shall be subject only to the provisions of Section 15.92.210.

C. New and rehabilitated cemeteries shall be subject only to the provisions of Sections 15.92.080, 15.92.150, and 15.92.160. Existing cemeteries shall be subject only to the provisions of Section 15.92.210.

D. This chapter 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. Plant collections, as part of botanical gardens and arboretums open to the public.

15.92.030 Fees.

A. The following fees are established and imposed pursuant to the provisions of this chapter:

1. Landscape Document Package application fee.

B. The city council shall establish the amounts of the forgoing fee by resolution.

15.92.040 Exceptions.

A. The director may authorize conditional exceptions to any of the design and improvement standards in this chapter. Such exceptions may be granted if the director finds in writing that the proposed design or improvement is in substantial compliance with the purpose and intent of the standard to be excepted.

B. This chapter shall not be applied so as to modify landscaping requirements set forth as a condition on a special permit or other land use entitlement.

15.92.050 Definitions.

As used in this chapter:

"Appendix A" means Appendix A Reference Evapotranspiration (ETo) Table set out at the end of this chapter.

"Appendix B" means Appendix B Sample Water Efficient Landscape Worksheet set out at the end of this chapter.

"Appendix C" means Appendix C Sample Certificate of Completion set out at the end of this chapter.

"Appendix D" means Appendix D Example Calculations of WAMA and ETWU set out at the end of this chapter.

"Applied water" means the portion of water supplied by the irrigation system to the landscape.

"Automatic irrigation controller" means an automatic timing device used to remotely control valves that operate an irrigation system. Automatic irrigation controllers schedule irrigation events using either evapotranspiration (weather-based) or soil moisture data.

"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.

"Certificate of Completion" means the document required under Section 15.92.130.

"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.

"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.

"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.

"Conversion factor (0.62)" means the number that converts acre-inches per acre per year to gallons per square foot per year.

"Developer-installed landscape project" means a landscape project installed by or under the direction of the developer of a development project.

"Director" means the director of the Community Development Department or the director's authorized designee.

"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.

"Ecological restoration project" means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

"Effective precipitation" or "usable rainfall" (Eppt) means the portion of total precipitation which becomes available for plant growth.

"Emitter" means a drip irrigation emission device that delivers water slowly from the system to the soil.

"Established landscape" means the point at which plants in the landscape have developed significant root growth into the soil.

"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.

"Estimated Total Water Use" (ETWU) means the total water used for the landscape as described in Section 15.92.080.

"ET adjustment factor" (ETAF) means a factor of 0.7, 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. A combined plant mix with a site-wide average of 0.5 is the basis of the plant factor portion of this calculation. For purposes of the ETAF, the average irrigation efficiency is 0.71. Therefore, the ET Adjustment Factor is (0.7)=(0.5/0.71). ETAF for a Special Landscape Area shall not exceed 1.0. ETAF for existing non-rehabilitated landscape projects is 0.8.

"Evapotranspiration rate" means the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specified time.

"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.

"Hardscapes" means any durable material (pervious and non-pervious).

"Homeowner-installed landscape project" means a landscape project installed in an owner-occupied single-family residence or residential development of four (4) or fewer residential units, by or under the direction of the owner-occupants of the residence or the unit(s).

"Hydrozone" means a portion of the landscaped area having plants with similar water needs. A hydrozone may be irrigated or non-irrigated.

"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).

"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 weeds. "Noxious weeds" means any weed designated by the Weed Control Regulations in the Weed Control Act and identified on a Regional District noxious weed control list. Lists of invasive plants are maintained at the California Invasive Plant Inventory and USDA invasive and noxious weeds database.

"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.

"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 minimum average irrigation efficiency is 0.71. Greater irrigation efficiency can be expected from well designed and maintained systems.

"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.

"Irrigation water use analysis" means an analysis of water use data based on meter readings and billing data.

"Landscape architect" means a person who holds a license to practice landscape architecture in the state of California Business and Professions Code, Section 5615.

"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).

"Landscape contractor" means a person licensed by the state of California to construct, maintain, repair, install, or subcontract the development of landscape systems.

"Landscape Documentation Package" means the documents required under Section 15.92.070.

"Landscape project" means the total area of landscape in a project as defined in "landscape area."

"Lateral line" means the water delivery pipeline that supplies water to the emitters or sprinklers from the valve.

"Local water purveyor" means the City of Sacramento, or any other public or private entity that provides retail water service to the project.

"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.

"Main line" means the pressurized pipeline that delivers water from the water source to the valve or outlet.

"Maximum Applied Water Allowance" (MAWA) means the upper limit of annual applied water for the established landscaped area as specified in Section 15.92.080. 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.

"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.

"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.

"Mulch" means any organic material such as leaves, bark, straw, compost, or inorganic mineral materials such as rocks, gravel, and 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.

"New landscape project" means new landscaping installed in conjunction with the construction of a new building, or other new landscaping not associated with construction of a new building, such as a park, playground, or greenbelt.

"Operating pressure" means the pressure at which the parts of an irrigation system are designed by the manufacturer to operate.

"Overhead sprinkler irrigation systems" means systems that deliver water through the air (e.g., spray heads and rotors).

"Overspray" means irrigation water which is delivered beyond the target area.

"Owner-installed landscape project" means a landscape project installed by or under the direction or approval of the owner of a building or other development and that is not a homeowner-installed landscape project.

"Permit" means an authorizing document issued for new landscape or rehabilitated landscape projects.

"Pervious" means any surface or material that allows the passage of water through the material and into the underlying soil.

"Plant factor" or "plant water use factor" is a factor, when multiplied by ETo, estimates the amount of water needed by plants. The plant factor range for low water use plants is 0 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 chapter are derived from the Department of Water Resources 2000 publication "Water Use Classification of Landscape Species".

"Precipitation rate" means the rate of application of water measured in inches per hour.

"Project applicant" means the individual or entity submitting a Landscape Documentation Package required under Section15.92.070, to request a permit, plan check, or design review. A project applicant may be the property owner or his or her designee.

"Rain sensor" or "rain sensing shutoff device" means a component which automatically suspends an irrigation event when it rains.

"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.

"Recreational area" means areas dedicated to active play such as parks, sports fields, and golf courses where turf provides a playing surface.

"Recycled water", "reclaimed water", or "treated sewage effluent water" means treated or recycled waste water of a quality suitable for non-potable uses such as landscape irrigation and water features. This water is not intended for human consumption.

"Reference evapotranspiration" or "ETo" means a standard measurement of environmental parameters that affect the water use of plants. ETo is expressed in inches per day, month, or year as represented in Appendix A set forth at the end of this chapter, 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 Allowance so that regional differences in climate can be accommodated.

"Rehabilitated landscape project" means any re-landscaping project that requires a permit , plan check, or design review, meets the requirements of Section 15.92.020, and the modified landscape area is equal to or greater than 2,500 square feet, is 50% or more of the total landscape area, and the modifications are completed within one year.

"Runoff" means water which is not absorbed by the soil or landscape to which it is applied and flows from the landscape area. For example, runoff may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or when there is a slope.

"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.

"Soil texture" means the classification of soil based on its percentage of sand, silt, and clay.

"Special Landscape Area" (SLA) means an area of the landscape dedicated solely to edible plants, areas irrigated with recycled water, water features using recycled water and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface.

"Sprinkler head" means a device which delivers water through a nozzle.

"Static water pressure" means the pipeline or municipal water supply pressure when water is not flowing.

"Station" means an area served by one valve or by a set of valves that operate simultaneously.

"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.

"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.

"Valve" means a device used to control the flow of water in the irrigation system.

"Water conserving plant species" means a plant species identified as having a low plant factor.

"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.

"Watering window" means the time of day irrigation is allowed.

"WUCOLS" means the Water Use Classification of Landscape Species published by the University of California Cooperative Extension, the Department of Water Resources and the Bureau of Reclamation, 2000.

15.92.055 Landscape Documentation Package--Required.

No person shall construct or install a new landscape project or rehabilitated landscape project to which this chapter applies unless a Landscape Document Package for the project has been approved as required by this chapter.

15.92.060 Landscape Documentation Package—Application—Submittal—Action by director.

A. Prior to construction of a landscape project, the director shall:

1. Provide the project applicant with the 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 completed Landscape Documentation Package to the director.

C. Upon approval of the Landscape Documentation Package by the director, 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.

15.92.070 Landscape Documentation Package—Application--Contents.

A. The Landscape Documentation Package shall include the following seven (7) elements:

1. The following project information:

a. Date of application;

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, private well) and the local 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; and

i. Applicant signature and date with statement, "I agree to comply with the requirements of Sacramento City Code Chapter 15.92 and submit a complete Landscape Documentation Package".

2. The project's Water Efficient Landscape Worksheet, including the:

a. Hydrozone information table; and

b. Water budget calculations, including:

i. The Maximum Applied Water Allowance (MAWA); and

ii. The Estimated Total Water Use (ETWU).

3. A soil management report;

4. A landscape design plan;

5. An irrigation design plan;

6. A grading design plan; and

7. A nonrefundable Landscape Document Package application fee in the amount established by resolution of the city council.

15.92.080 Landscape Documentation Package—Application--Water Efficient Landscape Worksheet.

A. A project applicant shall complete a Water Efficient Landscape Worksheet containing the following two sections and substantially conforming to the Sample Water Efficient Landscape Worksheet in Appendix B:

1. A hydrozone information table for the landscape project; and

2. A water budget calculation for the landscape project. For the calculation of the Maximum Applied Water Allowance (MAWA) and Estimated Total Water Use (ETWU), a project applicant shall use the ETo values from the Reference Evapotranspiration Table in Appendix A.

B. Water budget calculations shall adhere to the following requirements:

1. The plant factor used shall be from WUCOLS. The plant factor ranges from 0 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 described below.

4. ETAF for Special Landscape Areas shall not exceed 1.0.

C. The Maximum Applied Water Allowance shall be calculated using the equation:

$$MAWA = (ETo)\ (0.62)\ [(0.7 \times LA) + (0.3 \times SLA)]$$

Where:

MAWA = Maximum Applied Water Allowance (gallons per year)
ETo = Reference Evapotranspiration (inches per year)
0.62 = Conversion Factor (to gallons)
0.7 = ET Adjustment Factor (ETAF)
LA = Landscape Area including SLA (square feet)
0.3 = Additional Water Allowance for SLA
SLA = Special Landscape Area (square feet)

D. The Estimated Total Water Use shall be calculated using the equation below. The sum of the Estimated Total Water Use calculated for all hydrozones shall not exceed MAWA.

$$ETWU = (ETo)(0.62)\left(\frac{PF\ x\ HA}{IE} + SLA\right)$$

Where:

ETWU = Estimated Total Water Use per year (gallons)
ETo = Reference Evapotranspiration (inches)
PF = Plant Factor from WUCOLS
HA = Hydrozone Area [high, medium, and low water use areas] (square feet)
SLA = Special Landscape Area (square feet)
0.62 = Conversion Factor
IE = Irrigation Efficiency (minimum 0.71)

E. Example hypothetical calculations for MAWA and ETWU are contained in Appendix D.

15.92.090 Landscape Document Package—Application--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 may include:

i. Soil texture;

ii. Infiltration rate determined by laboratory test or soil texture infiltration rate table;

iii. pH;

iv. Total soluble salts;

v. Sodium;

vi. Percent organic matter; and

vii. Recommendations.

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 as part of the Landscape Documentation Package; or

b. If significant mass grading is planned, the soil analysis report shall be submitted 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 with Certificate of Completion.

15.92.100 Landscape Document Package-- Application--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. To encourage the efficient use of water, the following shall be considered:

i. Protection and preservation of native species and natural vegetation;

ii. Selection of water-conserving plant and turf species; and

iii. Selection of plants based on disease and pest resistance.

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 15.92.110(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. To encourage the efficient use of water, the following is highly recommended:

i. 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;

ii. 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); and

iii. 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. 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.

f. The use of invasive and/or noxious plant species is strongly discouraged.

g. 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. Mulch and Amendments:

a. A minimum two inch (2") 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.

b. Stabilizing mulching products shall be used on slopes.

c. The mulching portion of the seed/mulch slurry in hydro-seeded applications shall meet the mulching requirement.

d. Soil amendments shall be incorporated according to recommendations of the soil report and what is appropriate for the plants selected (see Section 15.92.090).

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 and installation details of any applicable stormwater best management practices that encourage on-site retention and infiltration of stormwater. Stormwater best management practices are encouraged in the landscape design plan and examples include, but are not limited to:

a. Infiltration beds, swales, and basins that allow water to collect and soak into the ground;

b. Constructed wetlands and retention ponds that retain water, handle excess flow, and filter pollutants; and

c. Pervious or porous surfaces (e.g., permeable pavers or blocks, pervious or porous concrete, etc.) that minimize runoff.

11. Identify any applicable rain harvesting or catchment technologies (e.g., rain gardens, cisterns, etc.);

12. Contain the following statement: "I have complied with the criteria of Sacramento City Code Chapter 15.92 and applied them for the efficient use of water in the landscape design plan"; and

13. 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.)

15.92.110 Landscape Document Package-- Application--Irrigation Design Plan.

A. 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. Irrigation System:

a. Dedicated landscape water meters are recommended on landscape areas smaller than 5,000 square feet to facilitate water management.

b. Automatic irrigation controllers utilizing either evapotranspiration or soil moisture sensor data shall be required for irrigation scheduling in all irrigation systems.

c. The irrigation system shall be designed to ensure that the dynamic pressure at each emission device is within the manufacturer's recommended pressure range for optimal performance.

i. 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.

ii. 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 approved by the director and in compliance with Section 13.04.240 of this code shall be required to protect the water supply from contamination by the irrigation system.

g. High flow sensors that detect and report high flow conditions created by system damage or malfunction are recommended.

h. 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.

i. Relevant information from the soil management plan, such as soil type and infiltration rate, shall be utilized when designing irrigation systems.

j. The design of the irrigation system shall conform to the hydrozones of the landscape design plan.

k. The irrigation system must be designed and installed to meet, at a minimum, the irrigation efficiency criteria as described in Section 15.92.080 regarding the Maximum Applied Water Allowance.

l. The project applicant shall consult 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.

m. In mulched planting areas, the use of low volume irrigation is required to maximize water infiltration into the root zone.

n. Sprinkler heads and other emission devices shall have matched precipitation rates, unless otherwise directed by the manufacturer's recommendations.

o. Head to head coverage is recommended. However, sprinkler spacing shall be designed to achieve the highest possible distribution uniformity using the manufacturer's recommendations.

p. Swing joints or other riser-protection components are required on all risers subject to damage that are adjacent to high traffic areas.

q. Check valves or anti-drain valves are required for all irrigation systems.

r. Narrow or irregularly shaped areas, including turf, less than eight (8) feet in width in any direction shall be irrigated with subsurface irrigation or low volume irrigation system.

s. 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:

i. The landscape area is adjacent to permeable surfacing and no runoff occurs; or

ii. The adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping; or

iii. The irrigation designer specifies an alternative design or technology, as part of the Landscape Documentation Package and clearly demonstrates strict adherence to the irrigation system design criteria specified in subsection (A)(1)(h), above. Prevention of overspray and runoff must be confirmed during the irrigation audit.

t. Slopes greater than 25% shall not be irrigated with an irrigation system with a precipitation 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.

d. Individual hydrozones that mix plants of moderate and low water use, or moderate and high water use, may be allowed if:

i. Plant factor calculation is based on the proportions of the respective plant water uses and their plant factor; or

ii. 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. The location and size of separate water meters for landscape;

2. The 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. The static water pressure at the point of connection to the public water supply;

4. The flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (pressure per square inch) for each station;

5. The recycled water irrigation systems as specified in Section 15.92.180;

6. The following statement: "I have complied with the criteria of Sacramento City Code Chapter 15.92 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 Title 16 of the California Code of Regulations, and Section 6721 of the Food and Agricultural Code.)

15.92.120 Landscape Document Package-- Application--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 grading plan prepared by a civil engineer that meets the minimum criteria specified in this section and submitted pursuant to Chapter 15.88 of this code 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. The grading design plan shall contain the following statement: "I have complied with the criteria of Sacramento City Code Chapter 15.92 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.

B. The project applicant shall comply with any additional requirements specified in Chapter 15.88 of this code and any regulations or other requirements adopted to implement or administer Chapter 15.88.

15.92.130 Certificate of Completion.

A. A Certificate of Completion in substantial conformance with Appendix C shall include the following six (6) elements:

1. Project information sheet that contains:

a. Project name;

b. Project applicant name, telephone, and mailing address;

c. Project address and location; and

d. 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, provided that
where there have been significant changes made in the field during construction, the "as-built" or record drawings shall be included with the certification;

3. The irrigation scheduling parameters used to set the controller required by Section 15.92.140;

4. The landscape and irrigation maintenance schedule required by Section 15.92.150;

5. The irrigation audit report required by Section 15.92.160; and

6. The soil analysis report, if not submitted with Landscape Documentation Package, and documentation verifying implementation of soil report recommendations required by Section 15.92.090.

B. The project applicant shall:

1. Submit the signed Certificate of Completion to the director for review;

2. Ensure that copies of the approved Certificate of Completion are submitted to the local water purveyor, if different than the City, and the property owner or his or her designee.

C. The director shall approve or deny the Certificate of Completion. If the Certificate of Completion is denied, the director shall provide information to the project applicant regarding reapplication, appeal, or other assistance.

15.92.140 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 in accordance with the requirements of article XI of Chapter 13.04 of this code.

3. For implementation of the irrigation schedule, particular attention shall be paid to irrigation run times, emission device, flow rate, and current reference evapotranspiration, so that applied water meets the Estimated Total Water Use (ETWU). 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 or soil moisture sensor data.

4. Parameters used to set the automatic controller shall be developed and submitted with the Certificate of Completion 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.

15.92.150 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; adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning; weeding in all landscape areas, and removing and obstruction 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.

D. A project applicant is encouraged to implement sustainable or environmentally-friendly practices for overall landscape maintenance.

15.92.160 Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis.

A. For new landscape and rehabilitated landscape projects, the project applicant shall submit an irrigation audit report with the Certificate of Completion that shall 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.

B. All landscape irrigation audits shall be conducted by a certified landscape irrigation auditor.

C. The director shall develop and 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.

15.92.170 Irrigation Efficiency.

For the purpose of determining Maximum Applied Water Allowance, average irrigation efficiency is assumed to be 0.71. Irrigation systems shall be designed, maintained, and managed to meet or exceed an average landscape irrigation efficiency of 0.71.

15.92.180 Recycled Water.

A. Irrigation systems and decorative water features for new landscape and rehabilitated landscape projects shall use recycled water unless a written determination is made by the local water purveyor that recycled water meeting all public health codes and standards is not available to the project.

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 Special Landscape Areas shall not exceed 1.0.

15.92.190 Stormwater Management.

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 retention and infiltration are encouraged.

B. Rain gardens, cisterns, and other landscapes features and practices that increase rainwater capture and create opportunities for infiltration and/or onsite storage are recommended.

C. Project applicants shall comply with all applicable provisions of Chapter 13.16 of this code and any regulations or other requirements adopted to implement or administer Chapter 13.16.

15.92.200 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 chapter.

A. 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.

B. Information shall be provided about designing, installing, managing, and maintaining water efficient landscapes.

15.92.210 Provisions for Existing Landscapes.

This section shall apply to all existing landscapes installed prior to the effective date of the ordinance that adopted this chapter and that have a landscape area over one acre in size.

A. For existing landscapes that have a metered irrigation service, the City may conduct or may require the property owner to provide 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 (MAWA) for existing landscapes shall be calculated as: MAWA = (0.8) (ETo)(LA)(0.62).

B. For existing landscapes that do not have a metered irrigation service, the City may conduct or may require the property owner to provide irrigation surveys and irrigation audits to evaluate water use and provide recommendations as necessary to prevent water waste.

C. All landscape irrigation audits shall be conducted by a certified landscape irrigation auditor.

15.92.220 Effective Precipitation.

The director 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) [(0.7 x LA) + (0.3 x SLA)].

Appendix A. Reference Evapotranspiration (ETo) Table.

City of Sacramento	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
	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

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.
Please complete all sections (A and B) of the worksheet.

SECTION A. HYDROZONE INFORMATION TABLE

Please complete the hydrozone table(s) for each hydrozone. Use as many tables as necessary to provide the square footage of landscape area per hydrozone.

Hydrozone*	Zone or Valve	Irrigation Method**	Area (Sq. Ft.)	% of Landscape Area
	Total			**100%**

**** Hydrozone***
HW = High Water Use Plants
MW = Moderate Water Use Plants
LW = Low Water Use Plants

*****Irrigation Method***
MS = Micro-spray
S = Spray
R = Rotor
B= Bubbler
D= Drip
O = Other

SECTION B. WATER BUDGET CALCULATIONS

Section B1. Maximum Applied Water Allowance (MAWA)

The project's Maximum Applied Water Allowance shall be calculated using this equation:

MAWA = (ETo) (0.62) [(0.7 x LA) + (0.3 x SLA)]

where:

MAWA = Maximum Applied Water Allowance (gallons per year)
ETo = Reference Evapotranspiration from Appendix A (inches per year)
0.7 = ET Adjustment Factor (ETAF)
LA = Landscaped Area includes Special Landscape Area (square feet)
0.62 = Conversion factor (to gallons per square foot)
SLA = Portion of the landscape area identified as Special Landscape Area (square feet)
0.3 = the additional ET Adjustment Factor for Special Landscape Area (1.0 - 0.7 = 0.3)

Maximum Applied Water Allowance = _____gallons per year

Show calculations.

Effective Precipitation (Eppt)

If considering Effective Precipitation, use 25% of annual precipitation. Use the following equation to calculate Maximum Applied Water Allowance:

MAWA= (ETo – Eppt) (0.62) [(0.7 x LA) + (0.3 x SLA)]

Maximum Applied Water Allowance = _____gallons per year

Show calculations.

Section B2. Estimated Total Water Use (ETWU)

The project's Estimated Total Water Use is calculated using the following formula:

$$ETWU = (ETo)(0.62)\left(\frac{PF\,x\,HA}{IE} + SLA\right)$$

where:

ETWU = Estimated total water use per year (gallons per year)
ETo = Reference Evapotranspiration (inches per year)
PF = Plant Factor from WUCOLS (see Definitions)
HA = Hydrozone Area [high, medium, and low water use areas] (square feet)
SLA = Special Landscape Area (square feet)
0.62 = Conversion Factor (to gallons per square foot)
IE = Irrigation Efficiency (minimum 0.71)

Hydrozone Table for Calculating ETWU

Please complete the hydrozone table(s). Use as many tables as necessary.

Hydrozone	Plant Water Use Type(s)	Plant Factor (PF)	Area (HA) (square feet)	PF x HA (square feet)
			Sum	
	SLA			

Estimated Total Water Use = _____**gallons**

Show calculations.

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

Project Name		
Name of Project Applicant	Telephone No.	
Name of Project Applicant Title	Fax No. Email Address	
Company	Street Address	
City	State	

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 City_____
2. Date the Landscape Documentation Package was approved by City_____
3. Date that a copy of the Water Efficient Landscape Worksheet (including the Water Budget Calculation) was submitted to City, or other local water purveyor if applicable_____

PART 2. CERTIFICATION OF INSTALLATION ACCORDING TO THE LANDSCAPE DOCUMENTATION PACKAGE

"I/we certify that based upon periodic site observations, the work has been substantially completed in accordance with Sacramento City Code Chapter 15.92 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 Sacramento City Code Section 15.92.140.

PART 4. SCHEDULE OF LANDSCAPE AND IRRIGATION MAINTENANCE

Attach schedule of Landscape and Irrigation Maintenance per Sacramento City Code Section 15.92.150.

PART 5. LANDSCAPE IRRIGATION AUDIT REPORT

Attach Landscape Irrigation Audit Report per Sacramento City Code Section 15.92.160.

PART 6. SOIL MANAGEMENT REPORT

Attach soil analysis report, if not previously submitted with the Landscape Documentation Package per Sacramento City Code Section 15.92.090.
Attach documentation verifying implementation of recommendations from soil analysis report per Sacramento City Code Section 15.92.090.

Appendix D -- Example Calculations of WAMA and ETWU

The example calculations below are hypothetical to demonstrate proper use of the equations and do not represent an existing and/or planned landscape project. The ETo values used in these calculations are from the Reference Evapotranspiration Table in Appendix A, for planning purposes only. For actual irrigation scheduling, automatic irrigation controllers are required and shall use current reference evapotranspiration data, such as from the California Irrigation Management Information System (CIMIS), other equivalent data, or soil moisture sensor data.

A. MAWA

Example MAWA calculation: a hypothetical landscape project in Fresno, CA with an irrigated landscape area of 50,000 square feet without any Special Landscape Area (SLA= 0, no edible plants, recreational areas, or use of recycled water). To calculate MAWA, the annual reference evapotranspiration value for Fresno is 51.1 inches as listed in the Reference Evapotranspiration Table in Appendix A.

MAWA = (ETo) (0.62) [(0.7 x LA) + (0.3 x SLA)]
MAWA = Maximum Applied Water Allowance (gallons per year)
ETo = Reference Evapotranspiration (inches per year)
0.62 = Conversion Factor (to gallons)
0.7 = ET Adjustment Factor (ETAF)
LA = Landscape Area including SLA (square feet)
0.3 = Additional Water Allowance for SLA
SLA = Special Landscape Area (square feet)

MAWA = (51.1 inches) (0.62) [(0.7 x 50,000 square feet) + (0.3 x 0)]
= 1,108,870 gallons per year

To convert from gallons per year to hundred-cubic-feet per year:
= 1,108,870/748 = 1,482 hundred-cubic-feet per year
(100 cubic feet = 748 gallons)

In this next hypothetical example, the landscape project in Fresno, CA has the same ETo value of 51.1 inches and a total landscape area of 50,000 square feet. Within the 50,000 square foot project, there is now a 2,000 square foot area planted with edible plants. This 2,000 square foot area is considered to be a Special Landscape Area.

MAWA = (ETo) (0.62) [(0.7 x LA) + (0.3 x SLA)]

MAWA = (51.1 inches) (0.62) [(0.7 x 50,000 square feet) + (0.3 x 2,000 square feet)]
= 31.68 x [35,000 + 600] gallons per year
= 31.68 x 35,600 gallons per year
=1,127,808 gallons per year or 1,508 hundred-cubic-feet per year

B. ETWU

Example ETWU calculation: landscape area is 50,000 square feet; plant water use type, plant factor, and hydrozone area are shown in the table below. The ETo value is 51.1 inches per year. There are no Special Landscape Areas (recreational area, area permanently and solely dedicated to edible plants, and area irrigated with recycled water) in this example.

Hydrozone	Plant Water Use Type(s)	Plant Factor (PF)*	Hydrozone Area (HA) (square feet)	PF x HA (square feet)
1	High	0.8	7,000	5,600
2	High	0.7	10,000	7,000
3	Medium	0.5	16,000	8,000
4	Low	0.3	7,000	2,100
5	Low	0.2	10,000	2,000
			Sum	24,700

*Plant Factor from WUCOLS

$$ETWU = (51.1)(0.62)\left(\frac{24{,}700}{0.71} + 0\right)$$

= 1,102,116 gallons per year

Compare ETWU with MAWA: For this example MAWA = (51.1) (0.62) [(0.7 x 50,000) + (0.3 x 0)] = 1,108,870 gallons per year. The ETWU (1,102,116 gallons per year) is less than MAWA (1,108,870 gallons per year). In this example, the water budget complies with the MAWA.

2. Example ETWU calculation: total landscape area is 50,000 square feet, 2,000 square feet of which is planted with edible plants. The edible plant area is considered a Special Landscape Area (SLA). The reference evapotranspiration value is 51.1 inches per year. The plant type, plant factor, and hydrozone area are shown in the table below.

Hydrozone	Plant Water Use Type(s)	Plant Factor (PF)*	Hydrozone Area (HA) (square feet)	PF x HA (square feet)
1	High	0.8	7,000	5,600
2	High	0.7	9,000	6,300
3	Medium	0.5	15,000	7,500
4	Low	0.3	7,000	2,100
5	Low	0.2	10,000	2,000
			Sum	23,500
6	SLA	1.0	2,000	2,000

*Plant Factor from WUCOLS

$$ETWU = (51.1)(0.62)\left(\frac{23{,}500}{0.71} + 2{,}000\right)$$

= (31.68) (33,099 + 2,000)
= 1,111,936 gallons per year

Compare ETWU with MAWA. For this example:
MAWA = (51.1) (0.62) [(0.7 x 50,000) + (0.3 x 2,000)]
= 31.68 x [35,000 + 600]
= 31.68 x 35,600
=1,127,808 gallons per year

The ETWU (1,111,936 gallons per year) is less than MAWA (1,127,808 gallons per year). For this example, the water budget complies with the MAWA.

SECTION 3. Findings.

The City Council finds that Chapter 15.92 of the Sacramento City Code as adopted by this Ordinance is substantially the same, and is as effective, as the updated model water efficient landscape ordinance issued by the California Department of Water Resources on October 8, 2009, and set forth in Chapter 2.7 of Division 2 of Title 23 of the California Code of Regulations.

Appendix L

CITY CODE 13.04

Article XI. Outdoor Water Conservation

13.04.830 Legislative intent.

The city council finds and determines:

A. To prevent waste and ensure reasonable use of water supplied by the city water distribution system, it is necessary and desirable to enact certain limitations to promote water conservation by city customers.

B. These limitations should be focused on outdoor water use, because the maximum demands for water from the city's water distribution system occur during the summer months, with outdoor irrigation use exceeding all other demands.

C. Water use limitations should be designed to promote the use of drip irrigation and other low volume irrigation methods that reduce outdoor water use by applying water more efficiently than traditional irrigation methods.

D. Reduction of water use through water conservation protects and promotes the public health, safety and welfare by conserving a vital resource that is subject to ever-increasing demands.

E. Reduction of water demands through water conservation will reduce the per capita amount of water used by city customers, and also will reduce the city's costs for electrical energy, equipment and chemicals utilized to pump and treat water supplied to the city water distribution system.

F. By reducing the use of electrical energy, equipment and chemicals, the reduction of water demands through water conservation also protects and promotes the public health, safety and welfare by reducing greenhouse gas emissions associated with the production and transport of electrical energy, equipment and chemicals. (Ord. 2009-050 § 1; Ord. 2009-026 § 1)

13.04.840 Definitions.

When used in this article, the following words or phrases shall have the meanings set forth below:

"City water" means any water delivered by the city's water distribution system.

"Integrated pest management" means a pest control methodology that utilizes a variety of complementary strategies to significantly reduce or eliminate the use of pesticides while at the same time managing pest populations at an acceptable level.

"Low volume irrigation system" means any irrigation system that applies irrigation water at low pressure through a system of tubing or lateral lines and low-volume emitters such as drip, drip lines, and bubblers with a flow rate measured in gallons per hour, and that is designed to apply small volumes of water slowly at or near the root zone of plants. This includes but is not limited to properly functioning drip irrigation systems and soaker hoses.

"New landscaping" means any lawn, plants or other landscaping planted after the effective date of the ordinance adopting this section.

"Water waste runoff" means water flowing away from property in any gutter, ditch or other manner over the surface of the ground due to excessive application of city water. (Ord. 2009-050 § 1; Ord. 2009-026 § 1)

13.04.850 Substandard water fixtures prohibited.

No person shall cause or allow any city water to be wasted due to leaky or faulty water lines, hoses, fixtures or other water using or distributing devices, unless such person shall have first obtained the written consent of the director to do so. (Ord. 2009-050 § 1; Ord. 2009-026 § 1)

13.04.860 Water runoff prohibited.

No person shall knowingly or willingly cause or allow any city water applied to any landscaping, including new landscaping, or used for any other irrigation purposes, to flow away as water waste runoff from property owned or occupied by such person. (Ord. 2009-050 § 1; Ord. 2009-026 § 1)

13.04.870 Outdoor conservation of water.

A. No person shall use, or cause to be used, any city water for the purpose of washing down sidewalks, driveways, or parking areas except to alleviate immediate fire, health or sanitation hazards, or to implement an integrated pest management program, unless the director provides prior written consent.

B. No person shall use, or cause to be used, any city water through a hose for the purpose of washing a vehicle unless:

1. The hose is equipped with an automatic shut-off nozzle attachment, and the attachment is being used to shut off the flow of water at all times when the hose is not being used to wash the vehicle; and

2. The vehicle washing is conducted on a day of the week when outdoor irrigation is permitted for the street address where the vehicle is being washed, as specified in this section.

This subsection shall not apply to commercial car washing businesses.

C. Beginning on the day that daylight savings time begins, and extending until the day before daylight savings time ends:

1. No person shall use, or cause to be used, any city water for landscape irrigation between the hours of ten a.m. and seven p.m., unless the director provides prior written consent to a different time limitation.

2. Residential and commercial locations bearing a street address ending in an odd number shall be permitted to irrigate with city water only on Tuesday, Thursday and Saturday, and locations bearing a street address ending in an even number shall be permitted to irrigate with city water only on Wednesday, Friday and Sunday, unless the director provides prior written consent to a different irrigation pattern.

3. No landscape irrigation shall be allowed on Mondays.

D. Beginning on the day that daylight savings time ends, and extending until the day before daylight savings time begins, all residential and commercial locations shall be permitted to irrigate with city water only on Saturday or Sunday, and landscape irrigation shall be prohibited on any other days of the week, unless the director provides prior written consent to a different irrigation pattern.

E. The limitations specified in subsections C and D shall not apply to landscape irrigation using a low volume irrigation system, nor to the irrigation of container plants, nor to the irrigation of new landscaping that is subject to the provisions of Section 13.04.880.

F. References in this article to any day of the week shall mean the period beginning at twelve a.m. on that day and ending twenty-four (24) hours later.

G. Upon declaration of a water shortage, the city council may impose revised and/or additional limitations on outdoor water use, as specified in Section 13.04.910, and no person shall use, or cause to be used, city water

in violation of such limitations while the water shortage remains in effect. (Ord. 2009-050 § 1; Ord. 2009-026 § 1)

13.04.880 New landscaping.

The following regulations shall apply to the use of city water to irrigate new landscaping:

A. Irrigation of new landscaping shall be allowed on any day of the week for a period of twenty-one (21) days after the new landscaping is planted, unless the director provides prior written consent to extend this time period based on plant type and the season when the new landscaping is planted.

B. Any irrigation of new landscaping after expiration of the time period specified in subsection A, and any irrigation of existing landscaping adjacent to the new landscaping, shall be subject to the limitations specified in Section 13.04.870.

C. Upon declaration of a water shortage, the city council may impose revised and/or additional limitations on the irrigation of new landscaping, as specified in Section 13.04.910, and no person shall use, or cause to be used, city water in violation of such limitations while the water shortage remains in effect. (Ord. 2009-050 § 1; Ord. 2009-026 § 1)

13.04.890 Penalties for violation.

A. The following penalties shall be imposed for violation of any of the provisions of Sections 13.04.850 through 13.04.880, inclusive. Any violations occurring on separate calendar days shall be considered separate violations.

1. First Violation During Any Twelve (12) Month Period. No penalty shall be imposed, but a written notice describing the violation and the penalties for subsequent violations shall be issued to the owner and the occupant (if different than the owner) of the premises where the violation occurred.

2. Second Violation During Any Twelve (12) Month Period. A written notice describing the violation and the penalty shall be issued to the owner and the occupant (if different than the owner) of the premises where the viola-

tion occurred. A penalty of twenty-five dollars ($25.00) shall be imposed, but this penalty shall be waived if the owner of the premises where the violation occurred, or the occupant (if different than the owner, and the occupant committed the violation), attends a water conservation seminar offered by the department within sixty (60) days after the date of the penalty notice; provided that only one such penalty waiver shall be allowed for the premises within any twenty-four (24) month period.

3. Third Violation During Any Twelve (12) Month Period. A written notice describing the violation and the penalty shall be issued to the owner and the occupant (if different than the owner) of the premises where the violation occurred. A penalty of one hundred dollars ($100.00) shall be imposed.

4. Fourth Violation and Any Successive Violations During Any Twelve (12) Month Period. A written notice describing the violation and the penalty shall be issued to the owner and the occupant (if different than the owner) of the premises where the violation occurred. A penalty of five hundred dollars ($500.00) shall be imposed.

B. The written notices specified in subsection A also shall provide notice of the right to appeal pursuant to Section 13.04.900 and shall specify the address where the notice of appeal shall be filed.

C. The penalties specified in subsection A shall be imposed on the owner of the premises where the violation occurs regardless of whether the violation is committed by the owner of the premises or any other person.

D. Upon declaration of a water shortage by the city council, as specified in Section 13.04.910, the penalty amounts specified in subsection A shall be doubled while the water shortage remains in effect.

E. The violation of any of the provisions of Sections 13.04.850 through 13.04.880, inclusive, also shall be deemed to constitute a public nuisance, subject to abatement in accordance with the provisions of Chapter 8.04 of this code, as applicable.

F. The foregoing provisions are cumulative and in addition to any other remedies or penalties authorized or imposed under any other provision of this code, including but not limited to Section 13.04.270, or any other applicable law or regulation. The provisions of this article may be enforced by the department or by the department of code enforcement. (Ord. 2009-050 § 1; Ord. 2009-026 § 1)

13.04.900 Appeal.

A. The owner or occupant of the premises where the violation occurred may appeal a notice of violation issued under Section 13.04.890(A) to the director for review and determination, by filing a written notice of appeal with the director not later than thirty (30) days after the notice of violation is issued. Such notice of appeal shall specify the grounds for appeal and shall provide the appellant's address and telephone number, with a statement that the appellant agrees to accept service at such address of the written notice of the time and place of the appeal hearing and the determination of the director or the director's designee.

B. Upon receipt of a timely notice of appeal, the director or the director's designee shall set the matter for an informal hearing at the earliest practical date. Not less than seven days prior to the date of hearing, the director or the director's designee shall provide written notice of the hearing to the appellant. At the hearing, the director or the director's designee shall hear any relevant evidence presented by the appellant or department staff, and may uphold, modify or rescind the notice of violation, including the penalty imposed by the notice of violation, if any. The person filing the appeal shall be provided written notice of the determination of the director or the director's designee, which shall be the city's final administrative determination of the matter.

C. The failure of the owner or occupant of the premises where the violation occurred to file a timely notice of appeal in accordance with the provisions of this section shall constitute an irrevocable waiver of the right to appeal and a failure to exhaust the owner's and occupant's administrative remedies with regard to the notice of violation.

D. Upon determination after appeal by the director or the director's designee that a penalty shall be imposed, or upon issuance of a notice of violation and penalty and expiration of the appeal period specified in subsection A with no notice of appeal being filed, the penalty amount shall be included on the bill for water service provided to the premises where the violation occurred and shall be collected in accordance with the provisions of Chapter 13.12 of this code. Any penalties collected shall be used by the department to fund water conservation programs. (Ord. 2009-050 § 1; Ord. 2009-026 § 1)

13.04.910 Declaration of water shortage.

In response to any condition necessitating increased water conservation, such as a water shortage due to drought, natural disaster or other reduction of water supply availability, or as may otherwise be required to protect the public health, safety and welfare, the city council may by resolution declare the existence of a water shortage and impose revised and/or additional limitations and time restrictions on outdoor water use while the water shortage remains in effect, and no person shall use, or cause to be used, city water in violation of such limitations or restrictions while the water shortage remains in effect. Unless the resolution specifies an ending date, the declaration of water shortage shall remain in effect until rescinded or otherwise modified by subsequent resolution of the city council. (Ord. 2009-050 § 1; Ord. 2009-026 § 1)

13.04.920 Access to customer premises—Compliance.

A. A customer receiving city water service shall provide the department's employees and/or contractors access to and use of the premises where city water service is received as may be required by the city's employees or contractors to determine whether there is any violation of any of the provisions of Sections 13.04.850 through 13.04.880, inclusive, or to abate any violation thereof. If the customer refuses to allow such access, the city may seek authorization from any court of competent jurisdiction for such access and abatement.

B. Compliance with the provisions of this article shall be a condition of the customer receiving or continuing to receive city water service. (Ord. 2009-050 § 1; Ord. 2009-026 § 1)

13.04.930 Fire and other emergencies.

Nothing in this article shall be construed to apply to the use of city water for purposes of extinguishing fire or any other similar emergency. (Ord. 2009-050 § 1; Ord. 2009-026 § 1)

13.04.940 Consent of director.

Whenever in this article a person is authorized to obtain the consent of the director to perform an act otherwise prohibited, the director may give consent on such conditions as the director may specify, and the director shall give such consent only where the director determines:

A. There is no practical alternative manner in which the person may accomplish the desired result; and

B. The desired result is of substantial importance when compared with the importance of conserving water resources as set forth in this article. (Ord. 2009-050 § 1; Ord. 2009-026 § 1)

13.04.950 City water use.

The City of Sacramento, and its officers, employees, and agents when acting in the course and scope of their employment, shall be exempt from the provisions of this article; provided, however, that the city manager shall promulgate administrative regulations governing water use by the city, and its officers, employees, and agents, as may be necessary for the city to achieve the conservation of water resources equal to or greater than the level of conservation achieved by the city's water service customers. (Ord. 2009-050 § 1; Ord. 2009-026 § 1)

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DELTA STEWARDSHIP COUNCIL

A California State Agency

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September 15, 2011

To: Jim Piefer
City of Sacramento

From: Phil Isenberg

Re: Comments on the Consultant's Draft 2010 Urban Water Management Plan (July 2010)

Dear Mr. Piefer:

Thank you very much for asking me to comment on the Draft 2010 Urban Water Management Plan (UWMP). The subject is very important and the UWMP eventually adopted by the City Council needs to clearly lay out how Sacramento can deliver a reliable supply of water for its citizens, through a prudent and careful use of water, while respecting the natural environment that is such a vital part of our heritage.

On a personal level, I want to thank you and other City officials who have consistently been focused, smart and responsive --- even when I have been occasionally critical of some of the details of the City's water policy. Even in these very tough economic times, the attitude of City staff remains positive and impressive.

These are my personal views as both a long-time resident of the city and as Chair of the Delta Stewardship Council. My colleagues on the Council may or may not agree with some or all of what I say.

When I use the word "city", "City" or "Sacramento" in this letter it refers only to the City of Sacramento, unless otherwise noted

Overall Impression

In my judgment the consultant's draft Sacramento 2010 UWMP does not meet the requirement of law[1]. The draft UWMP does not adequately identify steps needed to improve the water efficiency and conservation in Sacramento, nor does the draft clearly focus on areas where the City's current practices may conflict with provisions of the California Constitution requiring all water in the state to be for reasonable, beneficial, and nonwasteful use.

Coequal goals means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.
—CA Water Code §85054

The current draft UWMP is not a broad, forward-looking planning document that outlines the advantages and opportunities, and the problems and shortfalls of our current water supply system. Instead, it has been converted into a document that promotes three messages:

- **Sacramento will meet the bare minimum state requirements for urban water use conservation by the year 2020 and that is all we really have to do.**

  Complying with the 20% reduction in urban water use by 2020 is easy of course, since the law allows each water district to choose a favorable 'base' for calculating required savings (thus limiting the amount of conservation required), and provides a number of exceptions and exclusions. Sacramento is currently among the higher per capita water users in the state (far exceeding the state average), and it is very clear that *nothing in the consultant draft UWMP will change that fact.* Suggesting that achievement of the bare minimum required by law encourages further state mandatory limits, contrary to the goals of the Urban Water Management Act, which hoped that local water agencies through their own efforts would achieve dramatically high water efficiency and conservation.

Total urban water use by selected water agencies in 2006

Water Agency	Gallons per capita per day
San Francisco	95
Santa Barbara	127
Marin (MWD)	136
Los Angeles (LADWP)	142
Contra Costa (CCWD)	157
San Diego	157
East Bay (EBMUD)	166
Victorville (VVCWD)	246
Bakersfield	279
Sacramento	279
San Bernardino	296
Fresno	354

Developed by DWR staff using PWSS date from 2006

DWR. 2009. California Water Plan Update 2009. Sacramento, CA.

  One way to show success through the UWMP is to compare water use in 2005 to the current use in 2010. Unfortunately, there is no clear indication of improvement. For 2010 and all further Plan updates, I strongly recommend that you include a summary of how we are doing compared to other cities in California. At least the Council will be able to judge the City's performance against other cities.

- **The water metering program is under way and the rest of California should stop blaming us for not installing meters earlier.**

  I doubt that by slowly implementing a law we opposed, the City will claim much moral authority or expect much praise from the overwhelming proportion of California urban dwellers that have used water meters for decades. If there is any chance of improving Sacramento's image in the water world, it will be found in how rapidly and effectively we do more than the bare minimum required by law.

- **All other problems and solutions relating to water, water quality, conservation, efficiency and environmental impacts should be deferred to a later time.**

This theme, suggests that almost nothing in the way of conservation or water efficiency need be done any time soon. We did not recycle a drop of water in 2005. We did not recycle a drop of water in 2010. We have no intention of recycling a drop of water in the future --- unless someone gives us the money to do it! That is not a reasonable response to the water problems that face Sacramento or California.

In a larger sense, this draft consultant report does not provide the Mayor and City Council with a coherent overview of the City's supply, the trends in demand, the practical alternatives for conservation and system efficiencies, nor the larger issue of how Sacramento's water use fits into the use of water in the entire State. The Council cannot be expected to act wisely unless a very clear set of facts is presented, policy options are fully outlined, and full consultant and staff recommendations are included. This is not done in the 2010 UWMP; deferring the hard questions to future reports is not a reasonable option.

Let me outline some significant additional problems with the document. I reference the previous 2005 Sacramento UWMP, which in some respects is far clearer than the current draft version.

Significant Issues

1. **The limits to our available water supply are obscured in the draft 2010 UWMP.**

   In the 2005 UWMP, it was clearly indicated that Sacramento would use up its entire supply of available water by the year 2030, based on then-current patterns of use. It was astonishing that did not become a major public issue at the time, but for whatever reasons, it did not. The 2010 consultant draft UWMP seems to ignore this issue. Are the facts presented in 2005 still accurate? If so, what are the policy choices the Mayor and Council should consider? If not, what has changed?

   A careful reader of the 2005 UWMP would learn that Sacramento's total water supply is provided through five (5) Sacramento's water supply contracts[ii]. At least 80 percent or more of the total water comes from surface streams with the remaining balance coming from underground water. This discussion is replicated in the consultant draft 2010 UWMP.[iii]

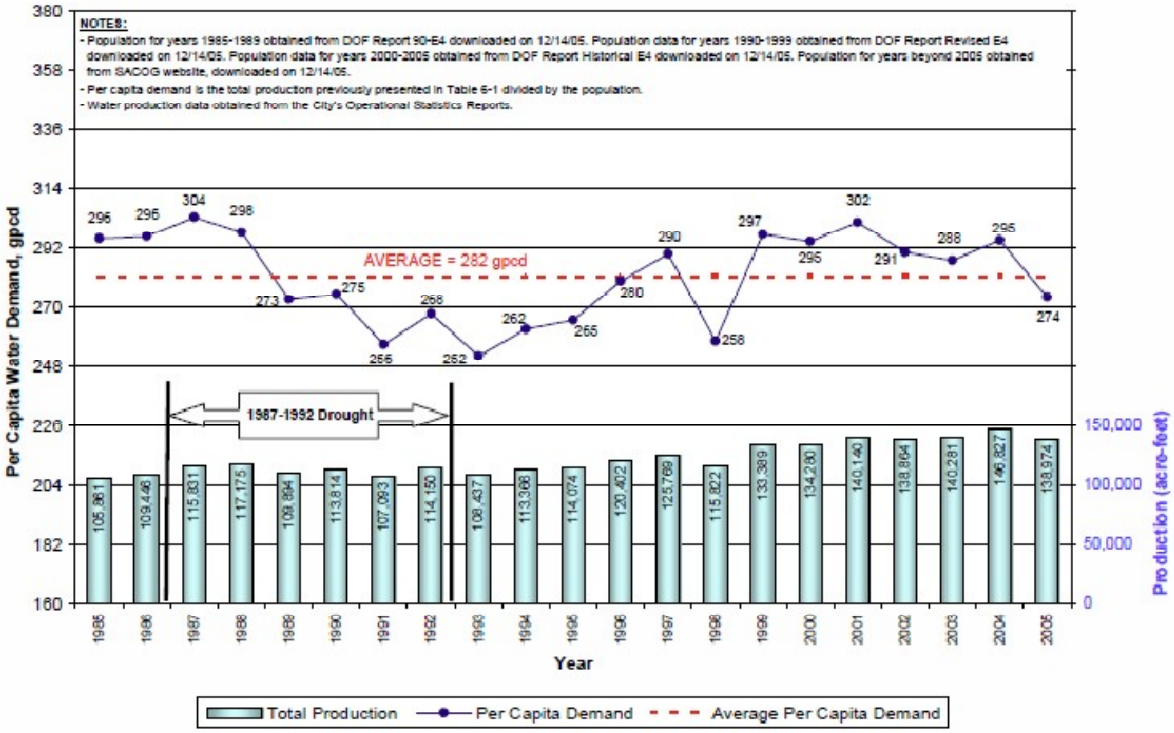
Table 21 Maximum Annual Diversion Allowed to the Year 2030 2010 Urban Water Management Plan City of Sacramento			
Year[1]	Maximum Diversion from the Sacramento River, AFY[2]	Maximum Diversion from the American River, AFY[3]	Maximum Combined Diversion, AFY
2010	81,800	170,500	227,500
2015	81,800	189,000	252,000
2020	81,800	208,500	278,000
2025	81,800	228,000	304,000
2030	81,800	245,000	326,800
2035	81,800	245,000	326,800

Notes:
1. Data obtained from Schedule A of the 1957 Water Rights Settlement Contract between the U.S. Bureau of Reclamation and the City.
2. The City may divert up to 81,800 AFY from the Sacramento River as long as the total combined diversion from both the Sacramento and American Rivers does not exceed the Maximum Combined Diversion.
3. The City may divert up to the Maximum Diversion from the American River as long as the total combined diversion from both the Sacramento and American Rivers does not exceed the Maximum Combined Diversion.

City of Sacramento. 2010 Urban Water Management Plan. pp. 4-6

In the 2005 UWMP, however, the reader can find a historic per capita use chart clearly indicating the water use patterns of residents of Sacramento.[iv]

Figure 6-1. Historical Per Capita Water Demand

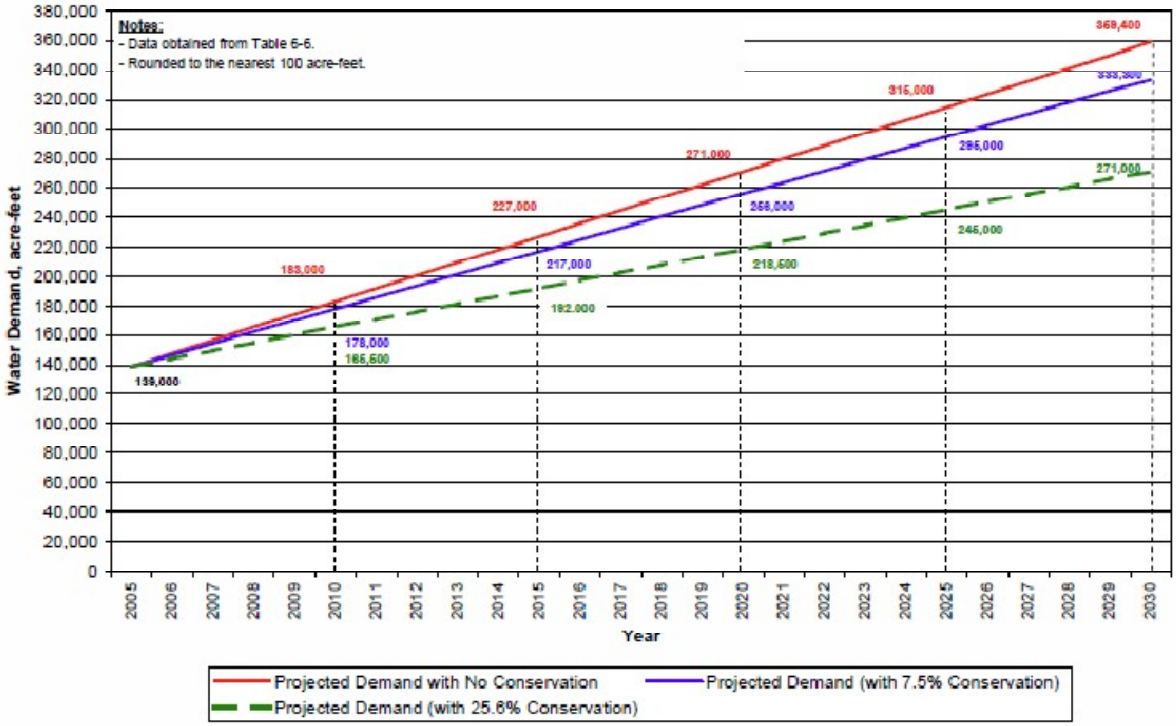


City of Sacramento. Urban Water Management Plan 2005. pp 6-14

It is no surprise that Sacramento uses a lot of water per capita, and far more than the state average, or many other similar cities. By only seeking to achieve the permitted 'base' water use calculation in the 2009 water conservation bill, the consultant's report carefully hides the fact that Sacramento has over time done very little to reduce its per capita use of water.

In the 2005 UWMP you find a chart that compares projected water demands to available supply.[v] There is nothing comparable in the 2010 consultant draft and there should be.

Figure 6-3. Projected Water Demands



City of Sacramento. Urban Water Management Plan 2005. pp. 6-15

2. **There is no agenda for City action in the draft consultant UWMP**.

   Sure, there is casual mention of possible repair of the 100-miles of ancient water pipes[vi], and the need to consider recycling water in the distant future, but the key elements of the consultant draft can only be found by reference to Appendix I, the City Interim Water Conservation Plan. **And in that Appendix, it is very clear that virtually all of the conservation to be achieved in the near future come from water meters, which we historically opposed!**

3. **Is there a Sacramento water conservation goal beyond the he bare minimum required by state law**?

If so, it is carefully hidden in the consultant's draft. A reader is left with the clear impression that the City of Sacramento will conserve water only when mandated by law, court order or regulatory changes, and only then if 'someone else' provides the money to make the changes (see p.4-23).

Reading the consultant's draft it is hard to avoid the conclusion that abstract conservation is good; specific actions are not. If the City policy is to actively support conservation and water efficiency, what are the policy choices the Mayor and Council should consider?

4. **Is Sacramento in danger of violating the constitutional prohibition on unreasonable use or wasting of water?**

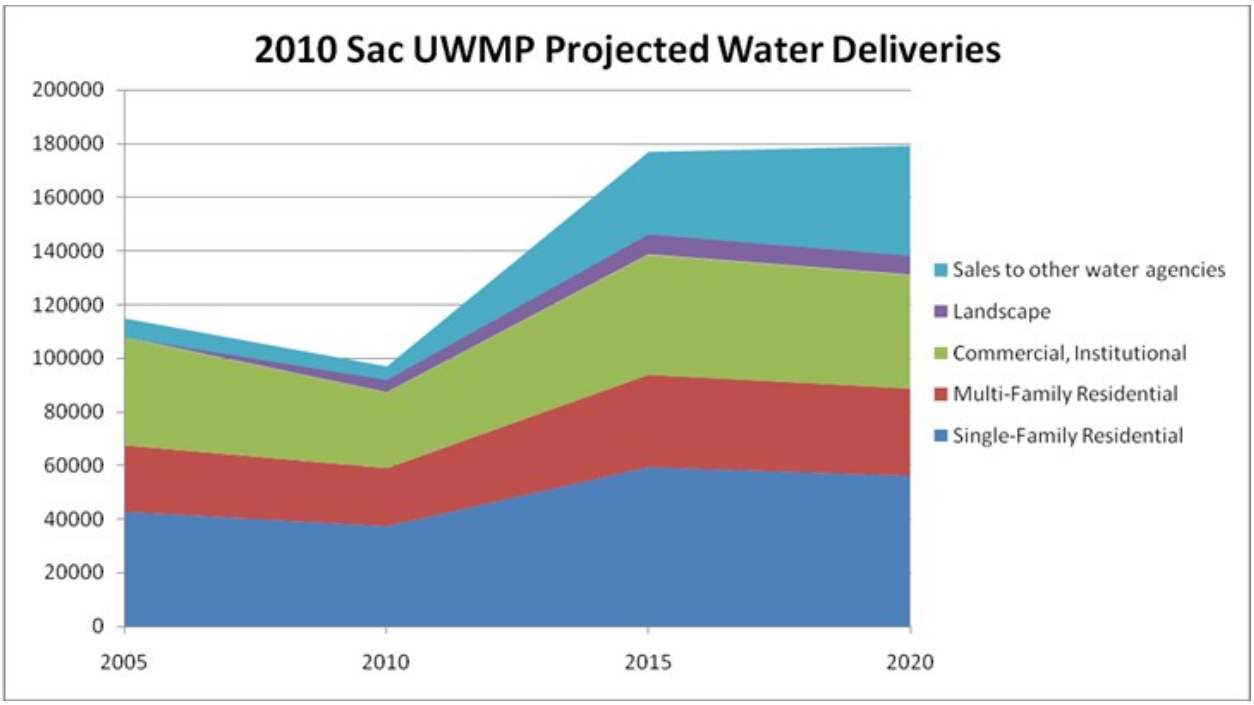
   California's Constitution requires that all water use be reasonable and that there by no wasting of water.[vii] What aspects of Sacramento's current water system might be considered unreasonable use or wasting of water under the Constitution? What policy choices should the Mayor and Council consider to avoid this possibility?

   For example, the 2010 UWMP indicates that perhaps "10 percent or higher" of our total water supply is lost through seepage and faulty water pipes. Is that a reasonable use of water? The same figure occurred in the 2005 UWMP (footnote to Table 6-12 at 6-13and p 6-1), which suggests that very little if anything has been done to address this problem.

   As you know, the State Water Resources Control Board is authorized to enforce the constitutional provision of beneficial use, reasonable use and no wasting of water. In 1989, in their famous Decision 1600, the Board found the Imperial Irrigation District in violation of the reasonable use provision of the state constitution by not instituting water conservation to prevent seepage and related water losses.[viii] It seems to me that failure to mention this problem is totally unfair to the Mayor and the Council and hides an issue which must be addressed. Yes, I acknowledge that the Department of Utilities has expressed concern about this before, but nothing has been done. More disturbing is that the UWMP offers nothing in the nature of a remedy to this problem.

5. **In the event of shortages of water, can or should Sacramento continue to serve areas outside the city limits? And do the contracts to provide services outside the City limits interfere with city residents getting water in the event of a severe drought? What policy choices should the Mayor and Council consider?**

   I include an interesting chart prepared by my colleague Aaron Farber here at the Delta Stewardship Council. He took the information in the 2010 consultant's report and put it into graphic form.



Adapted from 2010 UWMP. Tables 9-12. pp. 3-6 - 3-9

Assuming that we read this correctly, it indicates that increased demand for City water will be primarily to serve sales to other agencies, not for city residents themselves.

6. Using the same chart, it appears that the projected modest drop in Single-Family Residential use, which I assume includes household landscaping as well, is more than offset by significant growth in Commercial and Institutional use of water. Does that suggest that the often criticized use of water by the City for its parks and other irrigated public properties, and the same thing for large business owners, is a problem that needs to be corrected? The information seems to suggest that, but the draft UWMP offers no solution.

The draft consultant UWMP examines only some of these alternatives. But in each and every case it recommends absolutely no action whatsoever. Does this meet the test of law?

Additional questions

7. Table 9-12 on 3-6 to 3-9 shows no difference in the projected deliveries between metered and non-metered residential sectors of water use through 2030. This calls into the question the savings attributed to metering in Appendix I and throughout the UWMP. How much savings does the city expect from metering?

8. If the foundational and programmatic best management practices were implemented and generated the projected savings of 1,869 acre feet (pg. 6-7, Appendix I), it would mean

only a 2% reduction in retail water deliveries (92,060 AF) for 2010. This level of conservation would not seem to allow the city to meet the 2020 water use target of below 95% of the 5 year baseline. Will metering and education measures allow the city to meet the baseline? Are there any other conservation measures that would allow the city to meet 2020 target of 223 gpcd, which would be 20% reduction in per capita use?

9. On 3-5, the 2010 UWMP states that "water demands have been decreasing since the year 2000, except for recent dramatic increases observed since 2008." From 2007-2010, California experienced a series of dry and critical water years and the Delta ecosystem fully collapsed, leading to the biological opinions. While urban water use (not agriculture) somewhat increases in dry years, does the "dramatic increases" bring into question the city's reasoning that increased public awareness of drought conditions and the reduced supplies in the Delta produced conservation?

10. Over the next 20 years, the city expects groundwater use to remain constant at 22,300 AF yet expects to activate more of its water right and water diverted from the Sacramento and American Rivers to increase from 94,990 in 2010 to 156,952 in 2020 and 208,862 in 2035. Sacramento had 90 years to activate the full beneficial use of its water rights (e.g. Permit 992) and it seems to run counter to the goal of reducing reliance on the Delta and the objectives of the SWRCB, to finally activate and extract more than 100,000 more acre feet in 2030. How can the ecosystem recuperate, if cities continue to take more out of the rivers that serve as the primary inflows to the Delta, especially when the Sacramento and American Rivers are already fully appropriated for much of the year? Has the city calculated which appropriative water rights users (other communities with more junior water rights) may be pushed out of line?

11. Also, in Tables 9-12, the retail water deliveries per single family residential connection seem to increase from 294 gallons per capita in 2005 and 2010 to 435 gallons per capita in 2015? Is there an explanation for the increase?

12. In the 2005 UWMP, there is a chart which shows the city will reach or exceed its total limits yet the city projects obligated water supplies to reach 34,684 in 2020 and 42,696 in 2030. Will the city consider a moratorium on selling any more water? As we have seen in the past year, a wet year is necessary to aid the ecosystem such as the surge in the splittail population.

Thanks for asking me to submit comments. It was useful to me to do so, and hopefully of some use to you too

[i]The UWMP Act is found in Division 6 Part 2.6 of the California Water Code Sec. 10610 – 10656.
[ii] City of Sacramento. Urban Water Management Plan. 2005. pp. 4-4
[iii] City of Sacramento. Urban Water Management Plan. 2010. pp. 4-6
[iv] City of Sacramento. Urban Water Management Plan. 2005. Figure 6-1. Historical Per Capita Water Demand, p. 6-14.
[v] City of Sacramento. Urban Water Management Plan 2005. Figure 6-3. *Projected Water Demands*, p. 6-16.
[vi] City of Sacramento. Urban Water Management Plan 2010. Appendix I. pg. 24
[vii] *"It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable methods of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare. The right to water or to the use or flow of water in or from any natural stream or water course in this State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water*……" California Constitution, Article X, Sec. 2.

This provision was adopted by the voter in 1928 and helped to settle a historic battle between riparian and appropriative users of water. This constitutional provision specifically reversed a 1926 State Supreme Court decision in *Heminghaus v. Southern California Edison Co*. (1926) 200 Cal. 81, "…which allowed a riparian water rights holder to use the entire flow of the San Joaquin River to flood pasture land for the reclamation of soil and for irrigation, thus preventing Edison from developing an upstream power project pursuant to an appropriative right." For further details see California Water II (2007) Arthur L. Littleworth and Eric L. Garner, Solano Press Books, pp. 40-41.
[viii] California Water II, at pp. 114-115.

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October 11, 2011

Mr. Phil Isenberg, Chair
Delta Stewardship Council
890 Ninth Street, Suite 1500
Sacramento, CA 95814

Subject: Comments on the Draft 2010 Urban Water Management Plan

Dear Mr. Isenberg:

Thank you for submitting your September 15, 2011 comment letter on the City of Sacramento's Draft 2010 Urban Water Management Plan (UWMP). We appreciate the effort you have taken to share your views, and provide the following responses to the comments in your letter.

Comment 1

Your first comment states your judgment that the Draft 2010 UWMP (Plan) does not meet the requirements of law, and refers to possible conflict with the provisions of article X, section 2 of the California Constitution, which prohibits waste or unreasonable use of water.

Response

The Plan addresses all of the elements required under the Urban Water Management Planning Act (Water Code §§ 10610 et seq.), and follows the detailed guidelines issued by the Department of Water Resources. It complies with applicable laws. With respect to the California Constitution's prohibition against waste or unreasonable use, the City is also in compliance. The only specific claim of non-compliance appears elsewhere in your letter, where you suggest that the Plan's assumption regarding unaccounted for water, due to leakage, theft and other causes, may violate this prohibition. As noted in our response to this comment, below, some degree of this type of loss is inevitable and normal in every water system. The City has an active program to reduce the causes of water loss and minimize their occurrence. There is no basis to consider this waste or unreasonable use under article X, section 2.[1]

[1] If your citation of this constitutional provision is intended to refer to the water use reductions mandated by SBX7 7, we would call your attention to Water Code § 10608.8(a)(2), which states that a water purveyor's failure to reduce per capita demand, as required under SBX7 7, cannot provide the basis for asserting a violation of law for purposes of any state administrative or judicial proceeding prior to January 1, 2021.

Comment 2

Your next comment states that the Plan is not a "broad, forward-looking planning document," but, instead "has been converted into a document that promotes three messages:

- *Sacramento will meet the bare minimum state requirements for urban water use conservation by the year 2020 and that is all we really have to do.*
- *The water metering program is under way and the rest of California should stop blaming us for not installing meters earlier.*
- *All other problems and solutions relating to water, water quality, conservation, efficiency and environmental impacts should be deferred to a later time."*

We do not agree with these assertions, and will respond to each of them separately.

Response

a. The first assertion claims that:

- ***Sacramento is currently among the higher per capita water users in the state***
- ***Sacramento is only complying with the minimum goal***
- ***One way to show success is to compare 2005 to 2010 [demands]***

With respect to higher per capita water users, it is true that inland water users (including Sacramento) use more water, in large part due to the geography and climate of the area. The Sacramento Valley (along with other inland areas in the State) consumes more water than the cooler coastal areas due to the local hotter climate. This is shown in the table included in your comment letter. In addition, California's coastal cities can be expected to exhibit a lower per capita demand because housing is denser and tends to have less landscaping. The Legislature noted these distinctions in SBX7 7 (Water Code § 10608(i)):

> ***Per capita water use is a valid measure of a water provider's efforts to reduce urban water use within its service area. However, per capita water use is less useful for measuring relative water use efficiency between different water providers. Differences in weather, historical patterns of urban and suburban development, and density of housing in a particular location need to be considered when assessing per capita water use as a measure of efficiency.***

However, the fact that per capita water use in Sacramento is higher than per capita water use in coastal regions does not mean that the City is not committed to reducing this per capita usage through cost-effective water use efficiency measures; nor does the fact that the Plan contains the elements required by State law preclude the City from achieving a greater reduction than is required under State law. In this regard, please note that the City's per capita water demand in 2010 (207 gpcd) was below the 2020 target mandated by State law, and also is significantly lower than the demand shown for any other inland area listed on the urban water use table included in your comments. Notably, the Fifth Draft Delta Plan (August 2, 2011) issued by the Delta Stewardship Council, proposes the following two policies (Policy WR P1) for urban water suppliers:

> ***− Adopt and implement an Urban Water Management Plan and all required elements and measures, meeting the standards and timelines established in Water Code section 10610 et seq.***
>
> ***− Adopt and implement a plan to achieve 20 percent reduction in statewide urban per capita water use by December 31, 2020, meeting the standards and timelines established in Water Code section 10608 et seq.***

This is precisely what the City is doing, as reflected in the draft Plan.

Finally, with regard to your request for a comparison of 2005 and 2010 demands: The City's demand per capita in 2005 was 265 gallons per capita per day (gpcd), and for 2010 it was 207 gpcd, a 22 percent decrease in per capita water consumption.

b. The second assertion states that the City is implementing its water meter retrofit too slowly, after the City opposed the retrofit law, and should accelerate its pace to have "any chance of improving Sacramento's image in the water world."

Your comment is correct that the City in the past opposed legislation mandating the installation of residential water meters, based on provisions in the City Charter that compelled City officials to take that position. However, since adoption of the meter legislation that effectively preempted the City Charter prohibition, City officials have embraced the challenge of funding and implementing a $350 million dollar meter retrofit program. To date, the City has installed 32,485 meters at a cost of $58 million, funded through water rate revenues, grants and loans, and will continue to pursue funding, including grant funding, in order to expedite the installation schedule. For this reason, your comment concerning the City's image in the water world appears to be based on an outdated perception stemming from the City's past opposition to meter legislation, rather than on what the City is actually doing to implement a massive water meter retrofit program.

c. Your third assertion is that the City is deferring "all other problems and solutions relating to water, water quality, conservation, efficiency and environmental impacts … to a later time." Although this comment is phrased broadly, the only example given is the City's lack of water recycling. Aside from that example, there is no explanation what "all other problems and solutions relating to water, water quality, conservation, efficiency and environmental impacts" refers to, nor how the Plan is deferring those to a later time.

With regard to water recycling, initial results in the City's Water Master Plan process (still under development) suggest that the cost of providing recycled water is much more expensive than providing potable water, with no apparent commensurate environmental benefit, both in the context of water supply and greenhouse gas generation. Recycling is more cost effective and has greater environmental benefits in areas that import water at great expense, than in areas such as ours where it is not necessary to import water and water is returned to the river after use and treatment. Your comment suggests the application of a one-size-fits-all approach to water recycling that is not justified or appropriate.

In addition, it is reasonable and consistent with the "beneficiary pays" principle embodied in the Fifth Draft Delta Plan, to seek outside funding for water recycling measures when the City otherwise would incur significant costs to implement such measures without any commensurate benefit to the City or City residents and ratepayers. With regard to the comment that this is not a reasonable response to the water problems of California, we note that the Sacramento Regional County Sanitation District is, in fact, currently obtaining grant funding (through Proposition 50 and 84, among other sources) to construct recycled water improvements to provide recycled water locally, including to a number of potential City customers.

Comment 3

Your letter states that the City's 2005 UWMP indicated that Sacramento would use up its entire water supply by the year 2030, but the 2010 Plan seems to ignore this issue.

Response

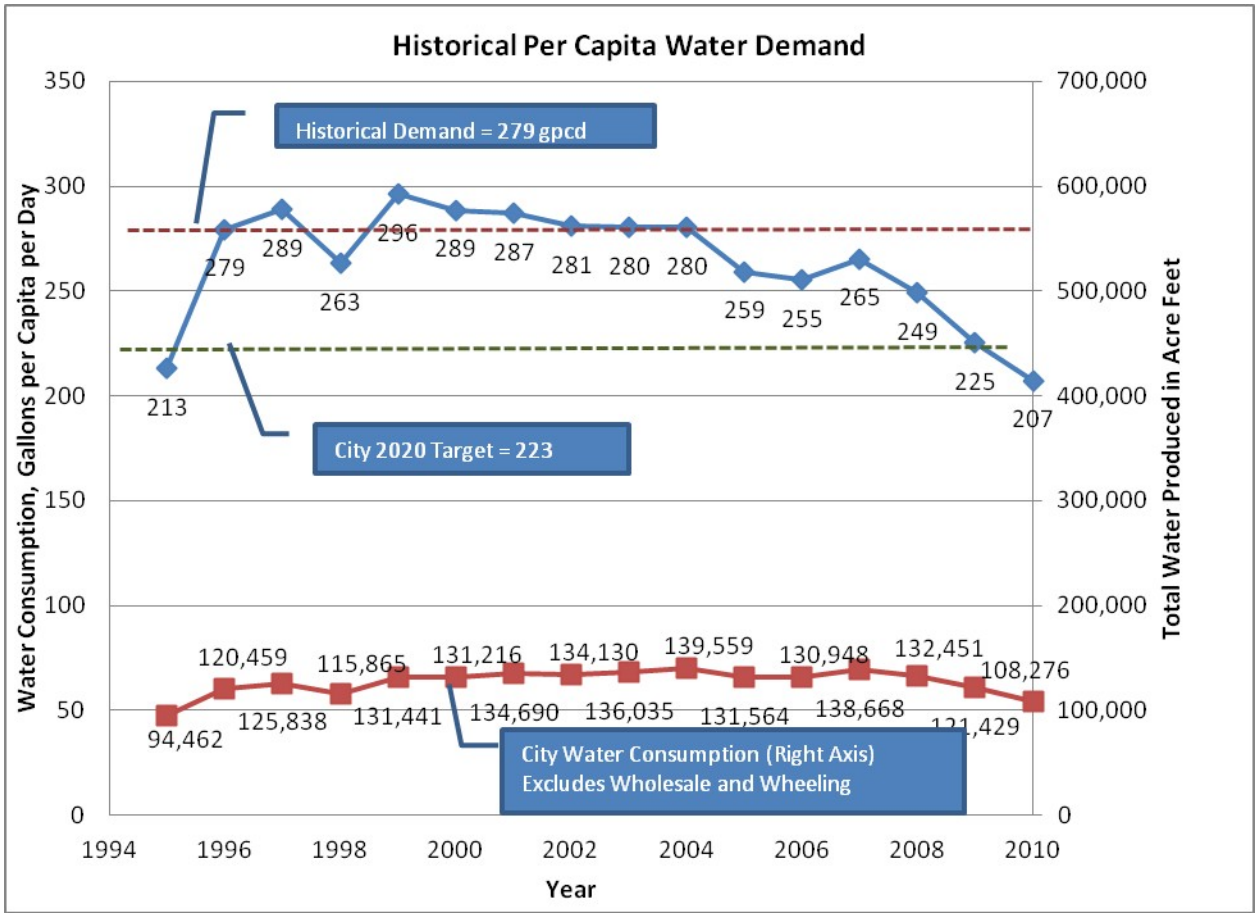
The Plan is not ignoring this issue. The demand estimates used in the 2005 UWMP were based on data developed in the early 1990s, which utilized less refined assumptions for water demands and land use. City staff and consultants recently have recalculated the City demands based on new and better information (including information from water meters). Based on this data, the Plan indicates that total aggregate demands in the year 2035 will not exceed the City's water entitlements, even when new potential wholesale customers are included.

Comment 4

Your letter notes that the 2005 UWMP included a chart showing historic per capita water demands indicating the water use patterns of residents of Sacramento, although no such chart is included in the 2010 Plan. The comment seems to suggest that this was done to hide "the fact that Sacramento has over time done very little to reduce its per capita use of water."

Response

We agree that a similar chart would be helpful to better understand the City's recent water consumption. Staff will have the Plan revised to include the chart set forth below. No attempt was made to hide the City's recent per capita use of water, which has declined, as indicated in the Plan and shown on the chart below.

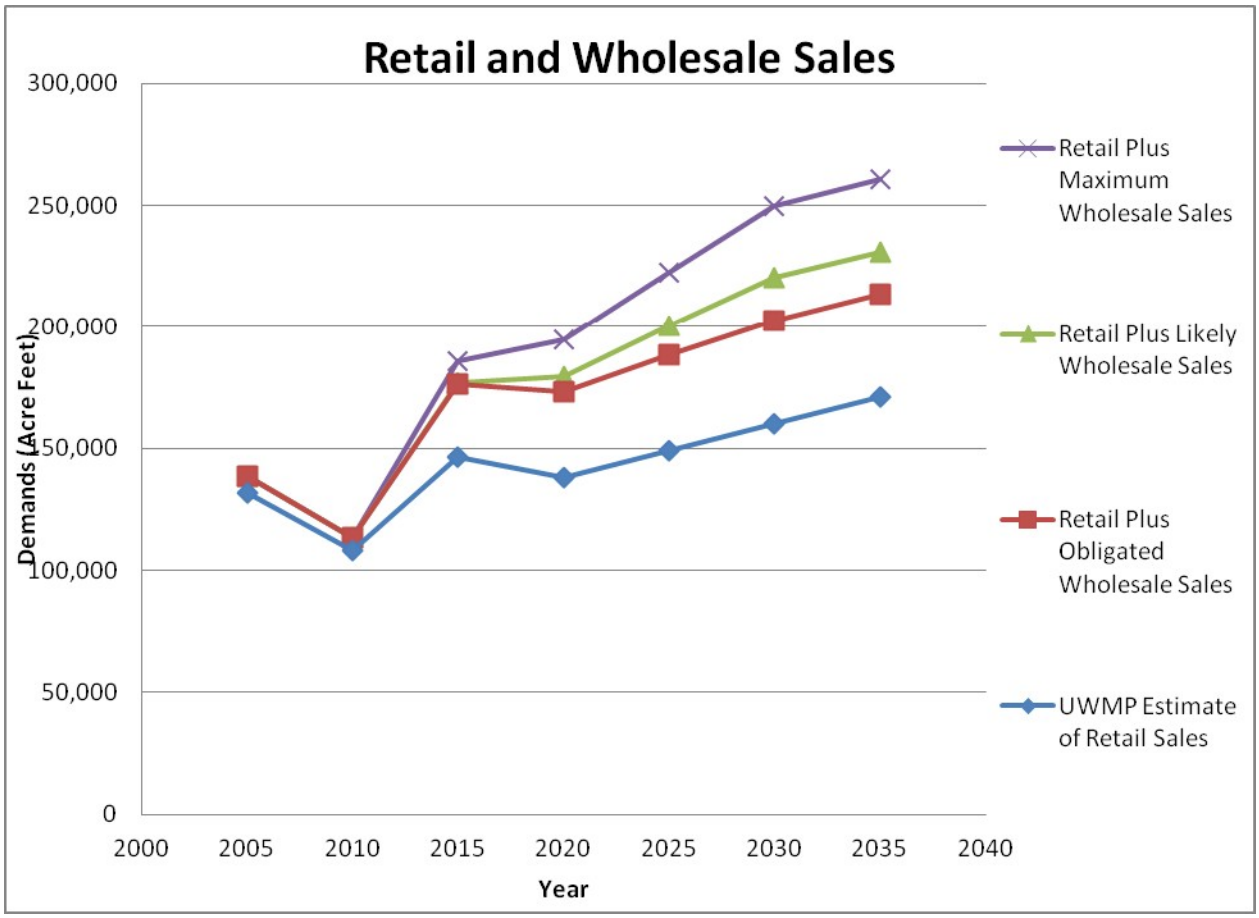


Comment 5

Your letter refers to a chart in the 2005 UWMP that compared projected water demands to available supply, and states that a comparable chart should be provided in the 2010 Plan.

Response

A chart similar to the one provided in 2005 is presented below and will be included in the Final UWMP. It should be noted that the chart presented in the 2005 UWMP included demand estimates under various conservation scenarios including no conservation, 7.5 percent conservation and 25.6 percent. The below chart assumes 20 percent conservation from recently calculated demands, based on current State law requirements. As previously noted, nothing in the Plan precludes the City from achieving a greater reduction than is required under State law.



Comment 6

Your letter states that there is no agenda for City action in the Plan, and suggests that the City's Interim Water Conservation Plan is inadequate because substantially all of the water conservation to be achieved in the near future would result from water meters, which the City has historically opposed.

Response

The Interim Water Conservation Plan (IWCP) lays out a variety of actions necessary to satisfy the requirements of the California Urban Water Conservation Council (CUWCC) memorandum of understanding (MOU). The IWCP is being revised and finalized and will be brought to the City Council next year. Water meters are a vital component of any water conservation program, and their importance is not lessened by the City's past opposition to residential water metering. As noted in a prior response, the City's past opposition was based on a City Charter provision that is no longer relevant.

Comment 7

Your letter states that a reader of the Plan "is left with the clear impression that the City of Sacramento will conserve water only when mandated by law, court order or regulatory changes, and only then if 'someone else' provides the money to make the changes."

Response

This is not an accurate statement, and misrepresents the facts. The City actively supports water conservation and water use efficiency, and has taken a number of actions to promote these important policies, including: (1) Prior to 2005, the City conducted a voluntary meter installation program that allowed property owners to request a water meter, which was as far as the City could go under the City Charter prohibition then in effect; ; (2) In 2009, the City approved a restructured metered water rate that incentivizes conservation by basing approximately 60% of the rate on volumetric usage for the average residential user, and the City has committed to increasing this percentage when adequate metered usage data is available to support development of a revised rate; (3) Since 2009, the City has made substantial investments of ratepayer funds in state-of-the art metered water technology and adopted an Automated Meter Infrastructure program that will be able to track water usage and detect leaks or other anomalies so that they may be promptly remedied; (4) The City has adopted City Code amendments to increase water use efficiency, including the Efficient Water Landscape Ordinance and the Outdoor Water Conservation Ordinance; (5) Since 2005, the City has installed 32,485 water meters, funded by a combination of ratepayer funds, loans and grants; and (6) The City has implemented and continues to implement numerous programs to encourage water conservation and reduce inefficient water use, including, but not limited to:

- ***Conducting "Water Wise House Calls" to audit single family and multifamily dwelling units and provide advice on improving water use efficiency.***
- ***Providing incentives to homeowners and businesses to install water efficient toilets, fixture units and clothes washers.***

Comment 8

This comment suggests that the City may be at risk of violating the constitutional prohibition against unreasonable use or waste of water, citing the Plan's assumption that 10% of water is unaccounted for, and making reference to the State Water Resources Control Board's decision finding the Imperial Irrigation District in violation of this prohibition because of practices such as enormous spillage rates from unlined canals, which water was "lost" to the Salton Sea.

Response

We appreciate the importance of diligence to avoid the risk of any waste or unreasonable use. An evaluation of the facts demonstrates that the City is not incurring such risk, and is improving its compliance as it pursues the actions set forth in the Plan and other City plans and requirements regarding water use. With reference to your specific assertion regarding system losses, in 1999, the California Urban Water Conservation Council identified a 10 percent benchmark for unaccounted for water (water lost due to leaks, theft, etc.). This is the industry standard. It is impossible to reduce the leakage rate of a distribution system to zero, as the cost to do so would be prohibitive. This is particularly true of a system as extensive as the City's. The Plan uses this 10% benchmark, which will be subject to revision when the City is fully metered and the actual loss rate can be calculated. Regardless of what reasonable assumption is used, the City is taking significant steps to reduce water loss. The City has spent $26 million over the last 10 years to replace leak prone riveted steel transmission mains, and spends nearly $800,000 in ratepayer fees annually to correct leaks. The City also is implementing an active leak detection program this year to further reduce leakage. The City has made significant investments in automated meter technology that will make it far easier to indentify and reduce leakage in future years. Additionally, the City's water meter retrofit program includes the replacement of leak-prone backyard water mains that have exceeded their useful life, and the estimated cost of replacing the pipelines (apart from the meters) in future years is approximately $195,000,000. These expenditures represent a very significant ongoing investment and commitment by the City and City ratepayers to reduce water loss.

You referenced the SWRCB's Imperial Irrigation District (IID) decision (consisting of Decision 1600 and the follow on Order 84-12). We assume that you reference this due to its reliance on Article X, Section 2 of the State Constitution. It is certainly an interesting decision and well worth reading. However, there is no analogy between IID's then existing water practices and those of the City. This is illustrated, by way of example, by (i) IID's loss of approximately one million acre-feet of water annually to the Salton Sea, where it is lost to re-use; (ii) canal spillage approximately 77% of the time; (iii) use of unlined canals; (iv) absence of regulatory reservoirs necessary to reduce canal spills and excess deliveries to farmers' headgates; and (v) absence of agricultural tailwater recovery systems. (These examples are from the SWRCB Decision 1600.) In contrast, the City's water use is quite reasonable, and furthermore is improving significantly as reflected by the data set forth in the 2010 UWMP.

Comment 9

Your letter asks whether the City can or should continue to serve wholesale water outside the City limits in the event of water shortages and whether such contracts would interfere with City residents getting water in the event of a severe drought. Your letter also asks whether increased demand for City water will be primarily to serve wholesale sales to other agencies, not for City residents themselves.

Response

Future increases in demand may occur due both to the wholesale provision of water to neighboring communities, and to increases in demand of City residents. The City's water rights are in part a resource both for City residents and for others in the region. In fact, the water rights assigned to the City by SMUD contemplate such regional benefits. This may be of increased importance in the future given groundwater contamination and other issues.

With respect to the specific question of whether wholesale contracts will interfere with City residents getting water in the event of a severe drought, it is unlikely that wholesale water agreements will impact service to residents. This is analyzed in the Plan chapter titled "Water Supply Reliability and Water Shortage Contingency Planning" (Chapter 5). The Water Code requires a water supplier to analyze the impact of a single year and a three year drought. The Department of Water Resources Urban Water Management Plan Guidebook provides specific direction on which past drought to replicate for future planning. The Plan used the 1977 drought for modeling a single year drought and the 1990 to 1992 to model a three year drought. As indicated in the Plan, the occurrence of these drought conditions would not result in interruptions to City residents.

The plan does mention the possibility of an extremely severe drought that has a very low probability of occurrence that would require demand reductions by City residents. Such a drought would require deliveries to wholesale customers to be reduced or ceased completely.

Comment 10

Your letter also interprets the Plan to indicate that 1) a modest drop of single family water use is offset by a significant growth in commercial and Institutional us of water and 2) the use of water by the City for its parks and other irrigated public properties, and by large business owners, is a problem that needs to be corrected.

Response

The demand growth between 2010 and 2015 assumes a number of drivers, including growth in all water use sectors (residential as well as commercial and institutional), reduction in demand, and economic recovery. The growth of all water use sectors inside the City is proportionally the same.

The tools used for reducing large landscape demands include Landscape Metering (BMP 1.30 under the CUWCC MOU), conservation pricing (BMP 1.40) and Large Landscape Conservation Program and Incentives (BMP 5.00). The City implements all of these measures.

With respect to park irrigation, the Utilities Department has performed large landscape audits on 123 of the City parks. Prior to the audits, nearly two thirds of the parks used more water than the standards currently applied to new development under the City's water efficient landscape ordinance. After the audits were performed, this was reduced so that approximately two thirds of the parks now meet the standards applicable to new development. While we are encouraged by this success, we recognize that there is still more work to be done. The current economic conditions pose a challenge because funding for City parks has been harder hit that many other municipal functions.

We are not aware of any factual basis for your comment that use of water by large business owners is a problem that needs to be corrected. We are committed to implementing cost effective water conservation measures across all water use sectors.

Comment 11

Your letter asks how much savings the City expects from metering.

Response

The City is not aware of any credible study that quantifies the amount of conservation solely attributed to metering. However, the City recognizes that metering and metered billing is an important element of an effective water conservation program, and the City believes that it is reasonable to assume that meaningful conservation

will result from full implementation of the meter retrofit program.

Comment 12

Your letter notes that if the foundational and programmatic best management practices were implemented and generated the projected savings of 1,869 acre feet (pg. 6-7, Appendix I), it would mean only a 2% reduction in retail water deliveries for 2010, which would not meet the per capita use reductions mandated by State law. In addition, your letter asks if there any other conservation measures that would allow the City to meet the 2020 target of 223 gpcd.

Response

This comment makes a good point and additional explanation is warranted. The 1,869 acre foot number is for one year only. The continued maintenance and funding of the conservation program is needed to promote continued and increased water conservation. Obviously, the one year savings of 1,869 acre feet is not sufficient to meet the statutory conservation targets for 2015 and 2020. However, as the conservation program continues to perform functions such as replacing inefficient toilets, installing water meters, instituting appropriate pricing of water and all of the other Best Management Practices, the conservation achieved in subsequent years will continue to grow and we anticipate that the City will meet or exceed its statutory obligations. The City's planned conservation measures will be detailed in the Interim Water Conservation Plan due to be adopted next year.

Comment 13

Your letter notes that the Plan states that "water demands have been decreasing since the year 2000, except for recent dramatic increases observed since 2008," and asks whether this brings into question the City's reasoning that increased public awareness of drought conditions and the reduced supplies in the Delta resulted in conservation.

Response

The excerpted language contains a typographic error. The Plan should be revised to state "… except for recent dramatic ~~increases~~decreases observed since 2008." The intent was to describe the accelerating reduction in water demands since 2008. Thank you for bringing this to our attention.

Comment 14

Your letter states that the City's intention to increase its surface water usage to meet future City demands "seems to run counter to the goal of reducing reliance on the Delta and the objectives of the SWRCB," and states that the ecosystem cannot recuperate if cities continue to take more out of the rivers that serve as the primary inflows to the Delta.

Response

The City's water rights permits currently provide to the year 2030 to perfect the City's water rights. An extended period to perfect water rights is appropriate for municipalities due to the fact that cities can grow in accordance with approved General Plans, and their water rights must be adequate to supply water to meet reasonable water demands associated with growth and development. This is reflected in and consistent with the domestic and municipal water use preferences codified in Water Code sections 106 and 106.5. This also is consistent with

various provisions of SBX7 1 providing assurances that Delta solutions must respect water rights and water right priorities (e.g., Water Code §§ 85031(d), 85032(i)). The City and City residents and ratepayers have made substantial investments in the City's water supply infrastructure and facilities in reliance on the City's water rights and the water supply assured by such rights, and will continue to do so. The City also is party to a settlement contract with the U.S. Bureau of Reclamation which among other things allowed the development of Folsom Reservoir, and provides additional security to the City's water supply. The City's exercise of its water rights is consistent with the California water rights system. It is also essential to the economic viability of the City and to some extent the Sacramento region. The City is incorporating metering and conservation into its routine practices which will ensure that its water use comports with current standards.

Comment 15

Your comment suggests that the Plan shows retail water deliveries per single family residential connection increasing from 294 gallons per capita in 2005 and 2010 to 435 gallons per capita in 2015.

Response

We do not read the Plan to provide that data. Please see Table 8 (page 3-5). The 2015 Interim Target is 256 gpcd and the 2020 water use target is 223 gpcd.

Comment 16

Your letter refers to water demand projections in a chart in the 2005 UWMP, showing that demands would exceed the City's water supply, and asks whether the City will consider a moratorium on wholesaling any more water.

Response

As noted above, the water demand projections in the 2005 UWMP have been replaced by the 2010 Plan, which uses more current and accurate assumptions to develop its demand projections. Based on the 2010 Plan projections and the current level of wholesale demand, there is no reason to consider a moratorium at this time. It is within the City Council's discretion to enter into future wholesale water agreements. As mentioned above, the City's surface water rights are in part a regional resource, and supplying wholesale surface water to neighboring communities is a vital component of a robust regional conjunctive use program.

We hope that the above responses prove helpful. Your comment letter, and this response, will be included in the record for the City Council's consideration of the Plan.

Sincerely,

Dave Brent
Interim Director of Utilities

cc: Mayor and City Council Members
John Shirey, City Manager
Bill Busath, Interim Engineering Manager
Dan Sherry, Supervising Engineer
Jim Peifer, Senior Engineer

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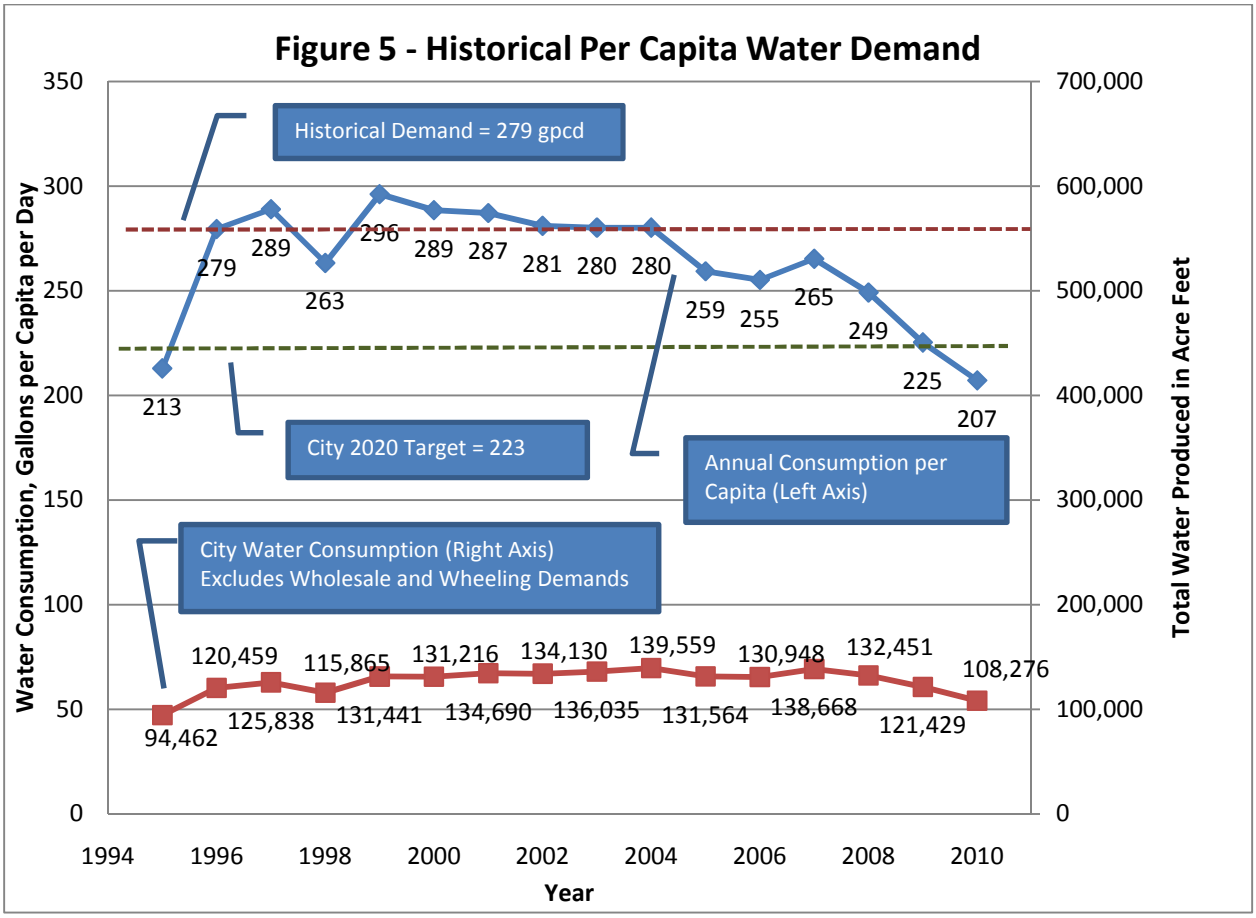
Attachment 3

Changes to the Draft 2010 Urban Water Management Plan

1. Page 3-5, add the following at the end of Section 3.2

"Figure 5 presents the historical Per Capita Water Demand and the total quantity of water consumed in the City."



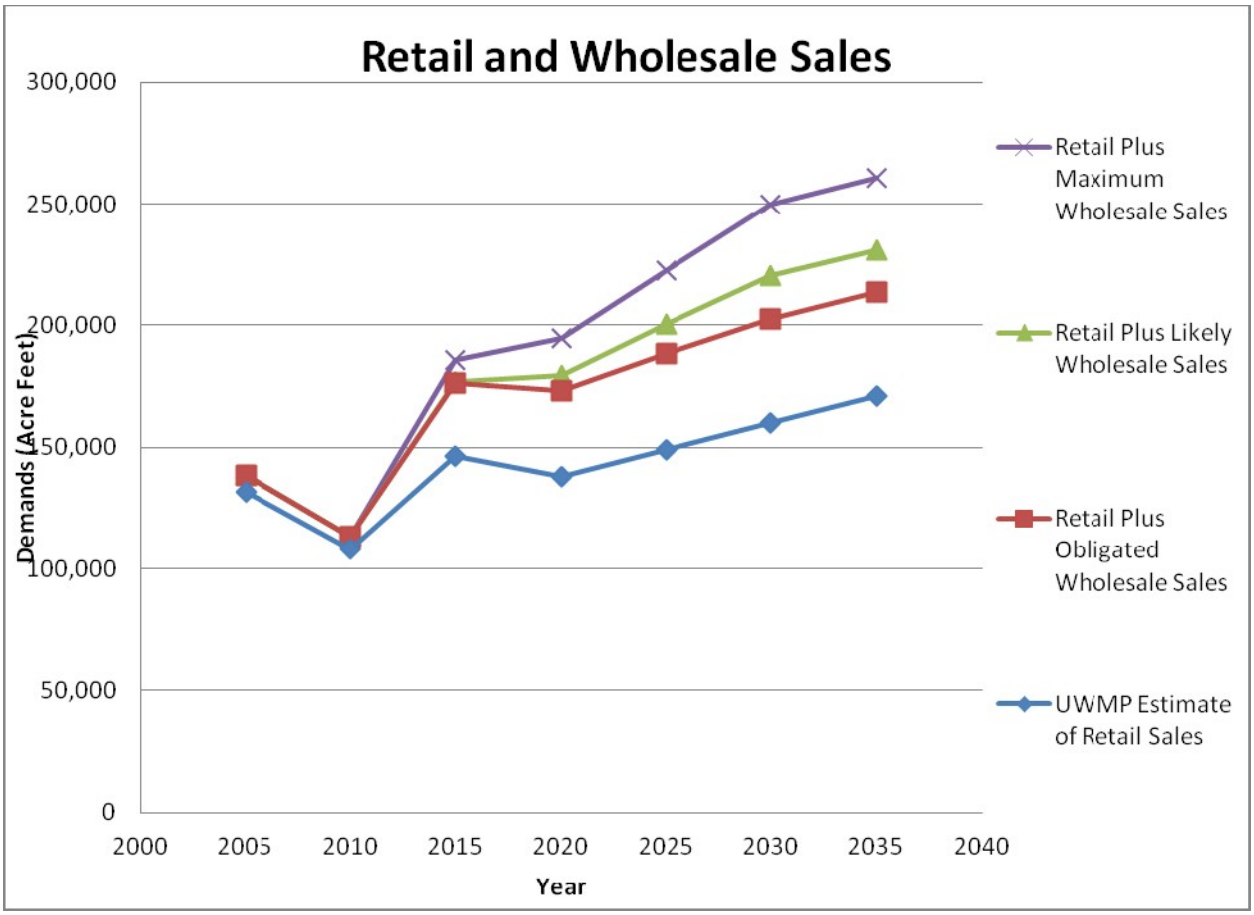
2. Page 3-5, second paragraph under section 3.3, make the following edit:

"… except for recent dramatic ~~increases~~decreases observed since 2008."

3. Page 3-16, after the last paragraph, add the following:

"Figure 7 presents the projected retail demands and total demands including wholesale and retail deliveries."

Figure 7
Retail and Wholesale Demands



4. Revise the numbering to the remaining figures to accommodate the newly added Figures.