PICO WATER DISTRICT

2010 Urban Water Management Plan

Adopted July 20, 2011

Prepared for:

4843 Church Street
Pico Rivera, CA 90660

Prepared by:

1410 Rocky Ridge Drive, Suite 140
Roseville, California 95661

9275 Sky Park Court, Suite 200
San Diego, California 92123

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Abbreviations

Act	Urban Water Management Planning Act
AF	Acre-Feet
AFY	Acre-Feet per Year
APA	Allowed Pumping Allocation
BMP	Best Management Practice
CBMWD	Central Basin Municipal Water District
CII	Commercial/Industrial/Institutional
CIMIS	California Irrigation Management Information System
City	City of Pico Rivera
CUWCC	California Urban Water Conservation Council
DPH	California Department of Public Health
District	Pico Water District
DMM	Demand Management Measures
DWR	California Department of Water Resources
ETo	evapotranspiration
FY	Fiscal Year
gpd	gallons per day
gpcd	gallons per capita per day
GIS	Geographical Information System
HCF	hundred cubic feet
HEW	High-Efficiency Washer
LACSD	Los Angeles County Sanitation Districts
MCL	Maximum Contaminant Level
Metropolitan	Metropolitan Water District
mgd	million gallons per day
mg/L	milligrams per liter
PRWA	Pico Rivera Water Authority
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SWP	State Water Project
ULFT	Ultra Low Flow Toilet
UMWP	Urban Water Management Plan
WSCP	Water Shortage Contingency Plan

1.0 Introduction

Since 1984, California's Urban Water Management Planning Act (Act) has required each urban water supplier in the state to prepare an urban water management plan (UWMP). The requirement applies to each urban water supplier that provides water for municipal purposes either directly or indirectly to more than 3,000 customers or supplies more than 3,000 acre-feet (AF) of water annually. These agencies must update their UWMP at least once every five years on or before December 31, in years ending in five and zero. The deadline for submittal of the 2010 UWMP for retail water purveyors is July 31, 2011 as a result of recent legislation. Sections 10610 through 10657 of the California Water Code detail the information that must be included in these plans. In accordance with the Act, the Pico Water District (District) is required to update and adopt its plan by July 1, 2011 prior to submittal to the California Department of Water Resources (DWR). **Appendix A** contains the text of the Act.

The District utilized DWR's "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" and language for Senate Bill 7-7 from the Extraordinary Session of 2009 commonly referred to as SBX 7-7. SBX 7-7 was passed in November 2009 with the goal of reducing California's urban per capita water use by 20 percent by December 31, 2020 with an incremental goal of reducing per capita water use by 10 percent by December 31, 2015. This report includes projections of the District's future demands and supplies, based on estimates of future growth in the District service area. It also discusses the steps the District has taken to promote water conservation and ensure water is being used wisely. The strategies outlined in this report are intended to allow the District to continue to provide a safe and reliable water supply to its customers.

The District maintains its records of water use on a calendar year that runs from January 1 through December 31. In this document, projections and other references to "years" of water demand over the course of a year are reported as calendar year. For estimates that are based on an instantaneous value and not a year-long accumulation (for example, the service area population), values are assumed to be valid on January 1 of the corresponding year i.e. January 1, 2010.

1.1 Changes to the California Urban Water Management Planning Act

Major amendments made to the Act since preparation of the District's 2005 UWMP Plan include the following:

- Water Code Section 10631.1 requires a plan by retail water suppliers to include water use projections for single and multi-family residential housing needed for lower income and affordable households, to assist with compliance with the existing requirement under Section 65589.7 of the Government Code, that suppliers grant a priority for the provision of service to housing units affordable to lower income households.

- Water Code Section 10621(b) clarifies that every urban water supplier preparing a plan must give at least 60 days advanced notice to any city or county prior to the public hearing on the plan within which the supplier provides water supplies to allow for consultation on the proposed plan.
- Water Code Section 10631(j) deems water suppliers that are members of the California Urban Water Conservation Council (CUWCC) and comply with the Memorandum of Understanding (MOU), as it may be amended, to be in compliance with the requirement to describe the supplier's water demand management measures in its UWMP.
- Water Code Section 10631.7 required DWR, in consultation with the CUWCC, to convene a technical panel, no later than January 1, 2009, to provide information and recommendations to DWR and the Legislature on new demand management measures, technologies, and approaches. The panel and DWR were to report to the Legislature on their findings no later than January 1, 2010 and each five years thereafter.
- Water Code Section 10633(d) clarifies that the "indirect potable reuse" of recycled water should be described and quantified in the plan, including a determination regarding the technical and economic feasibility of serving those uses.
- Water Code Section 10644(c) requires DWR to recognize exemplary efforts by water suppliers by obligating DWR to identify and report to the technical panel, described above, and "exemplary elements" of individual water suppliers' plans, meaning any water demand management measures adopted and implemented by specific urban water suppliers that achieve water savings significantly above the levels required to meet the conditions to state grant or loan funding.
- Water Code Section 10631.5 was amended to address conditions of eligibility for grants or loans from DWR. DWR will consider whether the urban water supplier has submitted an updated plan when determining eligibility for funds made available pursuant to any program administered by [DWR].

According to Water Code Section 10610.2(2), "[t]he conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level." **Appendix A** contains the text of the Act.

1.2 Senate Bills 610 and 221

Senate Bills (SB) 610 and 221 are the common names for Water Code Sections 10910 through 10914 and Government Code Sections 65867.5, 66455.3, and 66473.7. These bills amended state law to improve the link between water supply planning and land use decisions made by cities and counties. SB 610 requires that the water purveyor of the public water system prepare a water supply assessment to be included in the environmental documentation of certain large-scale proposed projects. SB 221 requires a written verification from the water purveyor that sufficient water supplies are available for certain large residential subdivisions prior to approval of a tentative map. The District's UWMP provides information that will be used in future assessments and verifications prepared to meet the requirements of these bills.

1.3 Senate Bill 7 of the Seventh Extraordinary Session of 2009

In addition to changes in the Act listed above, the state Legislature passed Senate Bill 7 as part of the Seventh Extraordinary Session on November 10, 2009, which became effective February 3, 2010. This new law was the water conservation component to the Delta legislation package, and seeks to achieve a 20 percent statewide reduction in urban per capita water use in California by December 31, 2020. Specifically, SBX 7-7 from this Extraordinary Session requires each urban retail water supplier to develop urban water use targets to help meet the 20 percent reduction goal by 2020 (20x2020), and an interim water reduction target by 2015.

The SBX 7-7 target setting process includes the following: (1) baseline daily per capita water use; (2) urban water use target; (3) interim water use target; (4) compliance daily per capita water use, including technical bases and supporting data for those determinations. In order for an agency to meet its 2020 water use target, each agency can increase its use of recycled water to offset potable water use and also step up its water conservation measures. The required water use targets for 2020 and an interim target for 2015 are determined using one of four "Target" methods – each method has numerous methodologies. The 2020 urban water use target may be updated in a supplier's 2015 UWMP. **Appendix A** also contains the text of SBX 7-7.

Four methods are stipulated for calculating the water use target. Three of the methods are listed in Water Code Section 10608.20(a)(1). The fourth method was developed by DWR. The four methods are:

- Method 1 – Eighty percent of the water supplier's baseline per capita potable water use
- Method 2 – Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscape area water use, and commercial, industrial, and institutional uses
- Method 3 – Ninety-five percent of the applicable state hydrologic region target as stated in the state's draft 20x2020 Water Conservation Plan.
- Method 4 – Draft Provisional Target Method 4 (January 2011)

In 2015, urban retail water suppliers will be required to report interim compliance followed by actual compliance in 2020. Interim compliance is halfway between the baseline water use and 2020 target. Baseline, target, and compliance-year water use estimates are required to be reported in gallons per capita per day (gpcd). For consistent application of the Act, DWR produced Methodologies for Calculating Baseline and Compliance Urban Water Per Capita Use in October 2010. Discussion on the District's baseline and target 2020 demands are discussed in more detail in Section 3.0.

Failure to meet adopted targets will result in the ineligibility of a water supplier to receive grants or loans administered by the State unless one (1) of two (2) exceptions is met. Exception one (1) states a water supplier may be eligible if they have submitted a schedule, financing plan, and

budget to DWR for approval to achieve the per capita water use reductions. Exception two (2) states a water supplier may be eligible if an entire water service area qualifies as a disadvantaged community.

1.4 Resource Maximization

Water management tools have been used by the District to maximize water resources. To help maximize water resources, the District has developed and implemented various policies and plans, which are referenced throughout this UWMP. The various components of the 2010 UWMP include evaluation and descriptions of the various sources of water supply, efficient water uses, water service efficiency, demand management measures, implementation strategy, and schedule. The District is also committed to continuing investigations of local groundwater, additional recycled water, and other potential water resources that could build greater supply reliability. Information in this UWMP was developed from various sources, including the draft 2010 UWMP by the Central Basin Municipal Water District (CBMWD).

Mission Statement

"…to provide its service area with the highest quality and reliable supplies of water at the lowest possible rate. Provide the best service; manage its infrastructure to meet present and future needs. Strive to minimize economic impact to its water customers."

1.5 Agency Coordination and Public Participation

The District coordinated the preparation of this UWMP with the appropriate agencies. The District is a member of the CBMWD, a water wholesaler, and appropriate information from CBMWD's 2010 UWMP was used in this UWMP as necessary.

In accordance with the Act, the District provided a 60-day notice to the land use jurisdictions (City of Pico Rivera and Los Angeles County Regional Planning) within its service area that it was preparing its 2010 UWMP. On July 6, 2011, the District presented its 2010 UWMP to interested citizens of the District's service area, the general public and the District's Board of Director's to solicit comments and gather public input.

The District encouraged community and public interest involvement in the UWMP update through public hearings and inspection of the draft document. Prior to adoption, the District made the 2010 UWMP available for review and with circulate the 2010 UWMP for up to 30 days. Copies of the draft UWMP were for public inspection at the District office, located at 4843 Church Street, Pico Rivera, California. A Public Hearing regarding the 2010 UWMP was held on July 20, 2011. Public hearing notifications were distributed through utility bills and published in local newspapers. A copy of the published Notice of Public Hearing is included in **Appendix B**. The hearing provided an opportunity for all residents and employees in the service area to learn and ask questions about their water supply in addition to the District's plans for providing a reliable, safe, high-quality water supply. These coordination efforts are summarized in Table 1.

Table 1 Coordination with Appropriate Agencies

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
City of Pico Rivera					X X		
General public		X X					
Los Angeles County Regional Planning						X	

1.6 Adoption and Implementation of the UWMP

This Urban Water Management Plan was adopted by the District Board on July 20, 2011. A copy of the adoption resolution (159-R) is attached in **Appendix B**. The District shall implement its adopted plan pursuant to Water Code Section 10643 in accordance with the information set forth in this UWMP.

2.0 Service Area

This section of the report provides an overview of the District's service area, climate, and water supply facilities.

2.1 Appropriate Level of Planning

The District's service area has not experienced significant growth in the past five years, and the service area population is expected to increase by an additional 3,500 people by 2035 including redevelopment allocated by the comprehensive update of the City of Pico Rivera's General Plan. All of the District's potable demands are currently met with local groundwater.

2.2 Service Area Description

The City of Pico Rivera is located approximately eleven (11) miles southeast of downtown Los Angeles, on the eastern edge of the Los Angeles Basin, and on the southern edge of the San Gabriel Valley. The towns of Pico and Rivera, from which the City of Pico Rivera originated, were incorporated as one municipality and as a general law city on January 29, 1958. The City boundary is depicted on Figure 1.

The City is one of twenty-four (24) cities in southeast Los Angeles County and is included in CBMWD's 227-mile service area. The City's primary source of potable water supply has been groundwater extracted from the Central Basin groundwater aquifer. With naturally occurring recharge, enhanced by recharging efforts, groundwater supplies have generally been sufficient to meet water demands.

The District is one of two (2) independent water purveyors that provide water service to the residents of the City. The District's water service area encompasses 1,462 acres (2.29 square miles) inside the City of Pico Rivera. All of the District's customers live in the City of Pico Rivera, inside the District's boundaries. The other supplier is the Pico Rivera Water Authority (PRWA), a division within the City of Pico Rivera municipal services.

Currently, there are no inter-connections between the two agencies. Each water purveyor maintains an independent water distribution system and operates several water supply wells used to extract the local groundwater from the Central Basin aquifer. Figure 1 illustrates the service area for each water purveyor.

The District was formed in 1926 as a County Water District under the State Water Act of 1913, and currently has approximately 5,400 connections within its 2.87 square mile service area. The District provides water service to approximately 24,000 residents. The District serves approximately 38 percent of the City's incorporated area and has prepared its own draft UWMP. As such, this report addresses only the District service area, demands, and supplies. The PRWA provides water service to the remainder of the City (approximately 62 percent) outside the District's boundaries and is preparing its own draft UWMP.

***Source*:** Pico Water District.

100020333 | Pico Water District

Figure 1

Pico Water District Service Area Map

ATKINS

The service area is primarily residential land use. Other land uses in the District are commercial including the Pico Rivera Plaza; government including schools and public buildings such as libraries and post offices; light industrial; and parks including William A. Smith Park and Pico Park. The District has itemized its customers into water billing classes or categories consistent with their land use type. Based on billing data, approximately 75 percent of District water use comes from the residential category. Another 15 percent comes from the commercial and industrial categories, with another 10 percent coming from government classified land uses such as schools and public buildings.

2.3 Climate Data

The source of the District's groundwater supply can be influenced by climate. Climatic conditions within the service area are characteristically Mediterranean, with mild, dry summers and cool winters. Most of the region's rainfall occurs between December and March. Average annual rainfall is approximately 14.8 inches per year.

Historic climate data were obtained from the Western Regional Climate Center for Station 045790 (Montebello). This station was selected because its annual temperature variation is representative of most of the District's service area. Evapotranspiration data were obtained from the California Irrigation Management Information System (CIMIS) for Zone 6 (Upland Central Coast and Los Angeles Basin). Climate and evapotranspiration data are summarized in Table 2.

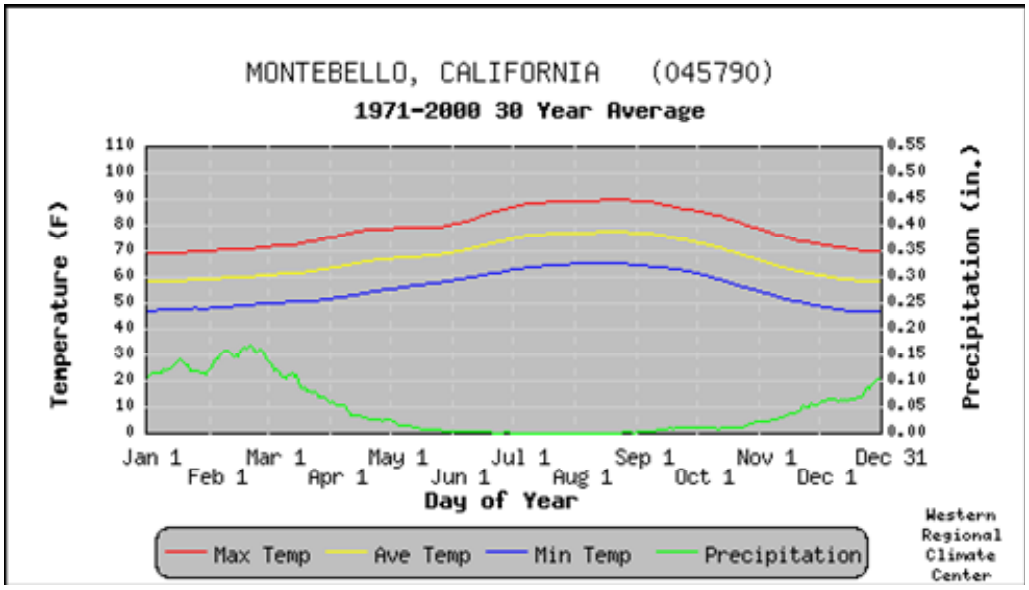
Table 2 Climate Data

Month	Monthly Average Evapotranspiration (inches)	Average Rainfall (inches)	Average Temperature (Fahrenheit)
January	1.86 3.69	58.6	
February	2.24 3.56	60.0	
March	3.41 2.82	61.7	
April	4.80 0.78	65.4	
May	5.58 0.19	68.3	
June	6.30 0.06	72.3	
July	6.51 0.01	76.4	
August	6.20 0.02	77.5	
September	4.80 0.17	75.8	
October	3.72 0.28	70.5	
November	2.40 1.26	63.4	
December	1.86 1.94	59.0	
Annual 49.7		14.78	67.4

Source: CIMIS for Zone 6 (Upland Central Coast And Los Angeles Basin) and Western Regional Climate Center for Station 045790 (Montebello).

The typical annual distribution for temperature and precipitation are shown in Figure 2.

Figure 2 Average Temperature and Precipitation



2.4 District Water System Overview

The District's water service area overlies the Central Basin Groundwater Basin (Central Basin) within the San Gabriel River watershed. The District is one of twenty-nine (29) water agencies that currently produce groundwater from the Central Basin. The California Department of Water Resources (DWR) is the Watermaster and the Water Replenishment District of Southern California (WRD) is charged with overseeing "artificial" groundwater replenishment activities in the Central Basin.

As shown above on Figure 1, the District's service area encompasses approximately 2.5 square miles, includes approximately 5,300 customers, and 52 miles of water distribution system. The District uses groundwater to produce 100-percent of its supply to meet customer demand. The District's allowed pumping allocation (APA) from the Central Basin is 3,624 acre-feet per year (AFY). In recent years (2007 and 2008) District water demands have exceeded its APA; as a result, the District has supplemented it supply with leased APA from other agencies. The cost to lease groundwater and related production costs and charges are much cheaper than the cost to purchase imported water. In response to customer demands (exceeding its APA), the District plans to continue to lease groundwater rights from other agencies if its economically feasible.

The Central Basin contains millions of acre feet of storage and is the principal source of water for the overlying cities and water districts, including the District. The Central Basin groundwater comprises a number of sources: 1) natural recharge from precipitation and runoff from regional/local watersheds; 2) artificial recharge supplied through purchased imported water; and 3) treated effluent from regional wastewater treatment facilities. As stated above, the WRD

manages the ongoing artificial recharge activities within the Central Basin groundwater area. Ongoing negotiations amongst the Central Basin groundwater users may eventually allow each Central Basin member agency to extract up to 20 percent over its APA, provided the over-extraction can made up the following year. Currently, if an agency exceeds its APA and does not possess carryover quantities from under pumping in previous years, it must lease unused APA from other overlying entities. It is generally understood that several thousand acre feet of APA are reportedly available for lease on purchases each year.

The District's water distribution system includes a total of six (6) active wells which draw potable water directly from the Central Basin. In conjunction with the wells, the supply system includes one (1) booster pump station and one (1) 1.25-million gallon (mg) reservoir.

The District operates its water system under CDPH Water System Number 1910125. Permit-approved sources of domestic water supply include Central Basin groundwater and treatment at Wells 2, 4a, 5a, 7, 8, and 10. Wells 1, 6, and 9a are currently inactive and not approved by CDPH for domestic water supply. Groundwater production averaged 3,705 AFY from 1996 through 2007. The District has leased groundwater production rights from other Central Basin member water agencies in recent years to provide for water demands that have exceeded their APA.

Currently, potable water is used all for landscape irrigation. CBMWD operates a large regional recycled water system. Currently, Pico Park, Smith Park and Rio Vista Elementary School have large landscapes that could realistically use recycled water for irrigation purposes. Pico Park has had the highest historical irrigation demand of 9.3 AFY. In the past only Pico Park was within a reasonable distance to connect to the recycled water system; however, CBMWD has installed an eight inch recycled water line adjacent to Smith Park, and Rio Vista Elementary School. Although the parks and Rio Vista Elementary School are close to either new or existing CBMWD recycled water pipelines; currently, it is neither economically feasible nor viable due to infrastructure limitations for these area to accept recycled water. In addition, the current cost of recycled water is set above the cost of potable water, which is another disincentive to connect to the recycled water system. To be conservative, this UWMP will assume that these larger irrigation demands will remain on the District's potable water system.

2.5 Service Area Population

The District's residents are employed in a variety of professions ranging from professional and administrative to laborer and warehouse positions. The median age of City residents is 30.6 years, and the median family income is estimated at about $45,422 per year. The average residence has 3.8 persons per-dwelling unit. The District's service area is built-out, with land use being 75 percent residential, 17 percent commercial, and 8 percent governmental. The projected growth is based on anticipated densification within the existing residential areas. The City's population is served by the District and PRWA. The estimated service area population is shown in Table 3.

Table 3 Population – Current and Projected

	2010	2015	2020	2025	2030	2035
District Service Area (a)	24,011	25,284	25,825	26,341	26,867	27,404
Compound Annual Growth Rate	~	1.06%	0.43%	0.40%	0.40%	0.40%
District Service Area (b)	24,011	24,600	25,202	25,819	26,450	27,098
Compound Annual Growth Rate	~	0.484%	0.484%	0.484%	0.484%	0.484%

Notes:

a. District 2008 Water System Master Plan

b. Derived by Atkins for 2010 UWMP Update based on 2010 US Census population counts within the City of Pico Rivera that reflects changes in population (a Citywide decline in between 2000 and 2010) due to a downturn in economic conditions

3.0 Service Area Demand

Water use and production records, combined with projections of population, employment, and urban development, provide the basis for estimating future water demands. This section presents information regarding regional demographics, customer based unit water use, total historical water use, and projections of future District water demands.

3.1 Water Use by Type for Past, Current and Future Deliveries

The District maintains records of its water consumption and its number of customers by customer type. Historic water use data from 2005 is summarized in Table 4.

Table 4 Water deliveries — actual, 2005

Water Use Sectors	2005 Metered	
	# of accounts	Volume (AF)
Single-family residential	2,485	1,919
Multi-family residential	859	640
Commercial	723	571
Industrial 1		
Governmental 452		296
Other 0		0
Total	**4,519**	**3,427**

Source: District 2005 UWMP and District 10-Year Water Use data.

The District distributes retail water supply directly to its customers, which include residential (single- and multi-family), commercial, industrial, and governmental users. Data from 2010 are summarized in Table 5. No water sales are made by District to other water agencies and additional water uses are identified and quantified in Table 11 below.

Table 5 Water deliveries — actual, 2010

Water Use Sectors	2010 Metered	
	# of accounts	Volume (AF)
Single-family residential	2,915	1,735
Multi-family residential	1,007	462
Commercial	848	500
Industrial 1		
Governmental 530		298
Other 0		
Total	**5,300**	**2,996**

Source: District 2005 UWMP and District 10-Year Water Use data.

In 2009, a 3-year water supply shortage coinciding with an economic recession required the District to impose mandatory conservation. In 2010 mandatory conservation continued and the

economic recession became more severe. As a result, 2010 water use decreased by 12 percent from 2005 levels.

Over 55 percent of the District's customers are single-family residences. The relative composition of the District's customers is expected to remain consistent. The 2008 Water System Master Plan (WSMP) presented an annual residential increase of 0.58 percent. Customer sectors, such as commercial, governmental, and institutional, are expected to grow at the same rate to support the residential development. The District's projected water consumption is shown in Table 6.

Table 6 Water deliveries — projected 2015, 2020, 2025, 2030, and 2035 (AF)

Water Use Sectors	2015	2020	2025	2030	2035
Single-family residential	2,061	2,024	2,073	2,124	2,176
Multi-family residential	662	651	666	683	699
Commercial / Industrial	589	578	592	607	622
Governmental	368	361	370	379	389
Other (District facilities)	37	36	37	38	39
Total	**3,680**	**3,614**	**3,702**	**3,793**	**3,886**

The City of Pico Rivera is currently undergoing a comprehensive update of its General Plan, as part of this effort; the City of Pico Rivera anticipates land use changes due to redevelopment projects within the city limits. Future growth within the District's service is likely to be impacted by these redevelopment projects, as such; the estimated growth in number of customers consistent with the 2008 Water System Master Plan (WSMP) is shown in Table 7 and projected over the twenty-five (25) year planning horizon.

Table 7 Customer Growth — projected 2015, 2020, 2025, 2030, and 2035

Water Use Sectors	2015	2020	2025	2030	2035
Single-family residential	3,000	3,087	3,172	3,264	3,359
Multi-family residential	1,036	1,066	1,096	1,128	1,160
Commercial / Industrial	873	898	923	949	977
Governmental	545	561	577	593	611
Other	0	0	0	0	0
Total	**5,454**	**5,613**	**5,766**	**5,934**	**6,107**

3.2 Low-Income Water Demand Projections

The requirements for the 2010 UWMP call for projections of water demands for low-income customers. The District reviewed the Housing Element from the City of Pico Rivera General Plan, which forecasts projections out to 2035. It is estimated that up to 808 low income units remain to be constructed within the city limits; of this a percentage could be built within the District's service area. This 2010 UWMP assumed up to 307 units (38 percent of 808 units)

would be constructed over the next 20 to 25-years – for planning purposes, it is assumed that construction of these dwelling units would be spread equally over the 25-year planning horizon. With these assumptions, this UWMP estimated approximately 12 units per year would be built or 61 units every five years.[1] Demands for the projected low-income housing projects were estimated using the District's planning demand criteria in their 2008 WSMP at 3.5 persons person per dwelling unit and approximately 220 gallons per day per residential dwelling unit (or 13,200 gpd). Projected water demands were then distributed equally throughout 2015 and 2030. These demands as shown in Table 8 have been assumed as part of the general growth within the District and have been included in the District's residential potable water demand projections.

Table 8 Low-income projected water demands (AF)

Low Income Water Demands	2015	2020	2025	2030	2035
Residential Total	14.8	14.8 14.8	14.8		14.8

Notes: Assumes multiple family units would be constructed as redevelopment occurs over 20 years. Source: Estimated as percentage of City of Pico Rivera Population – information taken from Source data from forthcoming Pico Rivera 2010 General Plan Update, SCAG or RHNA numbers

3.3 Service Area Sales and System Losses

The District does not sell any water to other agencies.

Table 9 Sales to other water agencies (AF)

Water Distributed	2005	2010	2015	2020	2025	2030
None	0	0	0 0 0			0

System losses are the total difference between the total the District delivered water and the total amount pumped from groundwater wells. Generally system losses are associated with leaks, pipeline breaks, illegal connections, and unmetered fires. Average unmetered water since 2000 has been 5.8 percent, which is lower than with industry standards. System losses have not been included in Table 6 so they have been included as a line item in Table 10. The routine losses experienced by the District's water distribution system (excluding the periodic loss of wells) are not entirely known. Losses presented in this UWMP are based solely on an acceptable industry standard of ten (10) percent. However, it is likely that actual losses would be similar to system losses experienced by similar water systems in urban areas. This also assumes that system losses occur between the wellhead pump and the District's water users including the District's own facilities; therefore, system losses are a function of demand. Accordingly, as demands increase, so do unaccounted-for losses. Based on historic data for the District, system losses for future years were estimated to be 10 percent of total water use.

1 Consistent with Housing Element - 47 new units were constructed between 2006 and 2010.

Table 10 Additional water uses and losses (AF)

Water Use	2005	2010	2015	2020	2025	2030	2035
System losses	302 318	368		361	370	379	389

Table 11 Total water use (AF)

Water Use	2005	2010	2015	2020	2025	2030	2035
Total water deliveries	3,427	2,996 3,680		3,614 3,702	3,793		3,886
Sales to other water agencies	0	0	0	0	0	0	0
Additional water uses and losses (Table 10)	193 304	405		397 407	417		428
Total	**3,620**	**3,300**	**4,085**	**4,011**	**4,109**	**4,210**	**4,314**

3.4 Wholesale Water

The District, as shown in Table 12 does not receive water from a wholesale supplier, so no projections were provided to a wholesale agency.

Table 12 District demand projections provided to wholesale supplier (AF)

Wholesale Sources	Contracted Volume	2010	2015	2020	2025	2030	2035
None	0	0	0	0 0 0			0

The District as shown in Table 13 does not plan to participate or receive water from any planned wholesale agency water supply projects.

Table 13 Wholesale supplies — existing and planned sources of water (AF)

Wholesale Sources	Contracted Volume	2015	2020	2025	2030	2035
None 0		0	0	0	0	0

3.5 Baselines and Targets

This 2010 UWMP includes the detailed description of how an urban water supplier calculates its baseline and targets, following the technical methods and methodologies described in DWR's Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use For the Consistent Implementation of the Water Conservation Bill of 2009. Background information and the approach used to develop baselines and targets are also to be included. A description of each of these elements follows:

- Baseline daily per capita water use — how much water is used within an urban water supplier's distribution system area on a per capita basis. It is determined using water use and population estimates from a defined range of years.
- Urban water use target — how much water is planned to be delivered in 2020 to each resident within an urban water supplier's distribution system area, taking into account water conservation practices that currently are and plan to be implemented.
- Interim urban water use target — the planned daily per capita water use in 2015, a value halfway between the baseline daily per capita water use and the urban water use target.

Following requirements provided in the DWR Methodologies for Calculating Baseline and Compliance Urban Water Per Capita Use document, the District has calculated baseline per capita water use, an urban use target for 2020, and an interim water use target for 2015. Reporting compliance daily per capita water use is not required until the 2015 UWMP cycle as it compares the interim target to actual water use in 2015.

Two baseline periods are to be determined during the calculation of the base daily per capita water use. The legislation provides some flexibility in what actual periods of time are used to establish these baselines. This accounts for short-term water demand variations resulting from weather influences, as well as acknowledging the advances of water suppliers that have already begun using recycled water to reduce potable demands. The two baseline periods are:

- 10- to 15-year base period. This is a 10-year or 15-year continuous period used to calculate baseline per capita water use.
- 5-year base period. This is a continuous 5-year period used to determine whether the 2020 per capita water use target meets the legislation's minimum water use reduction requirements of at least a 5 percent reduction per capita water use.

Currently, the District's use of recycled water is limited; therefore, a 10-year period from 1998 to 2007 provides a baseline of 139 gpcd, and a 5-year average of 135 as shown in Table 14. As instructed in the Guidebook to confirm the 2020 daily water use target meets the minimum threshold, 95 percent of the 5-year average is 128 gpcd.

Table 14 Results 20x2020 Baseline Calculations

20x2020 Requirement	gpcd
Baseline gpcd water use	
10-year average	139
5-year average	135
95 percent of 5-year average	128

Source: Derived by Atkins with Pico Water District, Water Historical Water Use Data adapted by Atkins, May 2011.

Methods 1, 2, 3, and 4 have been evaluated for District. The analysis of the four methods is described below:

- Method 1 requires setting the 2020 water use target to 80 percent of baseline per capita water use target as provided in the State's Draft 20x2020 Water Conservation Plan. Using the methodology in the Guidebook, Table 15 shows the interim 2015 gpcd target and the 2020 gpcd target. The District's 2015 target would be 125 gpcd and the 2020 gpcd target at 80 percent of baseline is 111 gpcd.
- Method 2 requires use of Performance Standards and actual data for indoor residential, landscaped areas and CII to produce values for calculating GPCD (fairly complex Method unless an agency has substantial water use and billing records for the last 10-15 years). District does not appear to have the detailed data on irrigated landscaped area at this time in order to calculate the Method 2 target for 2020. District can choose to investigate Method 2 prior to preparing their 2015 UWMP, if they begin preparing estimates of landscaped area as defined by DWR. The DWR methodology restricts the landscaped area to include only landscape irrigated through dedicated or residential meters. The methodology also requires that the target be based on the water supplier's estimate of 2020 landscaped areas.
- Method 3 sets its target as 95 percent of the state hydrologic region target. The District is within the South Coast Hydrologic Unit, whose 2020 target is 149 gpcd. Ninety-five percent of the region's 2020 target is 142 gpcd, with an interim 2015 target of 157 gpcd. As such, Method 3 sets a 2020 water use target of 142 gpcd and an interim 2015 target water use of 157.
- SBX 7-7 Provisional Method 4 Target Calculator Method 4 Calculates total savings subtracted from baseline water use. For this target method, savings are assumed between the baseline period and 2020 due to metering of unmetered water connections and achieving water conservation measures in three water use sectors. These savings include metering savings in the following sectors: residential savings, commercial, industrial, institutional savings, landscape and water loss savings. Water Code Section 10608.20(d) provides that DWR will update Target Method 4 by December 31, 2014. It is anticipated that improvements will be made to the target method based on new data and analytical techniques in the update. Provisional Target Method 4 described here will be in effect until the update by 2014. Using the SBx 7-7 Provisional Method 4 Target Calculator provided by DWR and applying the default indoor residential savings, the Method 4 target for 2020 is 128 gpcd, with an interim 2015 target of 134 gpcd. The District has chosen to pursue a daily water use target as derived through Method 4. As this target is reasonable and attainable for the District without stressing District resources or hindering its ability to achieve this target.

Table 15 20x2020 Water Conservation Target Method 1

2020 Daily Water Use Target (Method 1)	
2015 Interim Daily Water Use Target	125
2020 Daily Water Use Target (80% of baseline)	111

Source: Derived by Atkins with Pico Water District, Water Historical Water Use Data adapted by Atkins, May 2011.

In order to confirm that District's 20x2020 urban water use target meets the minimum water savings, it compares the 5-year baseline daily per capita water use value to the 20x2020 daily per capita urban water use target. If necessary, adjustments are made to ensure conformance. To accomplish this comparison, the Guidebook uses the following steps, first, determine if the 5-year base daily per capita water use value is less than or equal to 100 gpcd. If not, a second step is necessary. This step requires, calculating 95 percent of the 5-year average base daily per capita water use and then comparing the results to the 2020 daily per capita target. No adjustment is required since the 10-year baseline target is less than 95 percent of the 5-year baseline.

The District's recent per capita water use has been declining to the point where current water use meets the 2020 target water use for Method 1. In 2010, water use within the District was 111 gpcd and in 2009, District observed 119 gpcd. This recent decline in per capita water use is largely due to dry climate conditions, water use restrictions, and poor economic conditions. Tables 16, 17 and 18 present the results of the baseline and target methodology calculations, in accordance with the UWMP Act.

Table 16 Base period ranges

Base	Parameter	Value	Units
10- to 15-year base period	2008 total water deliveries	3,429	AFY
	2008 total volume of delivered recycled water	0	AFY
	2008 recycled water as a percent of total deliveries	0.00	percent
	Number of years in base period[1]	10	years
	Year beginning base period range	1998	
	Year ending base period range[2]	2007	
5-year base period	Number of years in base period	5	years
	Year beginning base period range	2003	
	Year ending base period range[3]	2007	

Source: Pico Water District 10-Year Water Use data
[1]If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period.
[2]The ending year must be between December 31, 2004 and December 31, 2010.
[3]The ending year must be between December 31, 2007 and December 31, 2010.

Table 17 Base daily per capita water use — 10-year range

Base period year		Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence Year	Fiscal Year			
Year 1	1998	22,486	3,204,053	142
Year 2	1999	22,679	3,444,200	152
Year 3	2000	22,802	3,246,135	142
Year 4	2001	22,934	3,110,797	136
Year 5	2002	23,066	3,277,098	142
Year 6	2003	23,197	3,185,444	137
Year 7	2004	23,329	3,274,947	140
Year 8	2005	23,461	3,059,368	130
Year 9	2006	23,593	3,098,851	131
Year 10	2007	23,724	3,257,305	137
Base Daily Per Capita Water Use				139

Source: Derived by Atkins with Pico Water District Water Historical Water Use Data adapted from DWR 2011 UWMP Guidebook

Table 18 Base daily per capita water use — 5-year range

Base period year		Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence Year	Fiscal Year			
Year 1	2003	22,802	3,185,444	137
Year 2	2004	22,934	3,274,947	140
Year 3	2005	23,066	3,059,368	130
Year 4	2006	23,197	3,098,851	131
Year 5	2007	23,329	3,257,305	136
Base Daily Per Capita Water Use				135

Source: Derived by Atkins with Pico Water District Water Historical Water Use Data adapted from DWR 2011 UWMP Guidebook

Pursuant to SBx7-7, baseline per capita water use is 139 gpcd using a 10-year average beginning in Fiscal Year 1998 and ending on December 31, 2007 and 135 gpcd using a 5-year average beginning in Fiscal Year 2004 and ending on December 31, 2008.

3.6 Water Use Reduction (compliance with Water Conservation Bill of 2009)

Pursuant to Water Code Section 10608.26 retail water suppliers are to develop an implementation plan for compliance with the Water Conservation Bill of 2009. The plan should provide a general description of how the supplier intends to reduce per capita water use to meet its urban water use target. In developing the implementation plan, suppliers should avoid placing a disproportionate burden on any customer sector. The plan should also discuss any potential economic impacts that may result from the water use reduction program.

Water conservation and water use efficiencies is conducted on the premise that water conservation increases the water supply by reducing the demand on available supply, which is vital to the optimal operation of the District. As a member agency of the CBMWD, the District

also participates in many water conservation programs designed and conducted as a shared-cost participation program among the member agencies.

Pursuant to Water Code Section 10608.26, the District continues to implement to the best of abilities its current programs to reduce water demand throughout its service area and ultimately meet its gpcd targets in 2015 and 2020. Section 8.0 lists a number of the District's on-going water conservation programs – these programs in combination with the initiatives and future programs described herein will provide means for the District to comply with the Water Conservation Bill of 2009 and reach its gpcd targets.

3.7 Water Use Reduction – the approach to achieving 20x2020

The District fully expects to meet its gpcd water use targets in 2015 and 2020 primarily because of its efforts to reduce unaccounted-for water losses to approximately 5 percent, promote maintain efficient water use and conservation savings at residences, and if feasible, increasing use of recycled water to offset potable demands. Furthermore, the District is currently exploring development of a formal water conservation plan that would formalize the District's water use reduction plan.

In addition, the District's customers are responding to the increasing cost of water by reducing demand. Since 2008, the District's customers have continued to lower demand, mainly, in response to rate increases that were required to cover the increasing cost to operate and maintain the District's water service system including replacement of the District's aging infrastructure.

The District anticipates that CALGREEN impacts will lower the indoor per capita consumption for those who purchase new homes within the District, and the landscape water conservation ordinances adopted by the District will result in more efficiently designed and irrigated landscapes and further contribute to a lower District-wide gpcd.

Public education is critical to the success of long-term per capita reduction. The District will continue public outreach to its customers and may choose to offer incentives to reduce demand throughout the service area. In addition, to control costs, the District will coordinate with CBMWD to further promote school education programs. Should water use rise dramatically in the future, the District may choose to create programs that specifically target large water use sectors that are likely to cause the District's overall gpcd to increase. If feasible, the District will explore grant programs that could be used to create financial water conservation incentives and rebate programs to further reduce demand.

3.7.1 Ongoing Water Conservation Programs and Communication Efforts:

As presented in Section 8.0, the District will continue its outreach efforts to educate its customers regarding water conservation and water smart landscapes through its website, articles within its quarterly newsletter, regular bill inserts, and its presence at outreach events throughout the community.

4.0 Service Area Supplies

The District distributes treated groundwater to its customers within its service area. As described in Section 2.2 above, water from the District is distributed via pipelines and pump stations, and is used by the District customers to meet their water demands. This section describes the groundwater sources, quantities, supply constraints, and the water quality of the water supply sources. In addition, this section discusses desalination and water supply reliability.

4.1 Surface Water

The District relies entirely on groundwater as its sole source of water supply. Surface water or imported water is not a viable water supply source. CBMWD purchases imported surface water from Metropolitan. However, the District currently remains without any direct connection to CBMWD's treated surface water interties, as the nearest feeder is about two miles west of District. Imported water more expensive than groundwater; therefore, at this time, there are no current plans to construct a connection to the Metropolitan/CBMWD system.

4.2 Groundwater

Within the region, there are two primary groundwater basins: the Central Basin and the West Coast Basin. The District receives all its groundwater from the Central Basin. Twenty-nine (29) public and private water agencies are supplied by the Central Basin, for which DWR is the Watermaster. The Central Basin is a large alluvial groundwater basin which lies beneath the southeastern portion of the Los Angeles Coastal Plain. The Central Basin is enclosed on the north by Merced Hills, Whittier Narrows, and Puente Hills, on the east by Orange County, and on the southwest by the Newport Inglewood Uplift. A more detailed description of the Basin is included in **Appendix C**.

As stated previously, the District obtains its potable water supply from the underlying Central Basin groundwater basin that is recharged by local streamflow, imported water, and recycled water. A summary of the water supply sources provided and managed by varying agencies and available to the District are summarized below.

4.2.1 Central Basin Groundwater Basin

The Central Basin contains millions of acre feet of storage and is the principal source of water for the overlying cities and water districts, including the District. The Central Basin groundwater comprises a number of sources: 1) natural recharge from precipitation and runoff from regional/local watersheds; 2) artificial recharge supplied through purchased imported water; and 3) treated effluent from regional wastewater treatment facilities. As stated above, the WRD manages the ongoing artificial recharge activities within the Central Basin groundwater area. Central Basin groundwater users have the ability to extract up to 20 percent above their APA, provided the over-extraction can made up the following year. In addition, WRD allows Central

Basin users to carryover up to 20 percent of their APA into the next year. In other words, the carryover supply is only available in the following year and cannot be added to previous carryover supplies. Currently, if an agency exceeds its APA and does not possess carryover quantities from under pumping in previous years, it must lease unused APA from other overlying entities. It is generally understood that several thousand acre feet of APA are reportedly available for lease purchases each year.

Description

Groundwater has for many years been the primary supply of water within Central Basin's service area. In fact, it was the sole source of water supply until the Central Groundwater Basin was overdrafted beginning in the late 1940s and throughout the 1950s. Today, the average retail customer agency in Central Basin relies on groundwater production for about 61 percent of its water supply. Although, there still remain many agencies in Central Basin's service area that rely exclusively on groundwater to meet all current water needs.

Ultimately, the continuous and extensive over pumping of the Basin caused critically low groundwater levels. This overpumping of the Basin resulted in a legal judgment, or adjudication, that limited the allowable extraction that could occur in any given year and assigned water rights to basin pumpers. The adjudicated water rights were greater than the Basin's yield. In essence, the Basin was operating with an annual overdraft. In order to address the overdraft, a strategy was required to purchase imported and recycled water sources. The Central Groundwater Basin Judgment is included as Appendix D of the Central Basin 2010 UWMP.

Water Replenishment District of Southern California

The groundwater producers (pumpers) in the area, which are members of the Central Basin Water Association, facilitated the creation of the WRD. The purpose of the WRD is to act as a financial mechanism that purchases imported and recycled water to replenish the Central Groundwater Basin. In 1959, the State Legislature enacted the Water Replenishment Act, enabling the water associations to secure voter approval for the formation of the “Central and West Basin Water Replenishment District.” The WRD has the statutory responsibility to acquire sufficient revenues through an assessment on each acre-foot of water pumped from the groundwater basin to purchase water from other sources to replenish the groundwater supplies within its boundaries for the beneficial use of the approximately 3.5 million residents and water users who rely upon those groundwater resources to satisfy all or a portion of their water needs.

Groundwater Rights

Although the water rights have been bought, sold, exchanged or transferred through the years, the total amount of allowable extraction rights within the entire groundwater basin has remained virtually the same. The adjudicated pumping rights from the Central Groundwater Basin are 217,367 AFY. However, not all holders of these rights are within the Central Basin service area.

Those rights holders within Central Basin's service area total 161,836 AF. Some of the groundwater rights holders are nurseries, businesses, schools, cemeteries and private entities that make up about 7 percent (16,679 AF) of the total water rights. Of the remainder, 127,237 AF is the water pumped by Central Basins service area cities and water agencies and 55,531 AF is pumped by cities and agencies not affiliated with Central Basin Municipal Water District. The adjudicated pumping rights in the Central Groundwater Basin are presented in Table 3-2 of the CBMWD 2010 UWMP.

Main Basin

Although most of the groundwater supply is extracted from the Central Basin, there are a number of water retailers that retain groundwater rights within the Main San Gabriel Basin (Main Basin) that are extracted and utilized within their Central Basin service area. Main Basin underlies most of the San Gabriel Valley, north of the Central Groundwater Basin. It is bounded by the San Gabriel Mountains to the north, the San Jose Hills to the east, the Puente Hills to the south and by the Raymond Fault and a series of other hills to the west. The total amount of water extracted from the Main Basin and utilized within the Central Basin service area over the last five years averages to approximately 31,500 AFY. The CBMWD 2010 UWMP (Table 3-3) displays the water retailers and the amount produced from the Main Basin and from the Central Groundwater Basin for the last five fiscal years.

The total amount of groundwater produced in the Central Basin and the Main Basin has remained fairly consistent over the last five years. This is due mainly to the fact that both basins are adjudicated, so groundwater extractions in any given year are limited. The total amount of groundwater projected to be extracted during the next 25 years will also be fairly consistent as shown in the CBMWD 2010 UWMP (Table 3-4). The economic costs to pump groundwater versus the purchases of imported water will continue to pressure water retailers to maximize their groundwater rights.

Groundwater Recharge

The WRD reports annually on its replenishment operations and groundwater management activities. The following information was excerpted from WRD's March 2011 Engineering Survey and Report (ESR). The complete ESR can be found in **Appendix F**.

> The Central and West Coast Basins have an annual overdraft because more groundwater is pumped out than is replaced naturally. The District purchases supplemental water (artificial replenishment water) each year to help offset this overdraft through managed aquifer recharge. The purchased water enters the groundwater basins at the Montebello Forebay spreading grounds, at the seawater barrier injection wells, and through the District's In-Lieu Program. The purpose of this Chapter is to determine the quantities of water needed for purchase in the ensuing year and to determine the availability and cost of that water. The District currently has available to it recycled and imported water

sources for use as artificial replenishment water. These two sources are described below:

Recycled Water*: Recycled water is wastewater from the sewer systems that is reclaimed through extensive treatment at water reclamation plants ("WRP"s). The water is treated to high quality standards so that it can be reused safely. Some agencies and businesses use recycled water for non-potable purposes, such as for irrigation of parks, golf courses, and street medians, or for industrial purposes. WRD has used recycled water for groundwater recharge since 1962. In semi-arid areas such as Southern California where groundwater and imported water are in short supply, recycled water has proven to be a safe and reliable additional resource to supplement the water supply. Recycled water is used at the spreading grounds and the seawater barrier wells. Although recycled water is high quality, relatively low cost, and a reliable supply all year long, the District is limited by regulatory agencies in the amount it can use for replenishment. Therefore, imported water is also used for recharge.*

Imported Water*: River water from northern California (State Water Project) and the Colorado River is imported into Southern California by the Metropolitan Water District of Southern California ("MWD" or "Met"). MWD then sells this water to their member agencies for multiple uses, including potable water and recharge water. WRD uses raw (untreated) imported water at the spreading grounds and potable (treated) imported water at the seawater intrusion barriers and for the in-lieu program for groundwater recharge. Because of treatment and transportation costs, it is the most expensive source for recharge water. The supply is under full upstream control, and its availability at the spreading grounds is limited and variable, especially during drought years. In fact, since May 2007 MWD has stopped delivery of its historically available discounted surplus replenishment and In-Lieu waters due to reduced supply, environmental issues and judicial decisions. As a result, the District purchased the more expensive but more available untreated Tier 1 water from CBMWD and Long Beach in 2010/2011 for spreading. Because it is questionable that the discounted replenishment water will be available anytime soon, the District plans on purchasing the Tier 1 water in the ensuing year as well.*

Recommended Quantities of Replenishment Water With information presented in the preceding chapters regarding the basins' pumping demands and the overall condition of the groundwater basins, WRD can estimate its projected need for replenishment water in the ensuing year.

Spreading

Groundwater recharge through surface spreading occurs in the Montebello Forebay Spreading Grounds adjacent to the Rio Hondo and the San Gabriel River, within the unlined portion of the San Gabriel River, and behind the Whittier Narrows Dam in the Whittier Narrows Reservoir. Owned and operated by the Los

Angeles County Department of Public Works ("LACDPW"), they were originally constructed in 1938 for flood control and conservation of local storm water, but have been used since the 1950s to replenish the basins with imported water and since 1962 with recycled water.

Since recycled water is a high quality, less expensive, and available year-round source of replenishment water, the District maximizes its use within established regulatory limits. These limits are discussed below under "Expected Availability of Replenishment Water". In general, the District plans on purchasing 50,000 AF in the ensuing year to maximize the amount under regulatory limits, unless lack of dilution water (storm water and imported water) causes a reduction in the recycled water amounts.

Additional replenishment water is needed beyond the 50,000 AFY of recycled water and will have to come from imported water. In 2003, the WRD Board adopted the long term average of 27,600 AFY of imported water to purchase for spreading. This value was based on long-term (30 year) averages of the overall water budget of the basins using the USGS computer model.

The 2003 ESR discusses the derivation of this value in more detail.

Since that time, the District has invested in cooperative projects with the LACDPW to capture more storm water and to lessen the need for imported water as part of WRD's Water Independence Now program, or WIN. Improvements to the Whittier Narrows Conservation Pool are expected to conserve an additional 3,000 AFY of storm water on average. Two new rubber dams were built in the San Gabriel River near Valley Boulevard and are expected to conserve an additional 3,600 AFY on average. Therefore, the new Long Term Average for imported spreading demands is 21,000 AFY. This amount plus the recycled demand cited earlier brings the total WRD basic spreading needs for the ensuing year to 71,000 AF (50,000 AF recycled and 21,000 AF imported). This is the amount planned for the ensuing year for spreading.

In addition, supplemental water may be needed to make up the deficit in the Optimum Quantity discussed at the end of Chapter 3. Per the Board's policy in 2006, the District would attempt to make up the Optimum Quantity deficit over a 20-year period. Much of this deficit, however, could be made up by rainfall if a few extremely wet years would occur. Therefore, focus is placed on making up the imported spreading water shortage which exists due to the District's inability to purchase planned amounts in recent years. Factors such as MWD ceasing to offer traditional replenishment water in May 2007 and construction and maintenance projects at the spreading grounds have been impedances to purchasing imported water for spreading. Between WY 2003/2004 and 2008/2009, the District was short 29,968 AF of planned imported water purchases for the spreading grounds. In 2009/2010 the District for the first time

purchased untreated Tier 1 water for replenishment since the historical replenishment water was not available, including an extra 5,286 AF to help make-up some of the deficit. In the current year 2010/2011, the District has plans to purchase the normal 21,000 AF of spreading water plus an additional 3,500 AF to help makeup the deficit. This water will also be untreated Tier 1 water since discounted water remains unavailable. The deficit at the start of ensuing year 2011/2012 will be 21,282 AF and the District will be considering reducing this amount by some margin in that year.

Injection

Another way of replenishing the groundwater supply is to inject water at the three seawater intrusion barriers owned and operated by the LACDPW, including the West Coast Basin Barrier, Dominguez Gap Barrier, and Alamitos Barrier. Although the primary purpose of the barriers is for seawater intrusion control, groundwater replenishment also occurs as the freshwater is injected into the CWCB aquifers and then moves inland towards pumping wells.

To determine the amount of barrier water estimated for the ensuing year, WRD under an Agreement with LACDPW gets annual estimates from the expected demand at the barriers. WRD reviews these estimates and makes adjustments as necessary. For 2010/2011, no adjustments were made to estimates provided by the LACDPW, with the exception that their original 20,000 AF estimate for the West Coast Barrier was reduced to 18,000 AF based on current operating conditions.

For the West Coast Basin Barrier Project, 18,000 AF of demand is estimated, of which 10,000 AF is imported water and 8,000 AF is recycled water from WBMWD based on current delivery capabilities. For the Dominguez Gap Barrier Project, 7,400 AF are estimated, with 50% recycled water and 50% imported water. For the Alamitos Barrier on the WRD-side of the barrier, 6,200 AF are estimated with 50% recycled water and 50% imported water.

The total barrier demand for the ensuing year is estimated at 31,600 AF, including 14,800 AF recycled water (47%) and 16,800 AF imported water (53%).

In-Lieu Replenishment Water

The basic premise of WRD's In-Lieu Program is to offset the pumping in the basin to lower the annual overdraft and reduce the artificial replenishment needs. It helps provide an alternate means of replenishing the groundwater supply by encouraging basin pumpers to purchase surplus imported water when available instead of pumping groundwater. This can help raise water levels in areas that are otherwise more difficult to address. Since May 2007, the In-Lieu water has not been made available by MWD due to water shortages. However, WRD has

planned for it in case the water became available. If monies raised go unspent, they are placed in a water purchase reserve for subsequent year water purchases. This concept was approved by the pumper's Technical Advisory Committee ("TAC") for the District in 2010 and will continue for ensuing year 2011/2012 at the same amount of 10,303 AF (6,000 AF in the Central Basin and 4,303 AF in the West Coast Basin).

Expected Availability of Replenishment Water The availability of water supplies for the ensuing water year has been taken into account when determining how funds should be raised. If a particular resource is expected to be unavailable during a given year, money can still be raised to fund the purchase of that quantity of water in a succeeding year.

Recycled Water

Recycled water is reliable all year round but its use is capped by regulatory limits. The current limits for recycled water spreading in the Montebello Forebay are established by the California Regional Water Quality Control Board (RWQCB) and are detailed in Order No. 91-100 adopted on September 9, 1991 with amendments on April 2, 2009 under Order No. R4-2009-0048. The District is limited to spreading 35% recycled water over a 5-year period based on the total inflow of all waters into the Montebello Forebay, meaning that at least 65% of the waters entering the forebay must be dilution waters such as storm water, underflow, rainfall, and imported water. As these dilution sources become scarce due to dry years or continued lack of imported replenishment water, the amount of recycled water will have to be reduced to maintain the 35% regulatory cap.

The Sanitation Districts of Los Angeles County (SDLAC) provides the recycled water to WRD for spreading by LACDPW. This water comes from the Whittier Narrows Water Reclamation Plant ("WNWRP"), San Jose Creek Water Reclamation Plant ("SJCWRP"), and Pomona Water Reclamation Plant ("PWRP"). WRD purchases water from the WNWRP and SJCWRP, whereas the water from the PWRP is considered incidental recharge and is not purchased. For planning purposes, the District assumes purchasing 50,000 AFY of recycled water each year to meet the regulatory cap.

Recycled water for injection into the seawater barrier wells comes from different agencies depending on the specific barrier. At the WCBBP, the water is provided by WBMWD's Edward C. Little Water Recycling Facility. Per regulatory limits, this resource can provide up to 75% of the water injected into the West Coast Basin Barrier with an increase up to 100% being planned. Because of recent operational issues at the treatment, only about 40% to 60% recycled water has been available to the barriers with imported water making up the difference. Since 18,000 AF is anticipated for the total barrier demand in the ensuing year,

and 8,000 AF appears to be the current maximum capability for recycled water, imported demand is estimated at 10,000 AF.

Recycled water for the DGBP is available from the City of Los Angeles' Terminal Island Treatment Plant (Harbor Recycled Water Project). The plant is permitted to provide the barrier with up to 5 million gallons per day (mgd) or 5,600 AFY, or 50% of the total barrier supply, whichever is less. Since 7,400 AF is anticipated for the ensuing year, 3,700 AF will be recycled water and 3,700 AF will be imported water.

Recycled water for the ABP is available from WRD's Leo J. Vander Lans Water Treatment Facility. This treatment plant is permitted to provide up to 50% of barrier water with recycled water with the remainder being imported. Since 6,200 AF is anticipated for the ensuing year, 3,100 AF will be recycled water and 3,100 AF imported water.

Imported Water

All indications from MWD are that seasonal discounted spreading water and In-Lieu water will once again not be available in the ensuing year due to drought, environmental issues, and judicial decisions on the Bay Delta. As imported deliveries are cut back during dry years or with climate change or extended periods of drought, WRD may need to look at other sources for replenishment water, such as increased used [*sic*] of recycled water and storm water, or purchasing more expensive but more available imported water such as untreated Tier 1 (firm delivery) water. The purchase of untreated Tier 1 water occurred for the first time in 2009/2010 and continued into 2010/2011 due to the continued unavailability of surplus water, and is expected to occur in the ensuing year.

For the imported water used for injection at the seawater barrier wells, the District pays the premium price for "non-interruptible" treated Tier 1 water meaning that it will be available all year long. Because of the increasing water costs at the barriers, the District is looking at ways to minimize costs such as reduction of pumping near the barriers, increased recycled water to offset imported water, or banking water at lower seasonal rates. At the ABP, the City of Long Beach and WRD have entered into an agreement to bank seasonal treated water and Tier 1 water through inland injection wells and then extract the water for injection at the barriers when needed, thus saving considerable costs on barrier water. In 2009/2010, the 2,000 AF of Tier 1 water banked in 2008/2009 was utilized. The seasonal water banked in 2004/2005 through 2006/2007 has 2,160 AF remaining and can be called at any time that serves the District most effectively.

Projected Cost of Replenishment Water WRD has estimated it will need 112,903 AF of replenishment water in the ensuing year. The MWD and their member agencies and the SDLAC set the price for the replenishment water WRD

buys for the replenishment at the spreading grounds, barrier wells, and In-Lieu, and are a direct pass-through on WRD's replenishment assessment.

4.2.2 Central Basin Municipal Water District

CBMWD normally acquires approximately 89,000 AFY of imported water from Metropolitan's State Project and Colorado River sources. About 21,000 AFY of this imported water is used for groundwater replenishment with the remaining 68,000 AFY sold to retail agencies for direct use.

4.2.3 Well Supply System

The District's water distribution system includes a total of nine (9) wells, three (3) of which are no longer active, which draw potable water directly from the Central Basin. In conjunction with the wells, the supply system includes one (1) booster pump station and one (1) reservoir with 1.25-mg of storage. All wells are located within the District's service area boundaries. The well pumps are operated to maintain a constant system pressure of 59 to 72 psi. Figures 3 and 4 show the District's wells and its water systems.

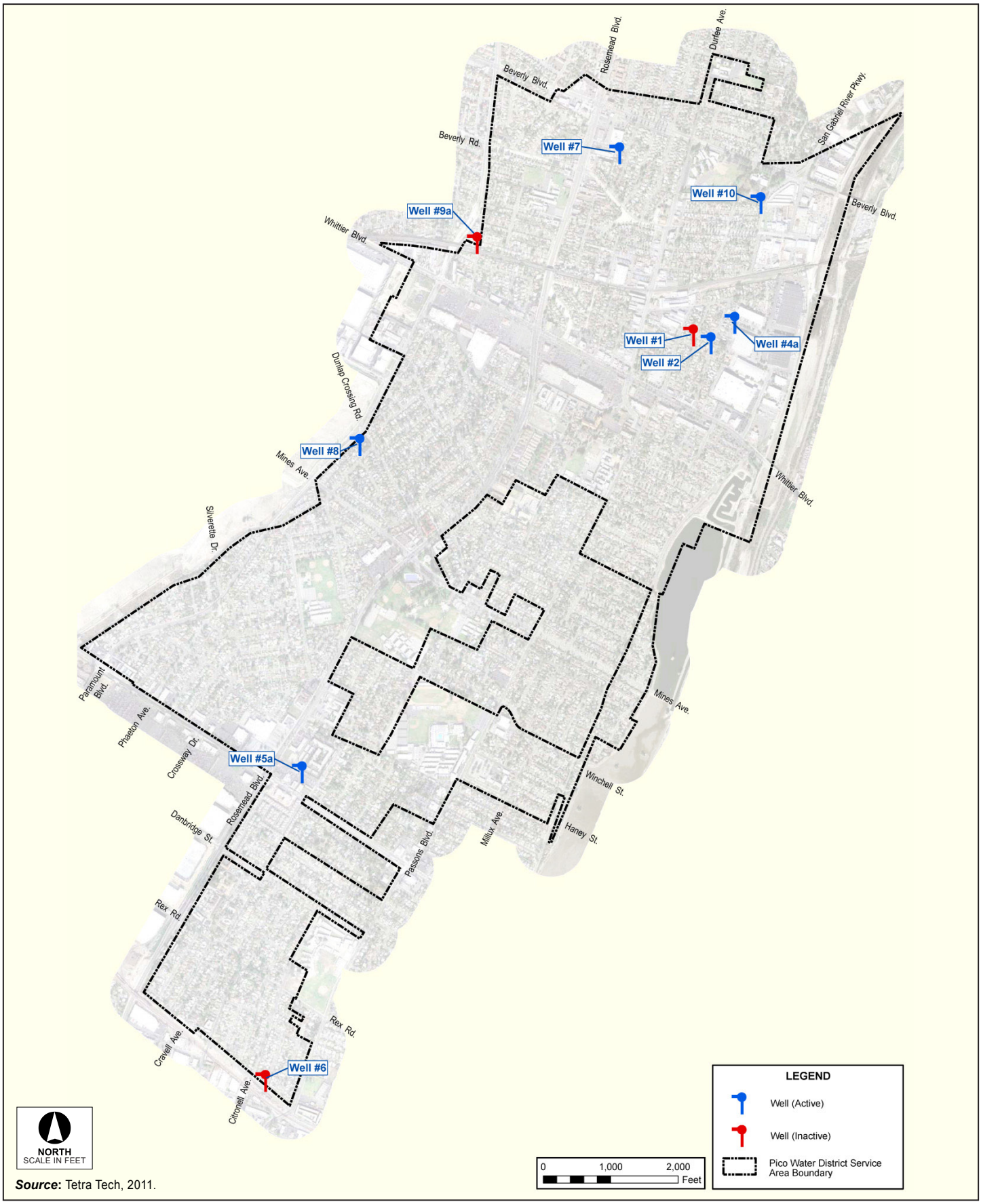
Groundwater produced at Well Nos. 2, 4a, 5a, 7, 8, and 10 is permit-approved for domestic water supply. Well Nos. 1, 6 and 9a are currently inactive and not approved by CDPH for domestic water supply. Table 19 provides a summary of the District's wells, including date drilled, production of each well and whether the well is currently operational.

Table 19 District Well Summary

Well #	Date Drilled	Production Capacity		Operational
		AFY	gpm	
1	Unknown	Out of Service	Out of Service	No
2 192	9	1,615	650	Yes
4a 198	3	2,260	1,400	Yes
5a 198	5	1,935	1,450	Yes
6	Unknown	Out of Service	Out of Service	No
7 195	2	2,260	1,200	Yes
8 195	5	1,935	1,450	Yes
9a	1987	Out of Service	Out of Service	No
10 192	5	3,065	1,600	Yes

Source: Pico Water District 2008 WSMP

Table 20 summarizes the District's groundwater pumping from the Central Basin over the last five (5) years. As shown in the table, production has decreased to below 3,000 AFY. In 2007, demand increased as result of low-precipitation in the region.



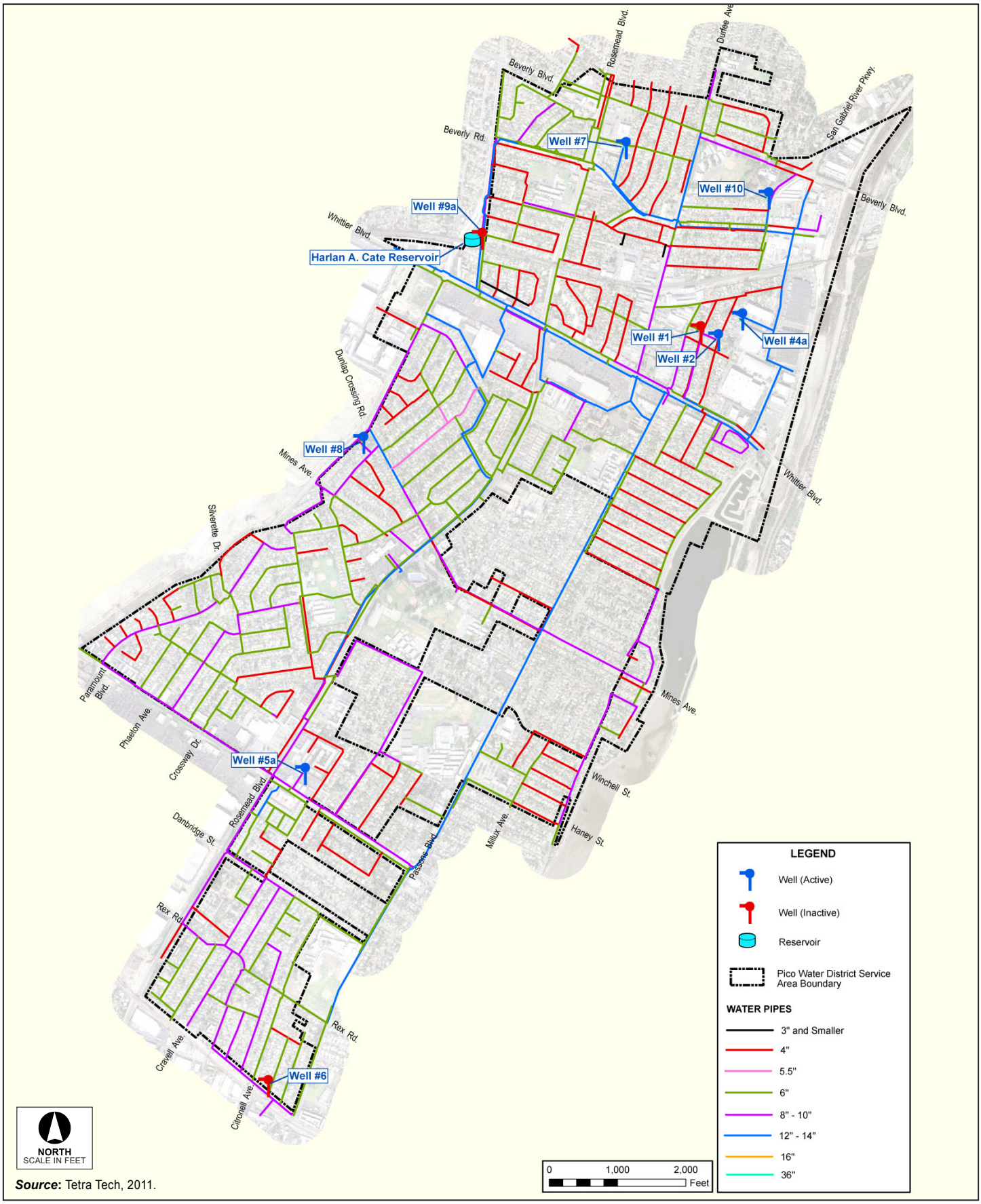
Source: Tetra Tech, 2011.

100020333 | Pico Water District

Figure 3

Pico Water District Water Supply Wells

ATKINS



Source: Tetra Tech, 2011.

100020333 | Pico Water District

Figure 4

Pico Water District Water System

ATKINS

Table 20 Groundwater — volume pumped (AF)

Basin Name(s)	Metered or Unmetered	2006	2007	2008	2009	2010
Central Water Basin	Metered	3,471	3,647	3,429	3,200	2,996
Groundwater as a percent of total water supply		100.0 %	100.0%	100.0%	100.0%	100.0%

Source: Pico Water District 10-Year Total Water Use data.

Table 21 shows the projected supplies within District's service area. The Central Basin is expected to be reliable in all years and over the 25 year planning horizon. Groundwater supplies are expected to remain constant and stable due to the adjudication of the Central Basin – if the District can access recycled water from CBMWD, then in most years, use of recycled water would reduce the groundwater pumping pressure within the basin.

Table 21 Groundwater — volume projected to be pumped (AF)

Basin Name(s)	2015	2020	2025	2030	2035
Central Water Basin (facilities and consumptive only)	3,680	3,614	3,702	3,793	3,886
Percent of total water supply	100.0%	100.0 %	100.0%	100.0%	100.0%

Over the last five (5) years groundwater supplies have been sufficient to meet the District's water demands and have been within the District's APA. The only legal constraints to groundwater supply are the APA, as provided under the adjudication of the Central Basin. As stated above, the WRD manages the ongoing artificial recharge activities within the Central Basin groundwater area. Central Basin groundwater users have the ability to extract up to 20 percent above their APA, provided the over-extraction can made up the following year. In addition, WRD allows Central Basin users to carryover up to 20 percent of their APA into the next year. In other words, the carryover supply is only available in the following year and cannot be added to previous carryover supplies. Currently, if an agency exceeds its APA and does not possess carryover quantities from under pumping in previous years, it must lease unused APA from other overlying entities. It is generally understood that several thousand acre feet of APA are reportedly available for lease purchases each year. The WRD also allows for increased pumping under specific (dry year) conditions as discussed in its 2011 ESR. (**Appendix F**). Historically when additional supplies beyond the base allotment of 3,624 AFY are required to meet demand, the District has been able to lease groundwater water rights from other Central Basin groundwater users that have surplus supplies available.

4.3 Transfer or Exchange Opportunities

Currently, the District does not transfer and/or exchange any water supply to or from other entities and this report does not anticipate that transfers or exchanges will occur in the future. It should be noted, that the District does satisfy minor water demands in excess of its water rights by water leasing from neighboring agencies on a year to year basis but in the last few years

demand has remained below the District's APA. In the future, within the Gateway Authority IRWMP there could be opportunities created that would allow transfer or exchanges within interested parties. The District will need to monitor the progress on these opportunities in the coming years.

Table 22 Transfer and exchange opportunities (AF)

Transfer Agency	Transfer or exchange	Short term or long term	Proposed Volume
None 0		0	0

4.4 Desalination

Desalinated water is not currently perceived to be a viable option for the District, and neither brackish nor impaired groundwater is pumped.

4.5 Recycled Supply

CBMWD operates a large regional recycled water system; as such, there exists the potential to connect several of the District's larger irrigation water users to its recycled water system. However, retail pricing of recycled water coupled with on-site infrastructure limitations (i.e. separate meters and systems to accept and use recycled water) currently, discourages the District's customer's ability to accept recycled water. As the District's potable water rate increases to pay for increasing operational expenses and replacement of aging infrastructure, the cost of recycled water will become more competitive, and the District anticipates recycled water use will increase accordingly.

4.5.1 Wastewater Collection & Treatment

The District does not provide wastewater collection, conveyance or treatment services within its service area. It is estimated that sewer service population is approximately the same as the number of water customers within the District's service area. The City of Pico Rivera is responsible for wastewater collection and conveyance to the Los Angeles County Sanitation District (LACSD) San Jose Creek Water Reclamation Plant (WRP), located in unincorporated Los Angeles County, next to the City of Whittier. LACSD also treats wastewater from several other local municipalities. LACSD treats and discharges effluent into the ocean, produces high-quality recycled water for use as groundwater recharge supplies and irrigation of parks, schools, and greenbelts.

Because the District does not provide wastewater services, consequently it does not maintain any records of sewage services or flow volumes/quantities. Table 23 shows the calculated volumes of wastewater generated by assuming 75 percent of residential water and 85 percent of commercial water used is returned to the sewer system.

Table 23 Recycled water — wastewater collection and treatment (AF)

Type of Wastewater	2015	2020	2025	2030	2035
Wastewater collected & treated in service area	2,944	2,891.2	2,961.6	3,034.4	3,108.8
Volume that meets recycled water standard 2,944		2,891.2	2,961.6	3,034.4	3,108.8

Note: Estimated wastewater flow based on 75 percent of residential and 85 percent of commercial potable water demands.

Within the District's service area, discharge of treated wastewater is regulated by the Regional Water Quality Control Board (RWQCB). In general, the majority of the wastewater generated and treated during the summer months is used for alternative beneficial uses such as wetland habitat and restoration and irrigation for golf courses. The use of the recycled water helps meet the irrigation water demand of other agencies during the peak summer months.

As stated above, wastewater generated within the City of Pico Rivera including the District's customers is collected by the City's sewer systems via the LACSD and then conveyed to the San Jose Creek WRP. Wastewater treatment consists of a blend of advanced primary, secondary levels, and tertiary treatment. Of the 82,600 AFY of wastewater the plant processes, approximately 34,800 AF are reused at 17 different sites, one of which is the Pico Rivera Municipal Golf Course.

Table 24 Recycled water — non-recycled wastewater disposal (AF)

Method of Disposal	Treatment Level	2010	2015	2020	2025	2030
Los Angeles County Sanitation District	Secondary/advanced primary/tertiary	47,800	47,800	47,800	47,800	47,800

Source: http://www.lacsd.org/info/water_reuse/refy0405/default.asp

4.5.2 Recycled Water Uses

The District currently has a very limited use of recycled water. However, within the District's service area three (3) 1-inch recycled water meters are accessible for connections to use recycled water (assuming the user's irrigation system is plumbed to irrigate with recycled water). The District's 2010 recycled water use compared to the 2005 UWMP projection is summarized in Table 25.

Table 25 Recycled water — 2005 UWMP use projection compared to 2010 actual (AF)

Use type	2010 actual use	2005 Projection for 2010
Landscape irrigation	0	24

4.5.3 Potential Uses of Recycled Water

Potential recycled water users are locations where recycled water could replace potable water uses. These potential users are typically landscape irrigation systems, or possibly some types of industrial or commercial water users.

CBMWD can provide recycled water within the District's service area to customers with the appropriate infrastructure connections and the on-site ability to use it. As stated previously, Pico Park, Smith Park, Rio Vista Elementary School and a satellite facility of Los Angeles County Public Library system could be future recycled water customers; however, this assumes the appropriate recycled water connections (meters and piping) are installed at each of these facilities.

These large landscape facilities with the potential to use recycled water are listed in Table 26 without quantities because of the uncertainty of these future connections. The District anticipates updating these data in its 2015 UWMP. For conservative water supply planning purposes, this UWMP assumes that these potential large irrigation demands will remain on the District's potable water system.

Table 26 Recycled water — potential future use (AF)

User Type	Description	Feasibility	2015	2020	2025	2030
Landscape Irrigation	Pico Park	Unknown ~		~	~	~
	Smith Park	Unknown	~	~	~	~
	Rio Vista Elementary School	Unknown ~		~	~	~
	Los Angeles County Library	Unknown ~		~	~	~
Total			**TBD**	**TBD**	**TBD**	**TBD**

4.5.4 Proposed Actions to Encourage Use of Recycled Water

One of the primary means of promoting recycled water is the fact that it is mandated by law when available at a reasonable price and is of acceptable quality. There is the potential for additional incentives such as pricing discounts, financing of retrofitting costs, and assistance with any technical, regulatory, or institutional issues that might arise. Currently, the District currently has a very limited use of recycled water, which is currently comprised of three (3) 1 inch water meters providing water to street medians. The District anticipates that future updates of its UWMP will appropriately address this subject accordingly. Pico Park, Smith Park, Rio Vista Elementary School and a satellite facility of Los Angeles County Public Library system could be future recycled water customers and could be granted financial incentives to use recycled water.

Table 27 Recycled water — Methods to encourage recycled water use (AF)

Actions	Projected Results					
	2010	2015	2020	2025	2030	2035
Financial incentives	NA	TBD	TBD	TBD	TBD	TBD
Total						

Note: TBD = updated in future updates of the District's UWMPs

4.6 Planned Water Supply Projects and Programs

The District has not identified any future water supply projects as shown in Table 28.

Table 28 Future water supply projects (AF)

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
Not Planned	Not necessary	~	~	~ ~		~ ~ ~		

The District's total current and planned supplies are shown in Table 29. The purchased water will meet the District's current and planned future water demands.

Table 29 Water supplies — current and projected (AF)

Water purchased from:	Wholesaler supplied volume (yes/no)	2010	2015	2020	2025	2030	2035
Central Basin Municipal Water District	Yes	0	0 0		0 0		0
Supplier-produced groundwater	No 2,997	[a]	3,680[b]	3,614 [b]	3,702 [b]	3,793 [b]	3,886 [b]
Transfers (to District)		0	0	0	0	0	0
Recycled Water (some potential)		0	0 0		0 0		0
Other (additional groundwater through one-time lease)		0	0 0		0 0		0
Total[b]		**2,997[a]**	**3,680**	**3,614**	**3,702**	**3,793**	**3,886**

Notes:
a: Actual water sales
b: Table 21 – Groundwater volume to be pumped

5.0 Water Service Reliability

5.1 Reliability of Supply

The Act states that every urban water supplier shall include, as part of its plan, an assessment of the reliability of its water supplies. The water supply and demand assessment must compare the total projected water use with the expected water supply over the next 25 years in 5-year increments. This reliability assessment is required for normal, single dry-year and multiple dry water years.

The District uses deep groundwater exclusively, and has 100 percent supply reliability regardless of periods of drought or years of below-normal precipitation. During short-term periods of water supply reductions, the District would implement its water shortage contingency plan, which is presented in **Appendix D**.

The tables presented in this Section show projected demand and supply during normal years, dry years, and multiple dry years. If the District's future demands are slightly more or less than currently projected, it is anticipated that the supply portfolio maintained by the District will be flexible enough to continue to meet the demands of the District's customers.

For the purposes of estimating demands, base water years are defined in Table 30. The "Normal Water Year" used in this plan is based on the average rainfall year FY 2009·10. According to the National Weather Service, the recorded rainfall in FY 2009·10 was 16.36 inches at the Los Angeles Civic Center one of the closest years to the historical average of 15.38 inches. The "Single Dry Year" is based on the lowest rainfall year· FY 2006·07. The recorded rainfall in FY 2006·07 was only 3.21 inches, the lowest recorded year in Los Angeles history. The three "Multiple Dry Water Years" used below were based upon the most recent multiple dry-year period FY 2006·07 (3.21 inches), FY 2007·08 (13.53 inches), and FY 2008·09 (9.08 inches).[2]

Table 30 Basis of water year data

Water Year Type	Base Year(s)
Normal Water Year	2009-2010
Single-Dry Year	2006-2007
Multiple-Dry Years	2006-2009

Notes: Central Basin MWD, Draft 2010 UWMP Table 4-1.

Factors resulting in inconsistency of supply are shown in Table 31.

2 Central Basin MWD, Draft 2010 UWMP, page 4-6.

Table 31 Factors resulting in inconsistency of supply

Water supply sources	Specific source name, if any	Limitation quantification	Legal & Environmental	Water quality	Climati c	Additional information
Central Basin (groundwater)	Central Basin	APA	APA	Section 7.0	N/A	Section 4.2
Leased water rights (groundwater)	Central Basin	Lease Agreements	Lease Agreements with Other Central Basin water suppliers	Section 7.0	N/A	Section 4.2
Recycled Water	LACSD via CBMWD	Infrastructure and users onsite facilities	N/A N/A		NA	Section 4.5

Water supply reliability based on an average water year for h istorical and current conditions are summarized in Tables 32 and 33.

Table 32 Supply reliability — historic conditions (AF)

Source - Normal Year	Single Dry Year	Multiple Dry Years			
		Year 1	Year 2	Year 3	Year 4
Central Basin (groundwater)	3,624 3,624		3,624	3,624 3,624	
Percent of Normal Year:	100%	100%	100%	100%	100%

Table 33 Supply reliability — current water sources (AF)

Water supply sources	Normal Year Supply 2011	Multiple Dry Year Supply		
		Year 2012	Year 2013	Year 2014
Central Basin (groundwater) 3,624		3,624	3,624	3,624
Leased water rights[a] (Central Basin)	0	0	0	0
Percent of normal year	100.0%	100.0%	100.0%	100.0%

Note:
a. Contract agreements determine quantities of leased extractions

5.2 Projected Normal Water Year Supply and Demand

The District's potable water supply is expected to continue t o be supplie d by ground water from the Central Basin. In 2 010, the District's demand was 2,996 AF. The projecte d supply and demand under normal weather are shown in Table 34.

Table 34 Supply and demand comparison — normal year (AF)

Water supply sources	2015	2020	2025	2030	2035
Groundwater	3,624	3,624	3,624	3,624	3,624
Recycled Water	N/A	N/A	N/A	N/A	N/A
Leased APA	56	0	78	169	262
Supply totals	3,624	3,624	3,624	3,624	3,624
Demand totals	3,680	3,614	3,702	3,793	3,886
Difference	0	0	0	0	0
Difference as % of Supply	98%	100.3%	98%	96%	93%
Difference as % of Demand	102%	98%	102%	105%	107%

5.3 Projected Single-Dry-Year Supply and Demand Comparison

Changes in weather can lead to changes in water use. During dry years, water demands can be expected to increase. The District has elected to use normal year demands to estimate its dry-year demands. The projected dry-year supplies and demands are compared in Table 35. Historically in dry year conditions, water suppliers have experienced an increase in water use because of low-precipitation; however, over the last three years (2006-2009) that were basically dry years - suppliers have been curtailed, voluntary or mandatory demand reductions were necessary, rates have increased and as result demand has remained low. Moreover, the demand decreases were observed prior to the full effect and observation associated with implementation of the water conservation requirements to meet SBx 7-7. Therefore, the District assumes single and multiple dry-year demands were assumed to be the same as normal demands.

Table 35 Supply and demand comparison — single dry year (AF)

	2015	2020	2025	2030	2035
Groundwater	3,624	3,624 3,624	3,624		3,624
Recycled Water	N/A	N/A N/A N/A			N/A
Supply totals	3,624	3,624 3,624	3,624		3,624
Demand totals	3,680	3,614 3,702	3,793		3,886
Difference -56		10	-78	-169	-262
Difference as % of Supply	98%	100.3%	98%	96%	93%
Difference as % of Demand	102%	98%	102%	105%	107%

In most of the ensuing years the District can anticipate exceeding its APA - if the District were able to facilitate distribution of recycled water at the large landscape facilities these reductions coupled with slightly more consumer reductions would balance supply against projected

demand. However, the District could as it has done in the past lease water rights from other Central Basin users to make up the difference and balance supply against projected demand.

5.4 Projected Multiple-Dry-Year Supply and Demand Comparison

The Act requires water agencies to project demands and supplies during multiple dry years. Projections were prepared for five time frames: five-year periods ending in 2010, 2015, 2020, 2025, and 2030. Normal-year demands for intermediate years were interpolated between the demand values in Table 34. The estimated supply and demand for five dry years ending in 2010 are summarized in Table 36.

In most of the ensuing years the District can anticipate exceeding its APA - if the District were able to facilitate distribution of recycled water at the large landscape facilities these reductions coupled with slightly more consumer reductions would balance supply against projected demand. However, the District could as it has done in the past lease water rights from other Central Basin users to make up the difference and balance supply against projected demand.

Table 36 Supply and demand comparison — multiple dry-year events (AF)

		2015	2020	2025	2030	2035
Multiple-dry year first year supply	Supply totals	3,624	3,624	3,624	3,624	3,624
	Demand totals	3,680	3,614	3,702	3,793	3,886
	Difference	-56	10	-78	-169	-262
	Difference as % of Supply	98%	100.3%	98%	96%	93%
	Difference as % of Demand	102%	98%	102%	105%	107%
Multiple-dry year second year supply	Supply totals	3,624	3,624	3,624	3,624	3,624
	Demand totals	3,680	3,614	3,702	3,793	3,886
	Difference	-56	10	-78	-169	-262
	Difference as % of Supply	98%	100.3%	98%	96%	93%
	Difference as % of Demand	102%	98%	102%	105%	107%
Multiple-dry year third year supply	Supply totals	3,624	3,624	3,624	3,624	3,624
	Demand totals	3,680	3,614	3,702	3,793	3,886
	Difference	-56	10	-78	-169	-262
	Difference as % of Supply	98%	100.3%	98%	96%	93%
	Difference as % of Demand	102%	98%	102%	105%	107%

6.0 Water Shortage Contingency Plan and Drought Management

This section describes the District's water shortage planning efforts. Water shortages may result from weather variations and catastrophes such as pipeline failures, supply contamination, and earthquakes. During periods groundwater supply shortages, the District will utilize its Water Shortage Contingency Plan (WSCP), as adopted in 1992.

District Ordinance No. 56C-R stipulates the use of a four-stage rationing plan to be used in case of water shortage. The rationing plan utilizes both voluntary and mandatory water rationing depending on the severity of the water shortage.

It is highly unlikely that the District's ability to pump groundwater would be impeded by natural disasters for more than several days as studies indicate that groundwater wells would probably be back in operation within five days of a severe earthquake. Refer to WRD Technical Bulletin Volume 12 – Summer 2007 (**Appendix G**).

The District has one storage reservoir capable of holding treated potable water to meet peak demands. In the event of an emergency and a loss of District wells coupled with significant demand increases the District's single 1.25 mgd reservoir is incapable of meeting all peak demands for more than four (4) hours. Therefore, demand management would be the key maintaining adequate water supplies to the District service area. Notably, feasible storage improvements, interties and fire hydrants connected to the recycled water system should be investigated and implemented in the near term.

6.1 Stages of Action

The Act requires that urban water agencies conduct a water shortage contingency analysis as part of their 2010 UWMP. In 1992, District adopted its WSCP in response to California Assembly Bill Number 11. The WSCP is intended to conservatively manage District water resources to provide water to its customers on an equitable and business-sound basis, in the event of supply shortages of up to 50 percent. Table 37 shows the water supply stages and conditions for the District.

Table 37 Water shortage contingency — rationing stages to address water supply shortages

Stage No.	Water Use Restriction Program	Water Supply Reduction Goal	Percent of Supply Shortage
1 Water Supply Warning	Voluntary	15% reduction	Up to 15%
2 Water Shortage Alert	Voluntary and/or Mandatory	25% reduction	15-25%
3 Water Shortage Crisis	Mandatory	35% reduction	25-35%
4 Water Shortage Emergency	Mandatory	Up to 50% reduction	35-50%

6.2 Estimate of Minimum Supply for Next Three Years

The Act requires an estimate of the minimum supply available during the next three years (2011 – 2014). It is suggested that the estimate be based on the driest three-year historic sequence for the water supply (as shown in Table 26 and consistent with CBMWD's multiple dry year scenario FY 2006-2009). The District's supply of potable water comes from their groundwater wells and is expected to provide sufficient water even during dry years. Table 38 shows the estimated minimum supply the District could expect to have in the event of as supply reduction in the Central Basin.

Table 38 Water shortage contingency

Water supply sources	Normal Water Year Supply 2011	Minimum Supply for Next Three Years		
		Year 2012	Year 2013	Year 2014
Central Basin[a] (groundwater)	3,624	3,624	3,624	3,624
Percent of normal year:		100.0%	100.0%	100.0%

Note:
a. Contract agreements determine quantities of leased extractions.

6.3 Catastrophic Supply Interruption Plan

Catastrophic events such as earthquakes or regional power outages can impact water supply. The District developed its Emergency Action Plan (EAP) (included in **Appendix E**) to meet emergencies within its service area and has updated the plan as necessary. The EAP provides information on the District operations, assigns responsibilities, and establishes general policies and procedures associated with operations during natural disasters, technological incidents, and nuclear defense emergencies. Table 39 summaries various possible catastrophes and a summary of the response actions.

6.4 Prohibitions, Penalties and Consumption Reduction Methods

The District has established a water shortage management plan that becomes effective during different stages of water shortage. District Ordinance No. 56C-R (**Appendix D**) stipulates mandatory prohibitions on water usage during water shortages apply to all the District customers. The mandatory prohibitions are shown in Table 40.

In addition to the prohibitions above, the District has identified a number of methods to reduce water consumption during a water supply shortage within the Central Basin – although groundwater is assumed to be drought-resistant, the Act requires that each water purveyor address a series of supply shortages. Public information notices will be used to inform and persuade customers to reduce water demand levels. These methods are summarized in Table 41.

Table 39 Preparation Actions for a Catastrophe

Possible Catastrophe	Summary of Actions
Fire	Staff will notify the fire authority and be available to assist as necessary. For fires in the motor or switchgear, where possible, the main electrical breaker should be turned off. For motors and switchgear (including well facilities, pumps, or control centers), staff are not allowed to enter the site.
Earthquake	Staff will take appropriate defensive measures until the earthquake has passed. After an earthquake, pumps, wells, control cabinets, reservoirs, and pipelines will be inspected for damage. Preparation will be initialized for the isolation of the reservoir water supply and prepared for emergency distribution.
Flooding	Sandbagging will be used, where feasible, to protect District facilities. Motors or electrical switchgears that could come in contact with floodwaters will be turned off, and the main breakers will be deactivated. After a flood, well and distribution system samples will be taken to ensure water quality has not been compromised. If contamination is present, immediate action will be taken, including additional chlorination, flushing, activation of interconnections, public notification, and/or boil water orders.
Sabotage of Water Supplies	If there is evidence of tampering, such as an open or damaged reservoir hatch, apparent tampering with wells or pumps, suspicious containers left on site, or water having a strange odor or color, the following steps must be taken: • Isolate the affected system • Immediately notify your supervisor and management • Isolate the area and notify local law enforcement officials • Coll ect water samples for analysis. • Notify the Health Department. • Notify the public, as appropriate • Flush and chlorinate, as appropriate The system will be returned to service only after testing has deemed it safe.
System Contamination	For contamination within the distribution system, reservoir, or wells, the procedures in the Emergency Chlorination Plan will be followed. Issue “Boil Water”, “Do Not Drink”, or “Do Not Use” orders and other press releases as appropriate.
Civil Disorder	In the event of civil disorder, District facilities will remain locked and, as practical, staffed by District staff. Additional private security guards will be hired as required.
Power Outages	Staff will contact the Southern California Edison (SCE) to determine the anticipated outage duration. Three portable diesel-powered generators are available to provide power for distribution pumping, and one well site is equipped with a natural gas engine that is designed to run in the case of a power outage. Once power has been restored, time will be allowed to let the SCE system stabilize, and then the generator and natural gas engine will be stopped.
Bomb Threats	All bomb threats are taken seriously. For an occupied building, the building must be evacuated until the threat is alleviated. District management, local police, and local fire authorities must be immediately notified of the threat. District employees are not allowed to try to disable a suspected bomb or suspicious device, and the area will be secured, allowing access only to authorized personnel.

Table 40 Water shortage contingency — mandatory prohibitions

Prohibitions	Stage When Prohibition Becomes Mandatory
Potable water used to irrigate grass, lawns, ground cover, shrubbery, vegetation, and tress shall not result in runoff of more than five minutes.	2
Potable water shall not be used to wash sidewalks, walkways, driveways, parking lots, open ground, or other hard-surfaced areas, except where necessary for public health or safety.	2
Potable water shall not be allowed to escape from breaks within the customer's plumbing system for more than twenty-four hours after the customer is notified or discovers the break.	2
Washing cars, boats, trailers, aircraft, or other vehicles by hose shall not be done without a shutoff nozzle and bucket, except to wash such vehicles at commercial or fleet vehicle washing facilities using water recycling equipment.	2
No restaurant, hotel, café, cafeteria, or other public place where food is sold, served, or offered for sale, shall serve drinking water to any customer unless expressly requested.	3
Cleaning, filling, or maintaining decorative fountains, lakes, or ponds with potable water is prohibited.	3
Where non-potable or recycled water is sufficient, potable water may not be used for construction, compaction, dust control, street or parking lot sweeping, or building washdown.	3
General Manager must issue prior approval for the use of potable water for sewer system maintenance or fire protection training.	3
Use of potable water for any purpose in excess of the amounts allocated pursuant to the District Water Shortage Contingency Plan is prohibited.	2 or 3

Source: Pico Water District Prohibiting Wasteful Use of Water

Table 41 Water shortage contingency — consumption reduction methods

Consumption Reduction Method	Stage When Method Takes Effect	Projected Reduction
Voluntary best efforts in general water use - Reduce general use by 10% - Water-efficient landscaping is encouraged - No runoff from irrigation - Cease irrigation between 11 a.m. and 4 p.m.	1 10%	
Voluntary and mandatory restriction in general water use (same as Stage I restrictions plus): - Reduce general use by 20% - Cease irrigation between 6 a.m. and 6 p.m., except with hand-held hose or using reclaimed water - Irrigation only 3 times per week	2 20%	
Mandatory restrictions (same as Stage II restrictions plus): - Reduce general use by 35% - Commercial car washing using recycled water only - No golf course water unless reclaimed water is used - Irrigation only 2 times per week.	3 35%	
Mandatory restrictions(same as Stage III restrictions plus): - Reduce general use by 50% - Water rationing by customer class - Irrigation only 1 time per week	4 50%	

Service may be terminated to any user who knowingly and willfully violates any provision of District's WSCP. Under the WSCP, a surcharge per billing unit (100 cubic feet of water) will be assessed for usage above established allotments. When an allotment is exceeded for the first and second billing period, the surcharge is equal to four times the highest tiered usage rate. For the third and any subsequent billing periods, this surcharge increases to ten times the highest rate. These penalties are summarized in Table 42. Section 7 of the WSCP describes in detail the applicable penalties (see **Appendix D**).

Table 42 Water shortage contingency — penalties and charges

Penalty	Situation when Penalty May Take Effect
Written notice of violation	1,2
Excess use surcharge applied	3,4

6.5 Revenue Impacts of Reduced Sales During Shortages

Anticipated shortfalls in projected revenue due to water supply shortages would need to be covered through increased water rates and/or an advance from funds set aside by the District. In order to mitigate the financial impacts of a water shortage, per Section 8 of the WSCP, the District has established an Emergency Fund, which allows the District to operate at 75 percent of its normal operating revenue. This fund will be used to stabilize rates during periods of water shortage or disasters affecting the water supply, and will decrease the need to make drastic rate changes during prolonged or severe water shortages. In addition, water rates may be adjusted at a percentage sufficient to offset the immediate loss of revenue suffered during the water shortage. Recommended percent increases during Stages 1 through 4 are 15, 25, 50, and 100 percent, with the maintenance of a fifteen (15) percent increase over pre-shortage rates to recover lost revenues. The impacts of such a reduction on the District's revenue and the effects on expenditures are shown in Table 43.[3]

Table 43 Actions and Conditions that Impact Revenues and Expenditures

Revenues Measure	Summary of Effects
Rate adjustment	The existing rate structure could be adjusted to recapture a portion of the lost revenue, which would affect all water users within the District's service area.
Development of reserves	The District has an Emergency Fund to be used in times of drought and emergencies to offset the loss of revenue. The District could also advance funds from its General Fund for the loss of essential revenue.
Expenditures Measure	**Summary of Effects**
Curb all discretionary spending	Discretionary spending is not considered to be a significant budget item.
Defer Capital Improvement Program	Certain non-essential projects (including scheduled facility replacement and refurbishments) could be delayed without having an adverse effect.

3 Pico Water District, Ordinance AB-11 and Resolutions 56C-R, 56B-R

6.6 Mechanism to Determine Reductions in Water Use

Mechanisms to determine reductions in water use include daily production and distribution record reviews and water meter auditing. The District's mechanisms for monitoring water use are summarized in Table 44.

Table 44 Water Use Monitoring Mechanisms

Mechanisms for determining actual reductions	Type and quality of data expected
Daily production and distribution records	Daily production and distribution records would be monitored, enabling the District staff to determine if reduction goals are being met. Customers would be alerted to actual water use (increase/decrease).
Water meter auditing	Monitoring of excessive water use with frequent meter readings of high-volume users.

7.0 Water Quality Impacts on Reliability

The District is committed to providing high-quality water to its customers. The District's supply is not considered subject to reduction due to poor water quality.

The quality of the District's water deliveries is regulated by the California Department of Public Health (DPH), which requires regular collection and testing of water samples and tests to ensure that the quality meets state and national regulatory standards and does not exceed MCLs. Through its approved laboratory contracts, the District performs water quality testing, which has consistently yielded results within the acceptable regulatory limits. Overall, the District's water is of high quality.

The quality of the District's groundwater supply over the next 25 years is expected to continue to exceed DPH standards. Groundwater will continue to be treated to meet drinking water standards, and no impacts to groundwater supplies due to water quality deficiencies are foreseen to occur in the next 25 years. Table 45 summarizes the current and project water supply changes due to water quality.

Table 45 Water quality — current and projected water supply impacts

Water source	Description of condition	2010	2015	2020	2025	2030	2035
Groundwater	None	0	0 0		0 0		0
Recycled Water	None	0	0 0		0 0		0

Groundwater in the Central Basin is continually monitored because of its susceptibility to potential contamination from adjacent basins, migration of shallow contamination into deeper aquifers and although remote, seawater intrusion. The available supply of replenishment water to physically recharge the Basin includes local and imported water. The local water that recharges the groundwater basin comes from storm flows from the San Gabriel Valley and flow obligations under the San Gabriel River Judgment with the Upper Area of the Central Basin. This water is defined as "Make-Up Water." Imported Water is purchased from Metropolitan to be used for surface spreading at the Montebello Forebay and for seawater barrier injection at the Alamitos Barrier. Recycled water is purchased from the County Sanitation Districts of Los Angeles County (CSDLAC) for spreading and injection. As mentioned in the overview, the Central Groundwater Basin has very good water quality overall.

Contaminants that may be present in source water include:

- Microbial contaminants, including viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife;
- Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming;

- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses;
- Organic chemical contaminants, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems;
- Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the USEPA and the (CDPH) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that must provide the same protection for public health.

Groundwater supplies are considered most vulnerable to automobile gas stations, known contaminant plumes, chemical/petroleum processing/storage, metal plating/finishing/fabricating, plastics/synthetics producers, and dry cleaners. There are several contaminants (Perchlorate, Manganese, and the Volatile Organic Compounds [PCE and TCE]) in isolated areas that are still a concern.[4]

As the groundwater replenishment agency for the Central Groundwater Basin, the WRD has programs to monitor groundwater levels and quality. WRD's Regional Groundwater Monitoring Program consists of a network of about 200 WRD and USGS installed monitoring wells at 45 locations throughout the Central Basin region. Monitoring well data is supplemented with information from production wells to capture the most accurate information available. WRD staff provides the in-house capability to collect, analyze and report groundwater data. This information is stored in a GIS database and provides the basis to better understand the characteristics of the Central Groundwater Basin. WRD makes this information available through an annual Regional Groundwater Monitoring Report which documents groundwater production, groundwater levels, and groundwater quality conditions throughout the Central Basin.

4 Central Basin MWD, 2010 Draft UWMP, page 5-2.

8.0 Demand Management Measures

Water conservation is a critical part of the District's 2010 UWMP and its long-term strategy for meeting the water needs of its customers. The District implements some water conservation demand management measures (DMMs).

The unpredictable water supply and ever-increasing demand on California's complex water resource system resulted in a coordinated effort by the DWR, water utilities, environmental organizations, and other interested groups to develop a list of urban DMMs for conserving water. The California Urban Water Conservation Council (CUWCC) was created to assist in increasing water conservation through partnerships among urban water agencies, public interest organizations, and private entities. This consensus-building effort resulted in a Memorandum of Understanding, as amended September 16, 1999, which formalizes an agreement to implement DMMs and provide a cooperative effort to reduce the consumption of California's water resources.

The goals of the District's water conservation program are to:

- demonstrate continued commitment to the DMMs, or if applicable, Best Management Practices (BMPs)[5]
- ensure a reliable water supply

The District is not a signatory to the Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California, which created the CUWCC in 1991. However, the District has voluntarily agreed to implement the fourteen water conservation DMMs.

In 2009, the CUWCC reorganized the BMPs and grouped them into five categories. Two categories, Operations and Education, are Foundational BMPs because they are considered to be essential water conservation activities by any utility and are ongoing practices with no time limits. The remaining BMPs are Programmatic BMPs and are organized into Residential, Commercial, Industrial, and Institutional (CII), and Landscape categories. Agencies can comply with the Programmatic BMPs through one of three compliance options: 1) traditional approach to BMP compliance; 2) the Flex Track Compliance Option; or, 3) the gallons per capita per day (GPCD) Compliance approach (this approach provides a reporting mechanism)

8.1 Foundational BMPs

- Utility Operations Programs - According to the CUWCC, this practice consists of several key actions that utilities shall take to better enable conservation program implementation, to supplement conservation incentives with regulations where appropriate, and to assist one another through the wholesaler-retailer relationship.

5 MOU Signatories only.

- Education Programs - California water agencies have played a major role in stressing the need for their customers to conserve water through both public information and school education programs. The specifics of how these programs are to be implemented are detailed below.
    - Public Information Programs present opportunities to use public information programs as an effective tool to inform customers about the need for water conservation and ways they can conserve, and to influence customer behavior to conserve.
    - School Education Programs have been implemented to reach the youngest water users at an early age and enforce the need to engage in water conservation as a life-long behavior.

8.2 Programmatic BMPs

According to the CUWCC, as stated above each signatory has the option of implementing and complying with each of the Programmatic BMPs through one of three (3) approaches: 1) the traditional approach to BMP Compliance; 2) the Flex Track alternative included in each Programmatic BMP or the GPCD Compliance Option. Table 46 presents the CUWCC's Foundational and Programmatic BMPs and DMMs.

- Residential - Residential water users throughout California depend on a reliable and safe supply of water for their homes. This BMP defines the best and most proven water conservation methods and measures those residents, working in conjunction with water agencies, can implement. By implementing these methods and measures homeowners, multi-family property owners, and tenants will increase water use efficiency and improve regional or local reliability.
- Commercial, Industrial, and Institutional (CII) - CII water demands make up a large percentage of total demand for California. CII water use varies dramatically between business sectors as well as within a given water agency's territory as is the case with the District. The goal of this BMP is to implement comprehensive yet flexible BMPs, allowing the District to tailor the implementation of each practice to fit local needs, opportunities and businesses in its service area. The end result is a practice that is successful and will produce the greatest amount of cost-effective water savings.
- Landscape - Outdoor irrigation accounts for a large portion of urban water use. Irrigation water use varies dramatically depending on water pricing and availability, plant choice, geographic locations, seasonal conditions, and the level of commitment to sound water efficiency practices. The goal of this BMP is that irrigators, with assistance from MOU signatories, will achieve a higher level of water use efficiency consistent with the actual irrigation needs of the plant materials. Achieving this goal would ultimately reduce overall demands for water, especially during the peak summer months when temperatures are high and irrigation is essential for plant life.

Table 46 Demand Management Measures

Demand Mgt Measures/Best Management Practices for Urban Water Conservation in California						
DMMs/CUWCC BMPs by Type, Organization and Compliance Measure						
Type	**Category**	**BMP**	**Description**	**DMM**		**Compliance**
Foundation	Operations Practices	1.1.1	Conservation Coordinator	**L**	Water Conservation Coordinator	**Pending/18 mth Schedule**
	1.1.2		Water Waste Prevention	**M**	Water Waste Prevention	**YES**
	1.1.3		Wholesale Agency Assistance Programs	**J**	Wholesale Agency Programs	**YES**
	1.2		Water Loss Control (System Water Audits, Leak Detection and Repair)	**C**	System Water Audits, Leak Detection and Repair	**Pending/18 mth Schedule**
	1.3		Metering with Commodity rates for all New Connections and Retrofit of Existing Connections	**D**	Metering with Commodity rates for all New Connections and Retrofit of Existing Connections	**YES**
	1.4		Retail Conservation Pricing	**K**	Conservation Pricing	**YES**
	Education Programs	2.1	Public Information Programs	**G**	Public Information Programs	**YES**
		2.2	School Education Programs	**H**	School Education Programs	**Pending/18 mth Schedule**
Programmatic	Residential 3.1		Residential Assistance Program	**A**	Water Survey Programs for Single-Family and Multi-Family Residential Customers[1]	**Pending/18 mth Schedule**
	(Plumbing		Retrofit)	**B**	Residential Plumbing Retrofit	**Pending/18 mth Schedule**
	3.2		Landscape Water Survey	**A**	Water Survey Programs for Single-Family and Multi-Family Residential Customers[1]	**Pending/18 mth Schedule**
	3.3		High-Efficiency Washing Machine Rebate - Financial Assistance Programs	**F**	High-Efficiency Washing Machine Rebate Programs	**YES**
	3.4		WaterSense Specification (WSS) Toilets	**N**	Residential ultra-low flush toilet replacement programs	**YES**
	CII 4		Commercial, Industrial, Institutional (CII)	**I**	Conservation Programs for Commercial, Industrial, Institutional (CII)	**YES**
	Landscape 5		Landscape	**E**	Large Landscape conservation programs and incentives	**Pending/18 mth Schedule**

Source: Adapted from Department of Water Resources Guidebook to Assist Urban Water Suppliers to Prepare a 2010 UWMP, February 2011.

Notes: [1] Components of DMM A (Water survey programs for single-family residential and multifamily residential customers) applies to both BMP 3.1 (Residential assistance program) and BMP 3.2 (Landscape water survey)

The District has limited resources including staffing and currently lacks the necessary funding to exhaustively support each of the DMMs completely. However, similar to many water utilities throughout California, the District, to the best of its abilities is committed to implementing water conservation programs and providing services to its customers to promote water use efficiencies and water savings.

8.3 Demand Management Measures

8.3.1 DMM A – Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

The District anticipates implementing a Water Survey Program for residential customers over the next two years. At a minimum the program would look at all the water-using devices inside the home, such as toilets, faucets, and showerheads then provide the customer with an assessment of the survey, recommendations are provided for retrofitting certain water use devices, educational materials are supplied to the resident along with recommendations as to how residents can reduce their water consumption.

8.3.2 DMM B – Residential Plumbing Retrofit

The District encourages its customers to use ultra-low flush (ULF) toilets, and the District coordinates its efforts with the CBMWD to distribute waterless urinals to various schools within the El Rancho Unified School District and some commercial customers. The District anticipates improving this program over the next 18 months; however, much of the success of this program is contingent upon the level of involvement of the CBMWD and Metropolitan.

8.3.3 DMM C – System Water Audits, Leak Detection, and Repair

The District strives to repair all leaks in a timely manner and to make sure all District meters are working. Over the past two years the District has implemented a large meter testing program, which tests all meters two inches and larger for accuracy. The District alternates the testing of its larger meters over a three year period. The District has not performed any water audits or customer surveys to date; however, it is working on developing a comprehensive water conservation program, which will initiate these two functions over the next two years.

8.3.4 DMM D – Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

The District's service area is fully metered, and meters are required for all new connections. All of the District's water connections are billed a fixed service charge plus commodity usage.

8.3.5 DMM E – Large Landscape Conservation Programs and Incentives

Currently the District does not have a large landscape conservation program; however, over the next two years the District anticipates developing [a water conservation] program that would include large landscape measures. Currently, the new development would adhere to California's Model Water Efficient Landscape Ordinance.

8.3.6 DMM F – High-Efficiency Washing Machine Rebate Programs

The District incorporates information about high-efficiency appliances, including washing machines, into its public information programs. At present there are several residential and commercial toilet and washer rebates offered by CBMWD, and the District will continue to monitor and promote the availability of these and other rebate programs to its customers.

8.3.7 DMM G – Public Information Program

The District coordinates its efforts with CBMWD and energy utilities to educate the public on water conservation. Board members regularly promote water conservation at public functions, community groups, and schools, and the District is considering expanding its public information program to include bill inserts and brochures.

8.3.8 DMM H – School Education Programs

Currently the District does not have a school education program; however, over the next two years the District expects to develop [a comprehensive water conservation program] to address to this issue. In the meantime, the District can build a partnership with CBMWD and its school education programs. See **Appendix H** for a list of CBMWD school education programs.

8.3.9 DMM I – Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

The District passed a resolution to require the future construction projects to use water conservation methods for plumbing fixtures, including ULFTs, low-flow showerheads, and waterless urinals. In addition, the District can take advantage of programs offered by CBMWD and Metropolitan that offer rebates to businesses, schools, and other facilities for items such as commercial clothes washers, waterbrooms, cooling tower conductivity controllers, pre-rinse spray nozzles, and x-ray machine recirculating devices, and commercial toilets and urinals.

8.3.10 DMM J – Wholesale Agency Assistance Program

Coordination with CBMWD for regional water conservation programs. Most recently, CBMWD As a part of Central Basin's "Shut Your Tap!" Conservation Campaign. CBMWD hosts a bimonthly event called the "Shut Your Tap! Roundtable". The Roundtable provides a forum for cities, water agencies, and interested parties to share ideas and information on conservation trends and issues. The setting provides a great forum for interaction and networking among water stakeholders. In an effort to provide Central Basin cities with support for their marketing, outreach, and enforcement of local mandatory water conservation ordinances, a "Water Use Efficiency Ordinance Tool Kit" was developed and provided to each city. The Tool Kit included a cover letter, sample ordinances, a sample staff report template, sample violation notices, and ordinance enforcement collateral. To add to the advertising opportunities of our campaign partners, a Conservation Messaging Tool Kit was also provided to cities and water retail agencies. Each kit includes water conservation tip sheets, door hangers, bill inserts, local cable TV announcements, countertop tent cards, and sample newsletter articles.

CCMWD has a host of grant programs that are specifically established to promote water conservation. See **Appendix H** for list of this programs that could provide the funding and the materials needed to improve the District's water conservation programs.

Furthermore, the CBMWD has five-year Conservation Master Plan to expand long-term water saving efforts and introduce new regionally tailored programs. The District will track its involvement with these future programs and can engage on a case-by-case basis according to the District's current operations, funding and staff resources.

8.3.11 DMM K – Conservation Pricing

The District has implemented a tiered water rate structure which was designed to discourage excessive water use. All users pay a minimum monthly service charge plus a three-tiered commodity rate that increases with increased water consumption.

8.3.12 DMM L – Conservation Coordinator

Currently the District does not have a designated conservation coordinator; however, over the next two years the District expects to develop [a comprehensive water conservation program] to address to this issue. The District currently has a water conservation committee that has been established to investigate and promote its conservation programs.

8.3.13 DMM M – Water Waste Prohibitions

Prohibitions against wasteful use of water are followed, as set forth in the California Constitution. The District has also adopted Resolution 56B-R (included in **Appendix D**), which establishes prohibitions for the following activities:

- Use of potable water for landscape irrigation that results in runoff for more than five minutes
- Use of potable water for the washing of hard-surfaced areas, unless required for public health or safety
- Allowance of potable water to escape from breaks within customer's system for more than twenty-four hours
- Use of potable water to wash a vehicle by hose without a shutoff nozzle and bucket.

During a declared water shortage emergency, additional restrictions are effective, as follows:

- At a public place where food is sold, drinking water shall not be served, unless specifically requested.
- Decorative fountains shall only fill, cleaned, and/or maintained with reclaimed water.
- Where recycled water is sufficient, potable water will not be used for construction, compaction, dust control, street sweeping, or building washdown.

- Use of potable water for sewer system maintenance or fire protection training shall only be done with prior approval from the General Manager.

8.3.14 DMM N – Residential ULFT Replacement Program

The District has previously participated with CBMWD in its ULFT replacement program, which supplied ULFTs free of charge to District customers.

8.4 Determination of Implementation

Currently, the District has not completely implemented all of the necessary DMMs. During development of this 2010 UWMP the District has specifically identified the DMMs that are lacking complete implementation and has initiated a process to develop a comprehensive water conservation program over the next 18 months. The following DMMs that are lacking 100 percent compliance; however, all DMMs including those listed below will be encapsulated in the District's forthcoming comprehensive water conservation program.

DMM A – Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

DMM B – Residential Plumbing Retrofit

DMM C – System Water Audits, Leak Detection, and Repair

DMM E – Large Landscape Conservation Programs and Incentives

DMM H – School Education Programs

DMM L – Conservation Coordinator

9.0 Climate Change

9.1 Climate Change

Climate change adds its own new uncertainties to the challenges of planning. Changes in weather significantly affect water supply planning, irrespective of the debate associated with the sources and cause of increasing concentrations of greenhouse gasses. Typically, water supplies that are dependent on natural hydrology are vulnerable to climate change, especially if the water source originates from mountain snow pack. In addition to water supply impacts, changes in local temperature and precipitation are expected to alter water demand patterns. The District is committed to performing its due diligence with respect to climate change.

9.2 Potential Impacts

While uncertainties remain regarding the exact timing, magnitude, and regional impacts of these temperature and precipitation changes, researchers have identified several areas of concern for California water planners. These include:

- Reduction in Sierra Nevada snowpack;
- Increased intensity and frequency of extreme weather events; and
- Rising sea levels resulting in increased risk of damage from storms, high-tide events, and the erosion of levees.

Other important issues of concern due to global climate change include:

- Effects on local supplies such as groundwater;
- Changes in urban and agricultural demand levels and patterns;
- Impacts to human health from waterborne pathogens and water quality degradation;
- Declines in ecosystem health and function; and
- Alterations to power generation and pumping regimes.

Appendix A
Text of Urban Water Management Planning Act

Section K: California Water Code, Division 6, Part 2.6: Urban Water Management Planning

The following sections of California Water Code Division 6, Part 2.6, are available online at http://www.leginfo.ca.gov/calaw.html.

Chapter 1. General Declaration and Policy	§10610-10610.4
Chapter 2. Definitions	§10611-10617
Chapter 3. Urban Water Management Plans	
Article 1. General Provisions	§10620-10621
Article 2. Contents of Plans	§10630-10634
Article 2.5. Water Service Reliability	§10635
Article 3. Adoption And Implementation of Plans	§10640-10645
Chapter 4. Miscellaneous Provisions	§10650-10656

Chapter 1. General Declaration and Policy

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2.

(a) The Legislature finds and declares all of the following:

(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.

(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.

(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.

(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.

(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.

(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.

(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

Chapter 2. Definitions

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. “Demand management” means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. “Customer” means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. “Efficient use” means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. “Person” means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

Chapter 3. Urban Water Management Plans

Article 1. General Provisions

10620.

(a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d) (1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(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.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(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.

10621.

(a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(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.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

Article 2. Contents of Plans

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter that shall do all of the following:

(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.

(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). 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:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(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 the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department 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.

(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 use records.

(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 reasonably available, including, but not limited to, historic use records.

(c) (1) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(A) An average water year.

(B) A single dry water year.

(C) Multiple dry water years.

(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 supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

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

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, 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.

(I) Agricultural.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

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

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

(N) Residential ultra-low-flush toilet replacement programs.

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

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

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

(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.

(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.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(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.

(j) For purposes of this part, urban water suppliers that are members of the California Urban Water Conservation Council shall be deemed in compliance with the requirements of subdivisions (f) and (g) by complying with all the provisions of the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated December 10, 2008, as it may be amended, and by submitting the annual reports required by Section 6.2 of that memorandum.

(k) Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).

10631.1.

(a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code,

as identified in the housing element of any city, county, or city and county in the service area of the supplier.

(b) It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirement under Section 65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households.

10631.5.

(a) (1) Beginning January 1, 2009, the terms of, and eligibility for, a water management grant or loan made to an urban water supplier and awarded or administered by the department, state board, or California Bay-Delta Authority or its successor agency shall be conditioned on the implementation of the water demand management measures described in Section 10631, as determined by the department pursuant to subdivision (b).

(2) For the purposes of this section, water management grants and loans include funding for programs and projects for surface water or groundwater storage, recycling, desalination, water conservation, water supply reliability, and water supply augmentation. This section does not apply to water management projects funded by the federal American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

(3) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if the urban water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the water demand management measures. The supplier may request grant or loan funds to implement the water demand management measures to the extent the request is consistent with the eligibility requirements applicable to the water management funds.

(4) (A) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if an urban water supplier submits to the department for approval documentation demonstrating that a water demand management measure is not locally cost effective. If the department determines that the documentation submitted by the urban water supplier fails to demonstrate that a water demand management measure is not locally cost effective, the

department shall notify the urban water supplier and the agency administering the grant or loan program within 120 days that the documentation does not satisfy the requirements for an exemption, and include in that notification a detailed statement to support the determination.

(B) For purposes of this paragraph, "not locally cost effective" means that the present value of the local benefits of implementing a water demand management measure is less than the present value of the local costs of implementing that measure.

(b) (1) The department, in consultation with the state board and the California Bay-Delta Authority or its successor agency, and after soliciting public comment regarding eligibility requirements, shall develop eligibility requirements to implement the requirement of paragraph (1) of subdivision (a). In establishing these eligibility requirements, the department shall do both of the following:

(A) Consider the conservation measures described in the Memorandum of Understanding Regarding Urban Water Conservation in California, and alternative conservation approaches that provide equal or greater water savings.

(B) Recognize the different legal, technical, fiscal, and practical roles and responsibilities of wholesale water suppliers and retail water suppliers.

(2) (A) For the purposes of this section, the department shall determine whether an urban water supplier is implementing all of the water demand management measures described in Section 10631 based on either, or a combination, of the following:

(i) Compliance on an individual basis.

(ii) Compliance on a regional basis. Regional compliance shall require participation in a regional conservation program consisting of two or more urban water suppliers that achieves the level of conservation or water efficiency savings equivalent to the amount of conservation or savings achieved if each of the participating urban water suppliers implemented the water demand management measures. The urban water supplier administering the regional program shall provide participating urban water suppliers and the department with data to demonstrate that the regional program is consistent with this clause. The department shall review the data to determine whether the urban water suppliers in the regional program are meeting the eligibility requirements.

(B) The department may require additional information for any determination pursuant to this section.

(3) The department shall not deny eligibility to an urban water supplier in compliance with the requirements of this section that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of the agencies participating in the project or plan is not implementing all of the water demand management measures described in Section 10631.

(c) In establishing guidelines pursuant to the specific funding authorization for any water management grant or loan program subject to this section, the agency administering the grant or loan program shall include in the guidelines the eligibility requirements developed by the department pursuant to subdivision (b).

(d) Upon receipt of a water management grant or loan application by an agency administering a grant and loan program subject to this section, the agency shall request an eligibility determination from the department with respect to the requirements of this section. The department shall respond to the request within 60 days of the request.

(e) The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities. In addition, for urban water suppliers that are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California and submit annual reports to the California Urban Water Conservation Council in accordance with the memorandum, the department may use these reports to assist in tracking the implementation of water demand management measures.

(f) This section shall remain in effect only until July 1, 2016, and as of that date is repealed, unless a later enacted statute, that is enacted before July 1, 2016, deletes or extends that date.

10631.7. The department, in consultation with the California Urban Water Conservation Council, shall convene an independent technical panel to provide information and recommendations to the department and the Legislature on new demand management measures, technologies, and approaches. The panel shall consist of no more than seven members, who shall be selected by the department to reflect a balanced representation of experts. The panel shall have at least one, but no more than two, representatives from each of the following: retail water suppliers, environmental organizations, the business community, wholesale water suppliers, and academia. The panel shall be convened by January 1, 2009, and shall report to the

Legislature no later than January 1, 2010, and every five years thereafter. The department shall review the panel report and include in the final report to the Legislature the department's recommendations and comments regarding the panel process and the panel's recommendations.

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:

(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.

(b) 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.

(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.

(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.

(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.

(f) Penalties or charges for excessive use, where applicable.

(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.

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water

supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

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 water management strategies and supply reliability.

Article 2.5. Water Service Reliability

10635.

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand

assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(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.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

Article 3. Adoption and Implementation of Plans

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

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 within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644.

(a) An urban water supplier shall submit to the department, 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. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the exemplary elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has submitted its plan to the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

(c) (1) For the purpose of identifying the exemplary elements of the individual plans, the department shall identify in the report those water demand management measures adopted and implemented by specific urban water suppliers, and identified pursuant to Section 10631, that achieve water savings significantly above the levels established by the department to meet the requirements of Section 10631.5.

(2) The department shall distribute to the panel convened pursuant to Section 10631.7 the results achieved by the implementation of those water demand management measures described in paragraph (1).

(3) The department shall make available to the public the standard the department will use to identify exemplary water demand management measures.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

Chapter 4. Miscellaneous Provisions

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or

applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

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Section L: California Water Code, Division 6, Part 2.55: Water Conservation

The following sections of California Water Code Division 6, Part 2.55, are available online at http://www.leginfo.ca.gov/calaw.html.

Chapter 1. General Declarations and Policy	§10608-10608.8
Chapter 2. Definitions	§10608.12
Chapter 3. Urban Retail Water Suppliers	§10608.16-10608.44

Legislative Counsel's Digest

Senate Bill No. 7
Chapter 4

An act to amend and repeal Section 10631.5 of, to add Part 2.55 (commencing with Section 10608) to Division 6 of, and to repeal and add Part 2.8 (commencing with Section 10800) of Division 6 of, the Water Code, relating to water.

[Approved by Governor November 10, 2009. Filed with Secretary of State November 10, 2009.]

Legislative Counsel's Digest

SB 7, Steinberg. Water conservation.

(1) Existing law requires the Department of Water Resources to convene an independent technical panel to provide information to the department and the Legislature on new demand management measures, technologies, and approaches. "Demand management measures" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

This bill would require the state to achieve a 20% reduction in urban per capita water use in California by December 31, 2020. The state would be required to make incremental progress towards this goal by reducing per capita water use by at least 10% on or before December 31, 2015. The bill would require each urban retail water supplier to develop urban water use targets and an interim urban water use target, in accordance with specified requirements. The bill would require agricultural water suppliers to implement efficient water management practices. The bill would require the department, in consultation with other state agencies, to develop a single standardized water use reporting form. The bill, with certain exceptions, would provide that urban retail water suppliers, on and after July 1, 2016, and agricultural water suppliers, on and after July 1, 2013, are not eligible for state water grants or loans unless they comply with the water conservation requirements established by the bill. The bill would repeal, on July 1, 2016, an existing requirement that conditions

eligibility for certain water management grants or loans to an urban water supplier on the implementation of certain water demand management measures.

(2) Existing law, until January 1, 1993, and thereafter only as specified, requires certain agricultural water suppliers to prepare and adopt water management plans.

This bill would revise existing law relating to agricultural water management planning to require agricultural water suppliers to prepare and adopt agricultural water management plans with specified components on or before December 31, 2012, and update those plans on or before December 31, 2015, and on or before December 31 every 5 years thereafter. An agricultural water supplier that becomes an agricultural water supplier after December 31, 2012, would be required to prepare and adopt an agricultural water management plan within one year after becoming an agricultural water supplier. The agricultural water supplier would be required to notify each city or county within which the supplier provides water supplies with regard to the preparation or review of the plan. The bill would require the agricultural water supplier to submit copies of the plan to the department and other specified entities. The bill would provide that an agricultural water supplier is not eligible for state water grants or loans unless the supplier complies with the water management planning requirements established by the bill.

(3) The bill would take effect only if SB 1 and SB 6 of the 2009–10 7th Extraordinary Session of the Legislature are enacted and become effective.

The people of the State of California do enact as follows:

SECTION 1. Part 2.55 (commencing with Section 10608) is added to Division 6 of the Water Code, to read:

Part 2.55. Sustainable Water Use and Demand Reduction

Chapter 1. General Declarations and Policy

10608. The Legislature finds and declares all of the following:

(a) Water is a public resource that the California Constitution protects against waste and unreasonable use.

(b) Growing population, climate change, and the need to protect and grow California's economy while protecting and restoring our fish and wildlife habitats make it essential that the state manage its water resources as efficiently as possible.

(c) Diverse regional water supply portfolios will increase water supply reliability and reduce dependence on the Delta.

(d) Reduced water use through conservation provides significant energy and environmental benefits, and can help protect water quality, improve streamflows, and reduce greenhouse gas emissions.

(e) The success of state and local water conservation programs to increase efficiency of water use is best determined on the basis of measurable outcomes related to water use or efficiency.

(f) Improvements in technology and management practices offer the potential for increasing water efficiency in California over time, providing an essential water management tool to meet the need for water for urban, agricultural, and environmental uses.

(g) The Governor has called for a 20 percent per capita reduction in urban water use statewide by 2020.

(h) The factors used to formulate water use efficiency targets can vary significantly from location to location based on factors including weather, patterns of urban and suburban development, and past efforts to enhance water use efficiency.

(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.

10608.4. It is the intent of the Legislature, by the enactment of this part, to do all of the following:

(a) Require all water suppliers to increase the efficiency of use of this essential resource.

(b) Establish a framework to meet the state targets for urban water conservation identified in this part and called for by the Governor.

(c) Measure increased efficiency of urban water use on a per capita basis.

(d) Establish a method or methods for urban retail water suppliers to determine targets for achieving increased water use efficiency by the year 2020, in accordance with the Governor's goal of a 20-percent reduction.

(e) Establish consistent water use efficiency planning and implementation standards for urban water suppliers and agricultural water suppliers.

(f) Promote urban water conservation standards that are consistent with the California Urban Water Conservation Council's adopted best management practices and the requirements for demand management in Section 10631.

(g) Establish standards that recognize and provide credit to water suppliers that made substantial capital investments in urban water conservation since the drought of the early 1990s.

(h) Recognize and account for the investment of urban retail water suppliers in providing recycled water for beneficial uses.

(i) Require implementation of specified efficient water management practices for agricultural water suppliers.

(j) Support the economic productivity of California's agricultural, commercial, and industrial sectors.

(k) Advance regional water resources management.

10608.8.

(a) (1) Water use efficiency measures adopted and implemented pursuant to this part or Part 2.8 (commencing with Section 10800) are water conservation measures subject to the protections provided under Section 1011.

(2) Because an urban agency is not required to meet its urban water use target until 2020 pursuant to subdivision (b) of Section 10608.24, an urban retail water supplier's failure to meet those targets shall not establish a violation of law for purposes of any state administrative or judicial proceeding prior to January 1, 2021. Nothing in this paragraph limits the use of data reported to the department or the board in litigation or an administrative proceeding. This paragraph shall become inoperative on January 1, 2021.

(3) To the extent feasible, the department and the board shall provide for the use of water conservation reports required under this part to meet the requirements of Section 1011 for water conservation reporting.

(b) This part does not limit or otherwise affect the application of Chapter 3.5 (commencing with Section 11340), Chapter 4 (commencing with Section 11370), Chapter 4.5 (commencing with Section 11400), and Chapter 5 (commencing with Section 11500) of Part 1 of Division 3 of Title 2 of the Government Code.

(c) This part does not require a reduction in the total water used in the agricultural or urban sectors, because other factors, including, but not limited to, changes in agricultural economics or population growth may have greater effects on water

use. This part does not limit the economic productivity of California's agricultural, commercial, or industrial sectors.

(d) The requirements of this part do not apply to an agricultural water supplier that is a party to the Quantification Settlement Agreement, as defined in subdivision (a) of Section 1 of Chapter 617 of the Statutes of 2002, during the period within which the Quantification Settlement Agreement remains in effect. After the expiration of the Quantification Settlement Agreement, to the extent conservation water projects implemented as part of the Quantification Settlement Agreement remain in effect, the conserved water created as part of those projects shall be credited against the obligations of the agricultural water supplier pursuant to this part.

Chapter 2. Definitions

10608.12. Unless the context otherwise requires, the following definitions govern the construction of this part:

(a) "Agricultural water supplier" means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water. "Agricultural water supplier" includes a supplier or contractor for water, regardless of the basis of right, that distributes or sells water for ultimate resale to customers. "Agricultural water supplier" does not include the department.

(b) "Base daily per capita water use" means any of the following:

(1) The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(2) For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier, the urban retail water supplier may extend the calculation described in paragraph (1) up to an additional five years to a maximum of a continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(3) For the purposes of Section 10608.22, the urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.

(c) "Baseline commercial, industrial, and institutional water use" means an urban retail water supplier's base daily per capita water use for commercial, industrial, and institutional users.

(d) "Commercial water user" means a water user that provides or distributes a product or service.

(e) "Compliance daily per capita water use" means the gross water use during the final year of the reporting period, reported in gallons per capita per day.

(f) "Disadvantaged community" means a community with an annual median household income that is less than 80 percent of the statewide annual median household income.

(g) "Gross water use" means the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

(1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier.

(2) The net volume of water that the urban retail water supplier places into long-term storage.

(3) The volume of water the urban retail water supplier conveys for use by another urban water supplier.

(4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24.

(h) "Industrial water user" means a water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.

(i) "Institutional water user" means a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.

(j) "Interim urban water use target" means the midpoint between the urban retail water supplier's base daily per capita water use and the urban retail water supplier's urban water use target for 2020.

(k) "Locally cost effective" means that the present value of the local benefits of implementing an agricultural efficiency water management practice is greater than or equal to the present value of the local cost of implementing that measure.

(l) "Process water" means water used for producing a product or product content or water used for research and development, including, but not limited to, continuous manufacturing processes, water used for testing and maintaining equipment used in producing a product or product content, and water used in combined heat and power facilities used in producing a product or product content. Process water does not mean incidental water uses not related to the production of a product or product content, including, but not limited to, water used for restrooms, landscaping, air conditioning, heating, kitchens, and laundry.

(m) "Recycled water" means recycled water, as defined in subdivision (n) of Section 13050, that is used to offset potable demand, including recycled water supplied for direct use and indirect potable reuse, that meets the following requirements, where applicable:

(1) For groundwater recharge, including recharge through spreading basins, water supplies that are all of the following:

(A) Metered.

(B) Developed through planned investment by the urban water supplier or a wastewater treatment agency.

(C) Treated to a minimum tertiary level.

(D) Delivered within the service area of an urban retail water supplier or its urban wholesale water supplier that helps an urban retail water supplier meet its urban water use target.

(2) For reservoir augmentation, water supplies that meet the criteria of paragraph (1) and are conveyed through a distribution system constructed specifically for recycled water.

(n) "Regional water resources management" means sources of supply resulting from watershed-based planning for sustainable local water reliability or any of the following alternative sources of water:

(1) The capture and reuse of stormwater or rainwater.

(2) The use of recycled water.

(3) The desalination of brackish groundwater.

(4) The conjunctive use of surface water and groundwater in a manner that is consistent with the safe yield of the groundwater basin.

(o) "Reporting period" means the years for which an urban retail water supplier reports compliance with the urban water use targets.

(p) "Urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

(q) "Urban water use target" means the urban retail water supplier's targeted future daily per capita water use.

(r) "Urban wholesale water supplier," means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes.

Chapter 3. Urban Retail Water Suppliers

10608.16.

(a) The state shall achieve a 20-percent reduction in urban per capita water use in California on or before December 31, 2020.

(b) The state shall make incremental progress towards the state target specified in subdivision (a) by reducing urban per capita water use by at least 10 percent on or before December 31, 2015.

10608.20.

(a) (1) Each urban retail water supplier shall develop urban water use targets and an interim urban water use target by July 1, 2011. Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28, and may determine the targets on a fiscal year or calendar year basis.

(2) It is the intent of the Legislature that the urban water use targets described in subdivision (a) cumulatively result in a 20-percent reduction from the baseline daily per capita water use by December 31, 2020.

(b) An urban retail water supplier shall adopt one of the following methods for determining its urban water use target pursuant to subdivision (a):

(1) Eighty percent of the urban retail water supplier's baseline per capita daily water use.

(2) The per capita daily water use that is estimated using the sum of the following performance standards:

(A) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department's 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.

(B) For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 (commencing with Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992. An urban retail water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas.

(C) For commercial, industrial, and institutional uses, a 10-percent reduction in water use from the baseline commercial, industrial, and institutional water use by 2020.

(3) Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009). If the service area of an urban water supplier includes more than one hydrologic region, the supplier shall apportion its service area to each region based on population or area.

(4) A method that shall be identified and developed by the department, through a public process, and reported to the Legislature no later than December 31, 2010. The method developed by the department shall identify per capita targets that cumulatively result in a statewide 20-percent reduction in urban daily per capita water use by December 31, 2020. In developing urban daily per capita water use targets, the department shall do all of the following:

(A) Consider climatic differences within the state.

(B) Consider population density differences within the state.

(C) Provide flexibility to communities and regions in meeting the targets.

(D) Consider different levels of per capita water use according to plant water needs in different regions.

(E) Consider different levels of commercial, industrial, and institutional water use in different regions of the state.

(F) Avoid placing an undue hardship on communities that have implemented conservation measures or taken actions to keep per capita water use low.

(c) If the department adopts a regulation pursuant to paragraph (4) of subdivision (b) that results in a requirement that an urban retail water supplier achieve a reduction in daily per capita water use that is greater than 20 percent by December 31, 2020, an urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may limit its urban water use target to a reduction of not more than 20 percent by December 31, 2020, by adopting the method described in paragraph (1) of subdivision (b).

(d) The department shall update the method described in paragraph (4) of subdivision (b) and report to the Legislature by December 31, 2014. An urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may adopt a new urban daily per capita water use target pursuant to this updated method.

(e) An urban retail water supplier shall include in its urban water management plan required pursuant to Part 2.6 (commencing with Section 10610) 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.

(f) When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections.

(g) An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan required pursuant to Part 2.6 (commencing with Section 10610).

(h) (1) The department, through a public process and in consultation with the California Urban Water Conservation Council, shall develop technical methodologies and criteria for the consistent implementation of this part, including, but not limited to, both of the following:

(A) Methodologies for calculating base daily per capita water use, baseline commercial, industrial, and institutional water use, compliance daily per capita water use, gross water use, service area population, indoor residential water use, and landscaped area water use.

(B) Criteria for adjustments pursuant to subdivisions (d) and (e) of Section 10608.24.

(2) The department shall post the methodologies and criteria developed pursuant to this subdivision on its Internet Web site, and make written copies

available, by October 1, 2010. An urban retail water supplier shall use the methods developed by the department in compliance with this part.

(i) (1) The department shall adopt regulations for implementation of the provisions relating to process water in accordance with subdivision (l) of Section 10608.12, subdivision (e) of Section 10608.24, and subdivision (d) of Section 10608.26.

(2) The initial adoption of a regulation authorized by this subdivision is deemed to address an emergency, for purposes of Sections 11346.1 and 11349.6 of the Government Code, and the department is hereby exempted for that purpose from the requirements of subdivision (b) of Section 11346.1 of the Government Code. After the initial adoption of an emergency regulation pursuant to this subdivision, the department shall not request approval from the Office of Administrative Law to readopt the regulation as an emergency regulation pursuant to Section 11346.1 of the Government Code.

(j) An urban retail water supplier shall be granted an extension to July 1, 2011, for adoption of an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) due in 2010 to allow use of technical methodologies developed by the department pursuant to paragraph (4) of subdivision (b) and subdivision (h). An urban retail water supplier that adopts an urban water management plan due in 2010 that does not use the methodologies developed by the department pursuant to subdivision (h) shall amend the plan by July 1, 2011, to comply with this part.

10608.22. Notwithstanding the method adopted by an urban retail water supplier pursuant to Section 10608.20, an urban retail water supplier's per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use as defined in paragraph (3) of subdivision (b) of Section 10608.12. This section does not apply to an urban retail water supplier with a base daily per capita water use at or below 100 gallons per capita per day.

10608.24.

(a) Each urban retail water supplier shall meet its interim urban water use target by December 31, 2015.

(b) Each urban retail water supplier shall meet its urban water use target by December 31, 2020.

(c) An urban retail water supplier's compliance daily per capita water use shall be the measure of progress toward achievement of its urban water use target.

(d) (1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors:

(A) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.

(B) Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period.

(C) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.

(2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40.

(e) When developing the urban water use target pursuant to Section 10608.20, an urban retail water supplier that has a substantial percentage of industrial water use in its service area, may exclude process water from the calculation of gross water use to avoid a disproportionate burden on another customer sector.

(f) (1) An urban retail water supplier that includes agricultural water use in an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) may include the agricultural water use in determining gross water use. An urban retail water supplier that includes agricultural water use in determining gross water use and develops its urban water use target pursuant to paragraph (2) of subdivision (b) of Section 10608.20 shall use a water efficient standard for agricultural irrigation of 100 percent of reference evapotranspiration multiplied by the crop coefficient for irrigated acres.

(2) An urban retail water supplier, that is also an agricultural water supplier, is not subject to the requirements of Chapter 4 (commencing with Section 10608.48), if the agricultural water use is incorporated into its urban water use target pursuant to paragraph (1).

10608.26.

(a) In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following:

(1) Allow community input regarding the urban retail water supplier's implementation plan for complying with this part.

(2) Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part.

(3) Adopt a method, pursuant to subdivision (b) of Section 10608.20, for determining its urban water use target.

(b) In complying with this part, an urban retail water supplier may meet its urban water use target through efficiency improvements in any combination among its customer sectors. An urban retail water supplier shall avoid placing a disproportionate burden on any customer sector.

(c) For an urban retail water supplier that supplies water to a United States Department of Defense military installation, the urban retail water supplier's implementation plan for complying with this part shall consider the United States Department of Defense military installation's requirements under federal Executive Order 13423.

(d) (1) Any ordinance or resolution adopted by an urban retail water supplier after the effective date of this section shall not require existing customers as of the effective date of this section, to undertake changes in product formulation, operations, or equipment that would reduce process water use, but may provide technical assistance and financial incentives to those customers to implement efficiency measures for process water. This section shall not limit an ordinance or resolution adopted pursuant to a declaration of drought emergency by an urban retail water supplier.

(2) This part shall not be construed or enforced so as to interfere with the requirements of Chapter 4 (commencing with Section 113980) to Chapter 13 (commencing with Section 114380), inclusive, of Part 7 of Division 104 of the Health and Safety Code, or any requirement or standard for the protection of public health, public safety, or worker safety established by federal, state, or local government or recommended by recognized standard setting organizations or trade associations.

10608.28.

(a) An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:

(1) Through an urban wholesale water supplier.

(2) Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 (commencing with Section 81300)).

(3) Through a regional water management group as defined in Section 10537.

(4) By an integrated regional water management funding area.

(5) By hydrologic region.

(6) Through other appropriate geographic scales for which computation methods have been developed by the department.

(b) A regional water management group, with the written consent of its member agencies, may undertake any or all planning, reporting, and implementation functions under this chapter for the member agencies that consent to those activities. Any data or reports shall provide information both for the regional water management group and separately for each consenting urban retail water supplier and urban wholesale water supplier.

10608.32. All costs incurred pursuant to this part by a water utility regulated by the Public Utilities Commission may be recoverable in rates subject to review and approval by the Public Utilities Commission, and may be recorded in a memorandum account and reviewed for reasonableness by the Public Utilities Commission.

10608.36. Urban wholesale water suppliers shall include in the urban water management plans required pursuant to Part 2.6 (commencing with Section 10610) an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part.

10608.40. Urban water retail suppliers shall report to the department on their progress in meeting their urban water use targets as part of their urban water management plans submitted pursuant to Section 10631. The data shall be reported using a standardized form developed pursuant to Section 10608.52.

10608.42. The department shall review the 2015 urban water management plans and report to the Legislature by December 31, 2016, on progress towards achieving a 20-percent reduction in urban water use by December 31, 2020. The report shall include recommendations on changes to water efficiency standards or urban water use targets in order to achieve the 20-percent reduction and to reflect updated efficiency information and technology changes.

10608.43. The department, in conjunction with the California Urban Water Conservation Council, by April 1, 2010, shall convene a representative task force consisting of academic experts, urban retail water suppliers, environmental organizations, commercial water users, industrial water users, and institutional water users to develop alternative best management practices for commercial, industrial, and institutional users and an assessment of the potential statewide water use efficiency improvement in the commercial, industrial, and institutional sectors that would result from implementation of these best management practices. The taskforce, in conjunction with the department, shall submit a report to the Legislature by April 1, 2012, that shall include a review of multiple sectors within commercial, industrial, and institutional users and that shall recommend water use efficiency standards for

commercial, industrial, and institutional users among various sectors of water use. The report shall include, but not be limited to, the following:

(a) Appropriate metrics for evaluating commercial, industrial, and institutional water use.

(b) Evaluation of water demands for manufacturing processes, goods, and cooling.

(c) Evaluation of public infrastructure necessary for delivery of recycled water to the commercial, industrial, and institutional sectors.

(d) Evaluation of institutional and economic barriers to increased recycled water use within the commercial, industrial, and institutional sectors.

(e) Identification of technical feasibility and cost of the best management practices to achieve more efficient water use statewide in the commercial, industrial, and institutional sectors that is consistent with the public interest and reflects past investments in water use efficiency.

10608.44. Each state agency shall reduce water use on facilities it operates to support urban retail water suppliers in meeting the target identified in Section 10608.16.

Appendix B
Adoption Resolution and Related Documentation

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NOTICE INVITING BIDS

The City of Whittier will accept sealed bids for the project, CARBON REPLACEMENT WHITTIER NARROWS OPERABLE UNIT, until Thursday, July 28, 2011, at 11:00 a.m. A mandatory pre-bid meeting is scheduled for Tuesday, July 12, 2011 at 10:30 a.m. at 330 N. Durfee, South El Monte, CA 91732. Plans and Specifications are available from the City Clerk's Office at City Hall, 13230 Penn Street, Whittier, California, 90602. The non-refundable cost is $10.00 per set plus $5.00 for mailing, if applicable.

For specific information on the project, please contact the Public Works Department, Monday through Friday from 7:00 a.m. to 12:00 noon or 1:00 p.m. to 4:00 p.m. at (562) 567-9545.

Publish: Friday, July 1, 8, 2011
Whittier Daily News Ad#59724

NOTICE OF TRUSTEE'S SALE Trustee Sale No. 11CA00564-1 Order No. 110158765 APN: 6372-016-013 YOU ARE IN DEFAULT UNDER A DEED OF TRUST DATED 09/07/2006. UNLESS YOU TAKE ACTION TO PROTECT YOUR PROPERTY, IT MAY BE SOLD AT A PUBLIC SALE. IF YOU NEED AN EXPLANATION OF THE NATURE OF THE PROCEEDINGS AGAINST YOU, YOU SHOULD CONTACT A LAWYER. On July 21, 2011 at 01:00 PM, RSM&A Foreclosure Services, as the duly appointed Trustee under and pursuant to Deed of Trust Recorded September 14, 2006 as Document Number: 06 2045040 of official records in the Office of the Recorder of Los Angeles County, California, executed by: SYLVIA ANN IMPERIAL, A SINGLE WOMAN, as Trustor, Mortgage Electronic Registration Systems, Inc., as nominee for Mortgagelt, Inc, as Beneficiary, WILL SELL AT PUBLIC AUCTION TO THE HIGHEST BIDDER FOR CASH (payable at time of sale in lawful money of the United States, by cash, a cashier's check drawn by a state or national bank, a check drawn by a state or federal credit union, or a check drawn by a state or federal savings and loan association, savings association, or savings bank specified in section 5102 of the Financial Code

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NOTICE OF PUBLIC HEARING

NOTICE IS HEREBY GIVEN that the Board of Directors of Pico Water District will hold a public hearing on the draft of the Pico Water District 2010 Urban Water Management Plan (the "Plan").

NOTICE IS HEREBY FURTHER GIVEN that said public hearing will be held on the 20th day of July 2011, at the hour of 6:00 PM at the Pico Water District office, 4843 Church St., Pico Rivera, California, at which time and place any and all persons interested may appear and be heard thereon. After conclusion of the hearing, the District's Board of Directors will consider adopting the Plan. If you would like to review the Plan, a copy is available at the Pico Water District office. For information call Mark Grajeda at (562) 692-3756.

Mark Grajeda, General Manager
Pico Water District

Publish: July 8, 2011
Whittier Daily News Ad#170416

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Trustee Sale No. 812-060182 Loan No. 9042437897 Title Order No. 5076658 NOTICE OF TRUSTEE'S SALE YOU ARE IN DEFAULT UNDER A DEED OF TRUST DATED 12-11-2006. UNLESS YOU TAKE ACTION TO PROTECT YOUR PROPERTY, IT MAY BE SOLD AT A PUBLIC SALE. IF YOU NEED AN EXPLANATION OF THE NATURE OF THE PROCEEDINGS AGAINST YOU, YOU SHOULD CONTACT A LAWYER. On 07-29-2011 at 10:30 AM, PLM LENDER SERVICES, INC. as the duly appointed Trustee under and pursuant to Deed of Trust Recorded 12-21-2006, Book , Page , Instrument 20062841681 of official records in the Office of the Recorder of LOS ANGELES County, California, executed by: HAROLD E FORTNER, JR, AN UNMARRIED MAN, as Trustor, DOWNEY SAVINGS AND LOAN ASSOCIATION, F.A., as Beneficiary, will sell at public auction the trustor's interest in the property described below, to the highest bidder for cash, cashier's check drawn by a state or national bank, a cashier's check drawn by

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T.S. No.: 2010-07534 Loan No.: 31874597

NOTICE OF TRUSTEE'S SALE

YOU ARE IN DEFAULT UNDER A DEED OF TRUST DATED 11/14/2002. UNLESS YOU TAKE ACTION TO PROTECT YOUR PROPERTY, IT MAY BE SOLD AT A PUBLIC SALE. IF YOU NEED AN EXPLANATION OF THE NATURE OF THE PROCEEDING AGAINST YOU, YOU SHOULD CONTACT A LAWYER.

A public auction sale to the highest bidder for cash, cashier's check drawn on a state or national bank, check drawn by a state or federal credit union, or a check drawn by a state or federal savings and loan association, or savings association, or savings bank specified in Section 5102 of the Financial Code and authorized to do business in this state will be held by the duly appointed trustee as shown below, of all right, title, and interest conveyed to and now held by the trustee in the hereinafter described property under and pursuant to a Deed of Trust described below. The sale will be made, but without covenant or warranty, expressed or implied, regarding title, possession, or encumbrances, to pay the remaining principal sum of the note(s) secured by the Deed of Trust, with interest and late charges thereon, as provided in the note(s), advances, under the terms of the Deed of Trust, interest thereon, fees, charges and expenses of the Trustee for the total amount (at the time of the initial publication of the Notice of Sale) reasonably estimated to be set forth below. The amount may be greater on the day of sale.

Trustor: CARMEN VASQUEZ, A SINGLE WOMAN
Duly Appointed Trustee: Western Progressive, LLC
Recorded 11/20/2002 as Instrument No. 02 2801201 in book ---, page --- and rerecorded on --- as --- of Official Records in the office of the Recorder of Los Angeles County, California,
Date of Sale: 7/28/2011 at 9:30 AM
Place of Sale:
At the West Side of the Los Angeles County Courthouse, Directly facing Norwalk Boulevard, 12720 Norwalk BLVD, Norwalk, CA
Amount of unpaid balance and other

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Trustee Sale No. 249414CA Loan No. 0023479504 Title Order No. 773382 NOTICE OF TRUSTEE'S SALE YOU ARE IN DEFAULT UNDER A DEED OF TRUST DATED 05-25-2006. UNLESS YOU TAKE ACTION TO PROTECT YOUR PROPERTY, IT MAY BE SOLD AT A PUBLIC SALE. IF YOU NEED AN EXPLANATION OF THE NATURE OF THE PROCEEDINGS AGAINST YOU, YOU SHOULD CONTACT A LAWYER. On 07-29-2011 at 10:30 AM, CALIFORNIA RECONVEYANCE COMPANY as the duly appointed Trustee under and pursuant to Deed of Trust Recorded 06-07-2006, Book N/A, Page N/A, Instrument 06 1249692, of official records in the Office of the Recorder of LOS ANGELES County, California, executed by: SALVADOR SALAS, A SINGLE MAN, as Trustor, MORTGAGE ELECTRONIC REGISTRATION SYSTEMS, INC., (MERS), SOLELY AS NOMINEE FOR LENDER, RESMAE MORTGAGE CORPORATION, IT'S SUCCESSORS AND ASSIGNS., as Beneficiary, will sell at public auction sale to the highest bidder for cash, cashier's check drawn by a state or national bank, a cashier's check drawn by a state or federal credit union, or a cashier's check drawn by a state or federal savings and loan association, savings association, or savings bank specified in section 5102 of the Financial Code and authorized to do business in this state. Sale will be held by the duly appointed trustee as shown below, of all right, title, and interest conveyed to and now held by the trustee in the hereinafter described property under and pursuant to the Deed of Trust. The sale will be made, but without covenant or warranty, expressed or implied, regarding title, possession, or encumbrances, to pay the remaining principal sum of the note(s) secured by the Deed of Trust, interest thereon, estimated fees, charges and expenses of the Trustee for the total amount (at the time of the initial publication of the Notice of Sale) reasonably estimated to be set forth below. The amount may be greater on the day of sale. Place of Sale: THE FRONT ENTRANCE TO THE POMONA SUPERIOR COURTS BUILDING, 350 W. MISSION BOULEVARD, POMONA, CA Legal Description: As more fully described in said Deed of

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NOTICE OF PUBLIC HEARING
BEFORE THE PLANNING
COMMISSION
OF THE CITY OF ROSEMEAD
ON JULY 18, 2011

NOTICE IS HEREBY GIVEN that the Rosemead Planning Commission will conduct a public hearing on Monday, July 18, 2011 at 7:00 P.M., at Rosemead City Hall, 8838 East Valley Boulevard, Rosemead:

CASE NO.: TENTATIVE PARCEL MAP 070753 - Charles Tran & Duc Tran have submitted an application for a Tentative Parcel Map to subdivide one existing 19,920 square foot lot into three (3) parcels. The existing house on the property would remain and the subdivision would allow for the construction of two additional single family residential units in the future. The subject site is located at 8929 Emerson Place in the R-1 (Single-Family Residential) zone.

ENVIRONMENTAL DETERMINATION:
Section 15315 of the California Environmental Quality Act (CEQA) guidelines exempt projects that consist of minor land division of property in urbanized areas zoned for residential, commercial, or industrial use into four or fewer parcels when the division is in conformance with the General Plan and zoning, no variances or exceptions are required, all services and access to the proposed parcels to local standards are available, the parcel was not involved in a division of a larger parcel within the previous two (2) years, and the parcel does not have an average slope greater than 20 percent. Tentative Parcel Map 070753 meets the foregoing guidelines and, accordingly, is classified as a Class 15 Categorical Exemption pursuant to Section 15315 of the CEQA guidelines. If you have any comments, please submit them before July 18, 2011. All comments should be in writing and should be sent to: Planning Division, 8838 E. Valley Boulevard, Rosemead, CA 91770, Attention: Paul Garry, Senior Planner.

Pursuant to Government Code Section 65009 (b), if this matter is

OFFICERS
ADRIAN L. DIAZ, PRESIDENT
RICK L. MERCADO, SR., VICE PRESIDENT
MARK J. GRAJEDA, GEN. MGR. / SECRETARY

Pico Water District

P.O. BOX 758 4843 CHURCH ST.
PICO RIVERA, CALIFORNIA 90660
TEL: (562) 692-3756 FAX: (562) 695-5627
www.picowaterdistrict.net

DIRECTORS
ADRIAN L. DIAZ
RICK L. MERCADO, SR.
ROBERT A. MARTINEZ
VICTOR CABALLERO
JAMES B. ROYBAL

May 17, 2011

Mr. James Knowles
Los Angeles County Dept of Regional Planning
13523 Telegraph Road
Whittier, California, 90605

Subject: 2010 Urban Water Management Plan

Dear Mr. Knowles:

Pico Water District wishes to inform you that we are in the process of reviewing and revising our Urban Water Management Plan. We are informing you of this revision because we serve water within the City of Pico Rivera located in Los Angeles County.

The revised Urban Water Management Plan is required to be adopted by July 1, 2011, and to be submitted to the Department of Water Resources by August 1, 2011. We will be holding a public hearing on the draft revision of the Urban Water Management Plan on July 20, 2011, with adoption of the plan to be scheduled following the close of the public hearing.

We welcome your participation in the revision of Pico Water District's Urban Water Management Plan. Please contact me if you should have any questions.

Sincerely,

M. J. Grajeda

Mark Grajeda
General Manager

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JAMES B. ROYBAL

May 17, 2011

Mr. Ron Bates, City Manager
City of Pico Rivera
6615 Passons Boulevard
Pico Rivera, CA 90660

Subject: 2010 Urban Water Management Plan

Dear Mr. Bates:

Pico Water District wishes to inform you that we are in the process of reviewing and revising our Urban Water Management Plan. We are informing you of this revision because we serve water within the City of Pico Rivera located in Los Angeles County.

The revised Urban Water Management Plan is required to be adopted by July 1, 2011, and to be submitted to the Department of Water Resources by August 1, 2011. We will be holding a public hearing on the draft revision of the Urban Water Management Plan on July 20, 2011, with adoption of the plan to be scheduled following the close of the public hearing.

We welcome your participation in the revision of Pico Water District's Urban Water Management Plan. Please contact me if you should have any questions.

Sincerely,

Mark Grajeda
General Manager

Appendix C
Groundwater Bulletin 118, Central Basin 4-11.04 Description

Coastal Plain of Los Angeles Groundwater Basin, Central Subbasin

- Groundwater Basin Number: 4-11.04
- County: Los Angeles
- Surface Area: 177,000 acres (277 square miles)

Basin Boundaries and Hydrology

The Central Subbasin occupies a large portion of the southeastern part of the Coastal Plain of Los Angeles Groundwater Basin. This subbasin is commonly referred to as the "Central Basin" and is bounded on the north by a surface divide called the La Brea high, and on the northeast and east by emergent less permeable Tertiary rocks of the Elysian, Repetto, Merced and Puente Hills. The southeast boundary between Central Basin and Orange County Groundwater Basin roughly follows Coyote Creek, which is a regional drainage province boundary. The southwest boundary is formed by the Newport Inglewood fault system and the associated folded rocks of the Newport Inglewood uplift. The Los Angeles and San Gabriel Rivers drain inland basins and pass across the surface of the Central Basin on their way to the Pacific Ocean. Average precipitation throughout the subbasin ranges from 11 to 13 inches with an average of around 12 inches.

Hydrogeologic Information

Water Bearing Formations

Throughout the Central Basin, groundwater occurs in Holocene and Pleistocene age sediments at relatively shallow depths. The Central Basin is historically divided into forebay and pressure areas. The Los Angeles forebay is located in the northern part of the Central Basin where the Los Angeles River enters the Central Basin through the Los Angeles Narrows from the San Fernando Groundwater Basin. The Montebello forebay extends southward from the Whittier Narrows where the San Gabriel River encounters the Central Basin and is the most important area of recharge in the subbasin. Both forebays have unconfined groundwater conditions and relatively interconnected aquifers that extend up to 1,600 feet deep to provide recharge to the aquifer system of this subbasin (DWR 1961). The Whittier area extends from the Puente Hills south and southwest to the axis of the Santa Fe Springs-Coyote Hills uplift and contains up to 1,000 feet of freshwater-bearing sediments. The Central Basin pressure area is the largest of the four divisions, and contains many aquifers of permeable sands and gravels separated by semi-permeable to impermeable sandy clay to clay, that extend to about 2,200 feet below the surface (DWR 1961). The estimated average specific yield of these sediments is around 18 percent. Throughout much of the subbasin, the aquifers are confined, but areas with semi-permeable aquicludes allow some interaction between the aquifers (DWR 1961).

The main productive freshwater-bearing sediments are contained within Holocene alluvium and the Pleistocene Lakewood and San Pedro Formations (DWR 1961). Throughout most of the subbasin, the near surface Bellflower aquiclude restricts vertical percolation into the Holocene age Gaspur aquifer and other underlying aquifers, and creates local semi-perched groundwater

conditions. The main additional productive aquifers in the subbasin are the Gardena and Gage aquifers within the Lakewood Formation and the Silverado, Lynwood and Sunnyside aquifers within the San Pedro Formation (DWR 1961). Specific yield of deposits in this subbasin range up to 23 percent in the Montebello forebay, 29 percent in the Los Angeles forebay, and 37 percent in the Central Basin pressure area (DWR 1961). Historically, groundwater flow in the Central Basin has been from recharge areas in the northeast part of the subbasin, toward the Pacific Ocean on the southwest. However, pumping has lowered the water level in the Central Basin and water levels in some aquifers are about equal on both sides of the Newport-Inglewood uplift, decreasing subsurface outflow to the West Coast Subbasin (DWR 1961).

There are several principal aquifers/aquicludes present in this subbasin.

Aquifers/ Aquiclude	Age	Formation	Lithology	Maximum Thickness (feet)
Gaspur	Holocene		Coarse sand, gravel	120
Semiperched	Holocene		Sand, gravel	60
Bellflower	Pleistocene	Lakewood Formation	Clay, sandy clay	140
Gardena	Pleistocene	Lakewood Formation	Sand, gravel	160
Gage			Sand	120
Silverado	Lower Pleistocene	San Pedro Formation	Sandy gravel	300
Lynwood			Coarse sand and gravel	150
Sunnyside				350

Restrictive Structures

Many faults, folds and uplifted basement areas affect the water-bearing rocks in the Central Basin. Most of these structures form minor restrictions to groundwater flow in the subbasin. The strongest effect on groundwater occurs along the southwest boundary to the Central Subbasin. The faults and folds of the Newport – Inglewood uplift are partial barriers to movement of groundwater from the Central Basin to the West Coast Basin (DWR 1961). The La Brea high is a system of folded, uplifted and eroded Tertiary basement rocks. Because the San Pedro Formation is eroded from this area, subsurface flow southward from the Hollywood Basin is restricted to the Lakewood formation (DWR 1961). The Whittier Narrows is an eroded gap through the Merced and Puente Hills that provides both surface and subsurface inflow to the Central Basin (DWR 1961). The Rio Hondo, Pico, and Cemetery faults are northeast-trending faults that project into the gap and displace aquifers. The trend of these faults parallels the local groundwater flow and do not act as significant barriers to groundwater flow (DWR 1961).

Recharge Areas

Groundwater enters the Central Basin through surface and subsurface flow and by direct percolation of precipitation, stream flow, and applied water; and replenishes the aquifers dominantly in the forebay areas where permeable sediments are exposed at ground surface (DWR 1961). Natural replenishment of the subbasin's groundwater supply is largely from surface inflow through Whittier Narrows (and some underflow) from the San Gabriel Valley. Percolation into the Los Angeles Forebay Area is restricted due to paving and development of the surface of the forebay. Imported water purchased from Metropolitan Water District and recycled water from Whittier and San Jose Treatment Plants are used for artificial recharge in the Montebello Forebay at the Rio Hondo and San Gabriel River spreading grounds (DWR 1999). Saltwater intrusion is a problem in areas where recent or active river systems have eroded through the Newport Inglewood uplift. A mound of water to form a barrier is formed by injection of water in wells along the Alamitos Gap (DWR 1999).

Groundwater Level Trends

Water levels varied over a range of about 25 feet between 1961 and 1977 and have varied through a range of about 5 to 10 feet since 1996. Most water wells show levels in 1999 that are in the upper portion of their recent historical range.

Groundwater Storage

Groundwater Storage Capacity. Total storage capacity of the Central Basin is 13,800,000 (DWR 1961).

Groundwater in Storage.

Groundwater Budget (Type A)

A complete water budget could not be constructed due to the lack of data available. Recharge to the subbasin is accomplished through both natural and artificial recharge. The Watermaster reported natural recharge for the subbasin to be 31,950 af and artificial recharge to be 63,688 af for 1998 (DWR 1999). Additionally, the subbasin receives 27,000 af/yr of water through the Whittier Narrows from the San Gabriel Valley Basin in the form of subsurface flow (SWRB 1952). Urban extractions for the subbasin were 204,335 af in 1998 (DWR 1999).

Groundwater Quality

Characterization. TDS content in the subbasin ranges from 200 to 2,500 mg/l according to data from 293 public supply wells. The average for these 293 wells is 453 mg/l.

I

Impairments.

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	316	15
Radiological	315	1
Nitrates	315	2
Pesticides	322	0
VOCs and SVOCs	344	43
Inorganics – Secondary	316	113

[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 Production characteristics

	Well yields (gal/min)
Municipal/Irrigation	
	Total depths (ft)
Domestic	
Municipal/Irrigation	

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
USGS	Groundwater levels	90
DWR	Groundwater levels	87
Los Angeles County Public Works	Groundwater levels	212 / Bi-monthly
USGS	Miscellaneous water quality	64
Department of Health Services and cooperators	Title 22 water quality	294

Basin Management

Groundwater management:	Central Basin was adjudicated in 1965, and the Department of Water Resources was appointed Watermaster. Every month extractions are reported to the Watermaster by each individual pumper. This allows the Watermaster to regulate the water rights of the subbasin. (DWR 1999)
Water agencies	
Public	City of Bellflower, Bellflower-Somerset MWC, City of Compton, City of Huntington Park, City of Long Beach, City of Los Angeles DWP, City of Montebello, City of Paramount, City of Pico Rivera, City of Santa Fe Springs, Sativa LA County WD, City of Signal Hill, South Montebello ID, City of South Gate, City of Vernon, City of Whittier. (DWR 1999)
Private	California-American Water Company, Montebello Land and Water Company, Bellflower Home Garden Water Co., California Water Service, Lynwood Park MWC, Maywood MWC, Park Water Company, Pearless Water Company, San Gabriel Valley Water Company, Southern California Water Company, Tract No. 180 Water Company, Tract 349 MWC, Western Water Company.(DWR 1999)

References Cited

California Department of Water Resources (DWR). 1961. Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County. Bulletin No. 104.

____, Southern District. 1999. Watermaster Service in the Central Basin, Los Angeles County, July 1, 1998 – June 30, 1999.

California State Water Resources Board (SWRB). 1952. Central Basin Investigation. Bulletin No. 8.

Additional References

United States Geological Survey (USGS). 2000. *Analysis of the Geohydrology and Water-management Issues of the Central and West Basins, Los Angeles County, California.* Internet Web Site: http://water.wr.usgs.gov/projects00/ca512.html.

Water Replenishment District of Southern California. 2000. *Annual Report on Results of Water Quality Monitoring Water Year 1998-1999.*

____. 2000. *Engineering Survey and Report.*

Errata

Changes made to the basin description will be noted here.

Appendix D
Water Shortage Contingency Plan District Resolution 56C-R; Wasteful Use of Water District Resolution 56B-R; Water Conservation Measures District Resolution 130-R

BOARD VOTED
ON 2/3/92

PICO WATER DISTRICT

WATER SHORTAGE CONTINGENCY PLAN

AB-11

Section 1. Coordinated Planning

CALIFORNIA WATER CODE SECTION 10620. (d) (2), Each urban water supplier shall coordinate the preparation of its water shortage contingency plan with other urban water suppliers and public agencies in the area, to the extent practicable.

Pico Water District presently relies on the underground basin known as the Central Basin as its only source of supply for providing Domestic Water to the Consumers. The Underground Supply lies within the confines of an adjudicated Basin and is regulated by a WaterMaster. The Basin is recharged by natural run-off from the San Gabriel Mountains and through Artificial Recharge supervised by the Water Replenishment District of Southern California, this Agency also has the day to day responsibility of the Underground Basin Management. Pico Water District is limited as to the amount of water which it may extract from the Basin. The amount of water allocated to Pico Water District is three thousand six hundred twenty four (3624) acre feet per year. This amount is subject to adjustment in the event the WaterMaster determines that there is insufficient supply in the groundwater Basin for all extractors to extract their full allotted amount of the adjudicated rights.

Pico Water District is formed under California State Laws regulating the formation of County Water Districts. The District formed in response to the increasing residential demand for Domestic Water in what had been a predominately Agricultural area. The predecessors of Pico Water District were the Cate Ditch Company and the Standifer Ditch Company.

Pico Water District is notified of water shortage when there is a lack of adequate supplies from both the natural run-off and the artificial recharge program supervised by the Water Replenishment District of Southern California, or when the WaterMaster determines that there is insufficient supply. All of the other agencies which extract water from and are dependent on the underground supply are also notified of the reduced amount of water available.

At present there are plans for the implementation of a reclaimed water program for high volume irrigation water users within the District. The Central Basin Municipal Water District is the lead agency in the program to furnish the reclaimed water to Pico Water District and other agencies within its jurisdiction. It is anticipated that an amount equal to five hundred (500) acre feet will ultimately be available for this purpose. The initial proposal, which is planned to be available during Calendar year 1993, will provide three hundred (300) acre feet of reclaimed water.

The issue of depleted water supplies has been discussed amongst responsible agencies in Central Basin on numerous occasions.

Pico Water District is preparing a Resolution requesting that the City of Pico Rivera Building Department inform the District about all current Building Permit Applications which would impact the Water Usage within the District.

Section 2 Past, Current and Projected Water Use (1991-1994)

CALIFORNIA WATER CODE SECTION 10631. (e) (1) Past, Current and projected water use and to the extent records are available, a break down of those uses on the basis of residential single family, residential multifamily, industrial, commercial, government and agricultural use.

Pico Water District has approximately five thousand five hundred (5500) consumer service connections active at any one time. The predominant use is by residential single family users. There are no agricultural users in the Pico Water District. The area is fully developed, and the only additional water uses are those anticipated through redevelopment of existing service areas by the City of Pico Rivera Redevelopment Agency.

WATER CONSUMPTION FOR THE YEARS 1991 THROUGH 1994;

	1991 (actual)	1992	1993	1994
		(projected use)		
RESIDENTIAL SINGLE FAMILY	1898.24	1803.32	1803.32	1803.32
RESIDENTIAL MULTIFAMILY	566.69	538.35	538.35	538.35
COMMERCIAL	591.82	562.23	562.23	562.23
INDUSTRIAL	3.99	3.99	3.99	3.99
GOVERNMENT	588.60	559.42	259.40*	259.40*
TOTAL	3649.60	3467.31	3167.29	3167.29

* Use of Reclaimed Water will begin in 1993.

Single family and Multifamily connections are not expected to have any significant growth within Pico Water District. Existing single family connections use 96 gpcd and multifamily connections use 85 gpcd. Newer construction using more efficient plumbing equipment will reduce these amounts to 85 gpcd for single family residential connections and 70 gpcd for multifamily residential connections.

Commercial, Industrial and Governmental demand is not expected to show any significant increase. However as the City of Pico Rivera Redevelopment Agency acquires additional residential areas for redevelopment into light industrial and commercial areas this is subject to change. The District's experience has been that water consumption generally declines in areas which have been redeveloped.

A portion of the water allocated for Governmental use is for the maintenance of the schools located within Pico Water District a major portion of the water used by the schools is for the irrigation of playing fields and grounds, this demand will decline as the use of reclaimed water increases. This will further reduce the demand on the underground supply.

Section 3 Worst Case Water Supply Availability for 12, 24, and 36 Months

CALIFORNIA WATER CODE SECTION 10631. (e) (2) An estimate of the minimum water supply available at the end of 12, 24, and 36 months, assuming the worst case water supply shortages.

Pico Water District only has the underground supply of the San Gabriel River Basin as a source of water, there are no other supplies available to the District or any of the nearby communities.

The amount of water available to Pico Water District is regulated by the Adjudicated Rights in the Basin. The Water Replenishment District of Southern California manages the Basin based on the available water from natural run-off and the Replenishment Districts ability to purchase recharge water.

SUPPLY SOURCE WORST CASE PROJECTION;

	Adjudicated Rights	Ave. 85-89	Actual 1991	Worst Case 12 Mo.	Worst Case 24 Mo.	Worst Case 36 Mo.
CENTRAL BASIN	3624	3697	3140	2718	2355	1812
RECLAIMED WATER*				300	300	300
TOTAL AVAILABLE	3624	3624	3624	3018	2655	2112

All water amounts shown in acre feet.
*Projected date of availability 1993.

Due to the regulations imposed under the Basin Adjudication the WaterMaster has full control over pumping allocations. Pico Water District is required by the Adjudication to comply with the rules set forth by the WaterMaster and the Water Replenishment District of Southern California.

Pico Water District has made an assumption of a decrease of fifteen percent (15%) of available supply below the 1991 year. The present schedule of availability of reclaimed water is 1993.

The Consumers of Pico Water District have voluntarily reduced the amount of water consumption by more than fifteen percent (15%) since the 1985-1989 average years. The Consumers have voluntarily reduced water consumption during the May to October season by more than twenty percent (20%) over the 1985-1989 average year.

Section 4 Stages of Action

CALIFORNIA WATER CODE SECTION 10631. (e) (3) Stages of action to be taken 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.

Pico Water District has developed a four stage rationing plan. The District's plan includes voluntary and mandatory reduction stages.

RATIONING STAGES AND REDUCTION GOALS;

Shortage	Stage	Demand/Reduction Goal	Type of Program
Up to 15%	I	15% Reduction	Voluntary
15% to 25%	II	25% Reduction	Voluntary/ Mandatory
25% to 35%	III	35% Reduction	Mandatory
35% to 50%	IV	50% Reduction	Mandatory

Priorities;

Health and Safety - Interior residential and fire suppression
Commercial, Industrial and Governmental - Maintain jobs and economic base
Existing Landscaping - Special concern for established trees and shrubs
New Demand - Projects without permits when emergency declared

Health and Safety Water quantity calculations for Stage II and III are sixty nine (69) gpcd and for Stage IV fifty (50) gpcd.

Commercial, Industrial and Governmental (including schools). Pico Water District will evaluate each of these consumers on a case by case basis. It is the intent to not infringe on the economic base or to jeopardize the Health and Safety of Employees and School Children. Reductions in water consumption will be made where possible.

Supply Shortage Triggering Levels;

Pico Water District has a legal responsibility to provide water for the health and safety needs of its consumers. In order to minimize the social and economic impact of water shortages, the District will manage it's water supply prudently. This plan is designed to provide a minimum of fifty percent (50%) of normal supply during a severe or extended water shortage. The following rationing plan Triggering Levels are established to ensure that these policies are implemented.

The District's present sole source of water is from the underground Central Basin, there are no supplemental sources presently available. The District expects to have the support of additional supplies for nonpotable use by 1993. Conditions of shortage are based upon a number of factors and cannot be tied to any simple objective criteria. Any decision to implement this plan will necessarily take into consideration decisions and determinations made by the WaterMaster, Water Replenishment District of Southern California and other agencies impacting water supplies in the Basin and then existing demand.

Specific Criteria for District's Rationing Stages;

Stage	Percent Shortage	Water Shortage
Stage I	Up to 15%	Source reduction as determined by cited criteria
Stage II	15% to 25%	Source reduction as determined by cited criteria
Stage III	25% to 35%	Source reduction as determined by cited criteria
Stage IV	35% to 50%	Source reduction as determined by cited criteria

Section 5 Mandatory Prohibition on Water Use

CALIFORNIA WATER CODE SECTION 10631. (e) (4) Mandatory provisions to reduce water use which include prohibitions against specific wasteful practices, such as gutter flooding.

Pico Water District has prepared a Resolution prohibiting wasteful use of water. A copy of the Resolution is attached hereto.

Section 6 Consumption Limits

CALIFORNIA WATER CODE SECTION 10631. (e) (5) Consumption limits in the most restrictive stages. Each urban water supplier may use any type of consumption limit in it's water shortage contingency plan that would reduce water use and is appropriate for it's area. Examples of consumption limits that may be used include, but are not limited to, percentage reductions in water allotments per capita allocations, an increasing block rate schedule for high usage of water with incentives for conservations, or restrictions on specific uses.

The District will base all allotments on the five year base period of 1985 through 1989 to provide a base level from which the allotted amounts will be determined. This will provide the District with the flexibility necessary to equitably regulate the use of water. The District will, however not allow any use allotment to exceed the amount of use recorded in the most recent year of the five year base period where such records are available.

The District General Manager shall classify and calculate each consumers allotment according to the method described. The allotment shall reflect seasonal patterns of use by the various users. Each user shall be notified of their classification and allotment by mail before the effective date of the Water Shortage Emergency. Users may appeal the General Manager's classification on the basis of use or the allotment on the basis of incorrect calculation. Appeals shall be processed in accordance with procedures established by the Pico Water District Board of Directors.

Section 7 Penalties for Excessive Use

CALIFORNIA WATER CODE SECTION 10631. (e) (6) Penalties or charges for excessive use.

Service may be terminated to any user who knowingly and willfully violates any provision of the Water Shortage Plan.

A user who exceeds the established allotment shall pay a surcharge of four times the highest tier per HCF of water for excess water delivered during the first or second billing period and a surcharge of ten times the highest tier per HCF for excess water delivered during the third consecutive excess and subsequent excess billing periods. As used herein "excess water" shall mean the amount of water delivered over the accounts established allotment.

Pico Water District current rate structure;

Monthly Service Charges are base on multiples of the standard single family 5/8 inch water meter.

Meter Size	1991 Monthly Charge	1992 Monthly Charge	1993 Monthly Charge
5/8 inch	$ 8.96	$ 8.96	$ 8.96
1 inch	$ 12.32	$ 12.32	$ 12.32
1 1/2 inch	$ 22.39	$ 22.39	$ 22.39
2 inch	$ 35.83	$ 35.83	$ 35.83
3 inch	$ 89.57	$ 89.57	$ 89.57
4 inch	$ 111.96	$ 223.92	$ 223.92
6 inch	$ 134.35	$ 295.57	$ 447.83
8 inch	$ 201.52	$ 443.35	$ 671.75
10 inch	$ 268.70	$ 591.14	$ 895.66

In addition to the Monthly Service Charge there is a tier structure which benefits the consumer who reduces his water use consumption and penalizes those consumers which do not wisely use water.

Tier Structure;

Less than 800 cubic feet per month	$ 0.35 per HCF
800 to 1200 cubic feet per month	$ 0.50 per HCF
more than 1200 cubic feet per month	$ 0.85 per HCF

Section 8 Analysis of Revenue and Expenditure Impacts

CALIFORNIA WATER CODE SECTION 10631. (e) (7) An analysis of the impacts of the plan on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of resources and rate adjustments.

Establishment of a Rate Stabilization Fund;

In order to mitigate the financial impacts of a water shortage, the District is establishing an Emergency Fund. The goal is to maintain the Fund at seventy five percent (75%) of normal District operating revenue. This fund will be used to stabilize rates during periods of water shortage or disasters affecting the water supply. The purpose of the fund is to decrease the need to make drastic rate changes during prolonged or severe shortages.

During a water shortage the water rates may be adjusted at a percentage sufficient to offset the immediate loss of revenue suffered during the water shortage.

Recommended increases to the existing rate structure;

Stage	Percent Increase
Stage I	15%
Stage II	25%
Stage III	60%
Stage IV	100%

Maintain a fifteen percent (15%) increase over preshortage rates to recover lost revenues.

Section 9 Implementation of the Plan

CALIFORNIA WATER CODE SECTION 10631. (e) (8) A draft water shortage contingency resolution or ordinance to carry out the urban water shortage contingency plan.

Pico Water District is adopting a Resolution to implement the water shortage contingency plan.

A copy of the Resolution is attached hereto.

Section 10 Water Use Monitoring Procedures

CALIFORNIA WATER CODE SECTION 10631. (e) (9) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency plan.

During a Stage I or Stage II water shortage, production amounts will be reported on a daily basis to the Field Superintendent. The Field Superintendent will provide this information to the General Manager on a weekly basis to verify that the target level is being met. Monthly reports will be provided to the Pico Water District Board of Directors. If reduction goals are not met, corrective action will be taken.

During a Stage III or Stage IV water shortage, the procedure listed above will be followed, with the addition of a daily production report to the General Manager. Excessive water use shall be monitored where possible with meter readings of high volume users taken at intervals established by General Manager. Wastage of water when noted will result in penalties to be established by Pico Water District Board of Directors.

Section 11 Plan Adoption Standards

CALIFORNIA WATER CODE SECTION 10621 (a) Each urban water supplier shall, not later than January 31, 1992, prepare, adopt and submit to the department an amendment to it's urban water management plan which meets the requirements of subdivision (e) of Section 10631.

Pico Water District has prepared the amendment to its urban water management plan; however to allow more time for public input to the amendment, the final plan will not be delivered until February 4, 1992.

RESOLUTION NO. 56B-R
RESOLUTION OF THE BOARD OF DIRECTORS OF PICO WATER DISTRICT PROHIBITING WASTEFUL USE OF WATER

WHEREAS, the California Legislature has enacted Assembly Bill 11X, which mandates that every urban water supplier providing municipal water directly to more than 3, 000 customers develop a Water Shortage Contingency Plan; and

WHEREAS, the District has adopted a Water Shortage Contingency Plan in accordance with Assembly Bill 11X; and

WHEREAS, in the event a water shortage emergency is declared in accordance with the District's Water Shortage Contingency Plan, the ordinary demands and requirements of the District's customers cannot be satisfied without impacting the District's ability to deliver water for human consumption, sanitation and fire protection; and

WHEREAS, Pico Water District has the power and authority to adopt water conversation measures within in its boundaries and in accordance with Chapter 3 of the California Water Code;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of Pico Water District as follows:

1. The Board of Directors finds and determines that, in order to conserve the District water supply for the greatest public benefit, and to reduce the quantity of water used by the District's customers, that wasteful use of water should be eliminated. Customers of the District shall observe the following regulations and restrictions on water use.

2. No customer shall waste water. As used herein, the term "waste" means:

a. Use of potable water to irrigate grass, lawns, ground-cover, shrubbery, vegetation, and trees in such a manner as to result in runoff for more than five (5) minutes;

b. Use of potable water to wash sidewalks, walkways, driveways, parking lots, open ground or other hard surfaced areas except where necessary for public health or safety;

c. Allowing potable water to escape from breaks within the customer's plumbing system for more than twenty-four (24) hours after the customer is notified or discovers the break;

d. Washing cars, boats, trailers, aircraft, or other vehicles by hose without a shutoff nozzle and bucket except to wash such vehicles at commercial or fleet vehicle washing facilities using water recycling equipment.

3. The following restrictions are effective during a declared water shortage emergency.

a. No restaurant, hotel, cafe, cafeteria or other public place where food is sold, served or offered for sale, shall serve drinking water to any customer unless expressly requested.

b. Use of potable water to clean, fill or maintain decorative fountains, lakes or ponds is prohibited unless such water is reclaimed.

c. Use of potable water for construction, compaction, dust control, street or parking lot sweeping or building washdown is prohibited where non-potable or recycled water is sufficient.

d. Use of potable water for sewer system maintenance or fire protection training without prior approval by the General Manager is prohibited;

e. Use of potable water for any purpose in excess of the amounts allocated pursuant to the District Water Shortage Contingency Plan is prohibited.

BE IT FURTHER RESOLVED, that the Board of Directors find that the provisions of this Resolution are exempt from the provisions of the California Environmental Quality Act as an action to mitigate emergency conditions pursuant to Public Resources Code § 21080(b)(4).

PASSED AND ADOPTED at a regular meeting of the Board of Directors of Pico Water District held on February 6, 1992.

/s/

Michael Mendoza

ATTEST:

/s/

Harold W. Maupin, Secretary

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RESOLUTION NO. 560-R

RESOLUTION OF THE BOARD OF DIRECTORS OF PICO WATER DISTRICT ADOPTING A WATER SHORTAGE CONTINGENCY PLAN

WHEREAS, the California Legislature enacted Assembly Bill 11X during the 1991 Extraordinary Session of the California Legislature (an act to amend California Water Code Sections 10620, 10621, 10631, and 10652, and to add Section 10656 to the California Water Code, relating to water); and

WHEREAS, Assembly Bill 11X mandates that every urban water supplier providing municipal water directly to more than 3,000 customers develop a Water Shortage Contingency Plan; and

WHEREAS, Pico Water District is an urban supplier of water providing water to more than 3,000 customers, and has, therefore, prepared and circulated for public review a Draft Water Shortage Contingency Plan, in compliance with the requirements of Assembly Bill 11X, and a properly noticed public hearing regarding said Draft Plan was held on February 6, 1992, and a Final Water Shortage Contingency Plan prepared;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Pico Water District as follows:

1. The Water Shortage Contingency Plan is hereby adopted and ordered filed with the Secretary of the District;

2. The General Manager is hereby authorized and directed to file this Plan with the California Department of Water Resources;

3. The General Manager shall immediately notify the Board, where a reduction in water supplies dictates that the Board declare a Water Shortage Emergency and implement this Water Shortage Contingency Plan;

4. The General Manager shall recommend to the Board of Directors regarding additional procedures, rules, and regulations to carry out effective and equitable allocation of water resources during a water shortage.

BE IT FURTHER RESOLVED, that the Board of Directors find that the provisions of this Resolution are exempt from the provisions of the California Environmental Quality Act as an action to mitigate emergency conditions pursuant to Public Resources Code § 21080(b)(4).

PASSED AND ADOPTED at a regular meeting of the Board of Directors of Pico Water District held on February 6, 1992.

ATTEST:

/s/
Michael Mendoza

/s/
Harold W. Maupin, Secretary

RESOLUTION NO. 130-R

**RESOLUTION OF THE BOARD OF DIRECTORS
OF PICO WATER DISTRICT
REGARDING WATER CONSERVATION MEASURES**

WHEREAS, the Board of Directors of Pico Water District (the "District") has previously adopted its Resolution No. 56B-R prohibiting the wasteful use of water and identifying specific actions for District customers to take in order to reduce water usage; and

WHEREAS, Rule 8.07 of the District's Rules and Regulations: (i) has been adopted to ensure that water resources available to the District are put to reasonable beneficial use; (ii) urges the District's consumers to install devices to reduce the quantity of water used; and (iii) authorizes the District to adopt such further rules and regulations as it deems appropriate to restrict the use and consumption of water; and

WHEREAS, in light of upcoming new development and redevelopment projects in the City of Pico Rivera (the "City") and the continuing need to conserve water resources, the District now desires to facilitate communication with the City regarding those projects and emphasize the importance of water conservation measures that may be incorporated in such projects;

NOW, THEREFORE, the Board of Directors of Pico Water District hereby resolves as follows:

1. The District's Board of Directors encourages the City, through its management and staff, to incorporate into the plans and specifications for any new development and any redevelopment project within the District's service area, to the greatest extent feasible, measures designed to reduce the use of potable water, including, but not limited to, the following: low-flow and/or dual flush toilets; waterless urinals; low-pressure showerheads; automatic shut-offs on faucets and showers; and irrigation systems designed to reduce water usage.

2. The District's Board of Directors further encourages the City's staff and management to communicate and cooperate with the District's staff and management in identifying conservation measures which can be incorporated into any new development or redevelopment project within the District's service area.

PASSED AND ADOPTED at a regular meeting of the Board of Directors of Pico Water District held on May 3, 2006.

_____
Salvador Orozco, President

ATTEST:

_____
Susan Foster, Secretary

Appendix E
Emergency Action Plan

Pico Water District
Emergency Action Plan
Revised on 3-23-10

Introduction

This plan has been developed to assist the Pico Water District employees in coping with emergency conditions that may arise. The goal of this plan is to provide a working document that provides general instruction on responding to emergencies. The objectives of this plan are:

- Ensure the safety of District employees, their families, and property.
- Provide general direction to each employee responding to an emergency.
- Determines basic assignments and reporting locations for each employee.
- Establish a basic strategy designed to keep Pico Water District facilities operational and provide the highest possible service to its customers.
- Create an internal communication protocol to provide necessary information during the emergency.
- Ensure compliance with Cal-OSHA, California Code of Regulations, Title 8 §3220, Emergency Action Plans.

Guide Structure

This Emergency Response Guide is divided into three major sections, which are interrelated with each other, to offer a concise organized response by District personnel to emergency situations as they occur. Although it is impossible to foresee every emergency that might arise, this guide utilized by well-trained District staff should allow the District to return to normal operations as rapidly as possible when abnormal conditions arise. The Emergency Action Plan discusses the nature and categories of emergencies offering general response guidelines. The Fire Prevention and Fire Emergency Plan offers guidance for the prevention of fires, and, in conjunction with the Emergency Action Plan, provides instruction should a fire start. The Emergency Chlorination Plan outlines the District's response to water quality issues.

The Emergency Action Plan

The Emergency Action Plan is the backbone of the District's emergency response effort. It has been designed to provide a general operational framework from which the District can

respond, both personally and corporately, to emergencies. Each employee should become familiar with the District's Emergency Response Guide. This guide includes basic emergency instruction via the Emergency Action Plan, Fire Prevention Plan, and Emergency Chlorination Plan. Periodic training is conducted to test the District's emergency plans and their procedures.

The Emergency Response Guide is not intended to offer specific instructions on making repairs to damaged facilities. District employees are already well trained to handle the repair and maintenance of the District's facilities. Instead, it is intended to offer both general and specific instructions on invoking emergency procedures, allowing the organized repair of District facilities, even under adverse conditions. Additionally, the plan outlines the responsibilities and roles each employee will assume during an emergency.

Brief Overview of Normal Pico Water District Operation

The District provides potable water to the residents of the City of Pico Rivera who lie within the District's service area, a population of approximately 24,000 through the use of a telemetry system that operates. The District's service area covers approximately 2.29 square miles and is comprised of residential and commercial customers. The District's water system is comprised of six ground water supply wells, one 1.25 million gallon reservoir, and three booster pumps. Average daily demand is approximately 3.7 million gallons (MGD). The District's well and reservoir supply system is operated based on pressure and flow set points registered in the telemetry system. All six active wells and the booster pumps at the Cate Reservoir are started and stopped based on sensing high and low pressure set points. Well nos. 5a, 7 and 8 have variable frequency/speed drives so these flow rate fluctuates based on system demand. Well Nos. 2, 4a, 10 and the three booster pumps are all constant speed pumps and operate at full flow when on. The system is operated to maintain as system pressure between 60 and 70 psi. The system is operated in a manner for redundancy and to always maintain at least one backup well and booster pump. The District also has plans to connect its system to another water purveyor as a secondary source of water in the event the District's groundwater supply is significantly impeded.

Disinfection of the District's water supply is performed by using liquid chlorine (sodium hypochlorite) injected at each well site during the operation of the well. The District also has the ability to inject liquid chlorine into the Cate Reservoir separately should the need arise.

The District has a backup power source at two well sites (2 and 5a) through the use of two portable standby diesel powered Case Generators that are connected to a power panel through an automatic transfer switch. When the transfer switch senses a power failure for more than ten seconds it automatically turns the backup generator on. Once the transfer switch senses that the electrical power has been on for more than ten minutes it automatically begins to turn the generator off. The District also has a portable generator equipped to specifically power the main office facilities in the case of a power outage.

Emergency Operations

During emergency conditions, the Pico Water District office doubles as the Emergency Operations Center (EOC), located at 4843 s. Church St. All operations will be directed from this location. The EOC shall be under the direction of the general manager, who shall direct the activities of the District staff. Additional contractual staff (i.e. engineering, construction contractors, service vendors, etc.) shall be obtained on an as needed basis.

What is an Emergency?

The dictionary defines an emergency as: "a sudden, urgent, unexpected occurrence requiring immediate action." Using this definition it can be seen that emergencies can and do happen almost on a daily basis. These are handled in the normal daily course of events and are not the subject of this emergency response plan. This does not lessen their importance, but this type of emergency would not normally invoke a full emergency response. Less frequent but considerably more devastating emergencies are always possibilities. Emergencies created by natural events such as earthquakes, tidal waves, flooding, drought, fire, wind, etc., can be extremely devastating and have far reaching effects. In an effort to categorize emergencies, and the required level of response, the following classifications have been developed:

Level I Emergency: A level I emergency can normally be handled by a single person or a small field crew. A typical level I emergency is a line break, severed fire hydrant, customer emergency turn off, pump; valve, well, reservoir or other alarm condition. Most level 1 emergency only effect a small area, but some such as a commercial power failure may affect several facilities. Level I emergencies are normally handled at the District level with management being informed through the normal channels. Generally the EOC is not activated for a level I emergency.

Level II Emergency: Level II emergencies may involve multiple crews or even outside resources. Level II emergencies are major emergencies that might involve other agencies, yet are generally within the District service area. Examples of a level II emergency are major line breaks, requiring an outside contractor, an area wide power outage that lasts for an extended period of time, etc. Local police, Cal-Trans, the city or county or other water agencies might be involved in a level II emergency. Depending upon the severity of the emergency, the full EOC, or at least an abbreviated version, may need to be set up to handle coordination and information exchange.

Level III Emergency: Level III emergencies are severe catastrophic events such as high magnitude earthquakes, floods, major fires, etc., which do extensive damage to facilities. A level III emergency will require the response of all personnel who can report to duty. Level III emergencies would be beyond the capability of the District to control, requiring extensive outside assistance. In a level III incident the major damage could be outside the

District's service area, but require the District's assistance. In the event of a level III emergency the EOC should be immediately set up.

Any emergency can escalate or de-escalate requiring the District to respond accordingly. Simple level I incidents can escalate to level II requiring additional response while the more severe level III can de-escalate to level II or level I as conditions are returned to normal. For example should a major local earthquake occur, District resources would probably become rapidly depleted, requiring the District's response to escalate accordingly? As the situation is brought under control, with the restoration of the production and distribution systems, the District's response would de-escalate to a normal operation. Level II and III incidents may involve local, county, or state public safety officials (police and/or fire) requiring District forces to coordinate their efforts with the local officials.

Response to an emergency

The most important response to any emergency is to **STAY CALM** and rely on your training and good common sense. It would be impossible to create a complete set of guidelines detailing complete instructions on how to handle every type of emergency that might occur. In lieu of that, the following are guidelines to assist you in responding to an emergency.

If you are at work when an emergency occurs:

- Level 1 Emergency - These types of emergencies are common and might be the result of an alarm condition or a customer complaint. Rely on your training and good common sense to resolve these emergencies. Should the situation escalate, or you feel additional assistance is required, immediately contact your supervisor for assistance. Do not try to remedy a situation that you are either unprepared for or you do not have adequate resources to control. Report all emergencies and their resolution to your supervisor.
- Level II Emergency - Should a level I emergency escalate to level II, or if when responding to an emergency it turns out to be of level II proportions, immediately notify your supervisor for assistance and direction.
- Level III Emergency - Report to your supervisor or to the District EOC for additional instructions.

If you are NOT at work when an emergency occurs:

- Level I and II Emergencies - Normally the "on-call" person would be the first responder to after hours emergencies. The person responding should notify their supervisor if assistance is needed and assemble a crew to correct the emergency. All District employees are subject to call out as needed.

- Level III Emergency - Since Level III emergencies are catastrophic in nature the following guidelines are given:
    - Insure the safety of your family.
    - Call your supervisor for instructions. If you cannot reach your supervisor,
    - Call the District office for instructions. If you cannot contact the office,
    - Report directly to work. You should report to the District's main office.
    - Do not wait for someone to contact you. In a catastrophe, time is of the essence.
    - Providing the District office is safe to enter, try to assess the damage to the system. Use the TV, District radio, telephone, or whatever is functioning to assist you.

If there is immediate danger, or if there has been an injury requiring medical attention, call 911 to report the incident if phones are available and working. If the two-way radio is the only communications available, report the emergency to the District receptionist. Administer first aid if necessary.

Chain of Command

During emergency situations, the chain of command remains as it does during normal operations. The General Manager is responsible for the operation of the District with District employees being subordinate to the General Manager. Should the General Manager be absent, the field superintendent shall acquire the duties of the General Manager.

All pertinent decisions, communications and coordinating efforts must have the approval of the General Manager or his designate. The General Manager will assess the situation and determine what actions are necessary to return the District to normal operation.

Emergency Operations Center

During times of emergency, requiring the setup of an Emergency Operations Center (EOC), the Pico Water District will utilize its office facilities for this function. The Boardroom will be the operations center. From this location the EOC Director (General Manager or his designate) will direct the activities of the District staff and outside support personnel. Commercial radio and television is available as a source of media information. Additional information may be available via the District's internet connection. System maps and other pertinent information are available in the file room and would be moved to the boardroom on an as needed basis. Security would be handled from the receptionist area utilizing the existing front security gate. Communications with the field crew(s) would be via the existing Nextel wireless telephone/radio system.

General Response Guidelines

The following are general response guidelines to emergency conditions that may occur. Emergencies can occur at any time, from minor level I emergencies to level III catastrophes. Remember that the key to success in dealing with any emergency is to STAY CALM and use a common sense approach.

These basic guidelines are intended to give basic assistance to an employee in dealing with an emergency. It is impossible to predict the nature, and to what extent, any emergency might involve. The following guidelines are intended to offer general assistance for some of the more probable emergencies an employee might encounter.

Fire (For additional information refer the District's Fire Prevention Plan in this booklet)

Buildings - If a small fire, such as a trash can fire, breaks out within a building and a fire extinguisher is available, and you are trained in its use, you may attempt to extinguish the fire. If the building structure is involved, you should evacuate the building, sounding an alarm if others are present, and summon the fire authority.

If you are in the office and a fire breaks out, activate the fire alarm. If the fire is small, such as a trashcan or computer fire and a fire extinguisher is near and you are trained in the use of fire extinguishers, you may attempt to extinguish the fire. If the fire involves the building structure, sound an alarm and evacuate the building, proceed to the designated staging area and notify the fire authority. Do not attempt to extinguish the fire. It is important that all personnel in the building evacuate to the staging area to help account for all known persons that were in the building.

If you are caught in a building that is on fire observe the following:

- Stay close to the floor. The temperature will be cooler there and this is where you will find fresh air. Smoke tends to kill more people than flames.
- Never open any doors without checking to see if they are hot. A hot door indicates flames on the other side.
- If your clothing catches on fire, drop to the ground and roll.
- If a companion's clothing catches on fire, push them to the floor and make them roll. If a blanket, coat or other piece of heavy clothing is available, use it to smother the flames.

Motors or Switchgear - If you approach a well facility, pump, or control cabinet that appears to be on fire, DO NOT enter the site. Notify the fire authority and be available to assist as necessary. If the fire has spread to involve the structure, DO NOT try to extinguish the fire yourself. If a fire erupts in a motor or the switchgear, if possible, immediately turn off the main electrical breaker. If the fire is small, not involving the building structure and a fire extinguisher is near and you are trained in

the use of fire extinguishers, you may attempt to extinguish the fire. DO NOT try to restart any electrical component that has been subjected to a fire.

Vehicles - If you encounter a vehicle fire while driving, pull the vehicle to the side of the road and exit as soon as it is safely possible. Summon assistance in whatever way is available without endangering your life. If the fire is in the engine compartment and the hood can be safely opened, you may use the vehicles fire extinguisher to extinguish the fire. Be careful of the battery. When overheated, batteries will explode.

Above all else, in the event of a fire, stay calm and DO NOT take unnecessary chances.

Earthquake

If you are in a building when an earthquake strikes you should DUCK, COVER, HOLD.

- DUCK - or drop to the floor.
- COVER - Take cover under a sturdy table or desk away from windows or other objects that might fall. If that is not possible, seek cover against an interior wall.
- HOLD - If you have taken cover under an object, HOLD on to it and be prepared to move with it. Stay in that position until the shaking stops and it is safe to move.

Some additional tips to remember in dealing with an earthquake:

- DO NOT try to exit a building during an earthquake. Wait until the shaking stops and then exit as rapidly as safely possible.
- Always try to move along an interior wall if possible.
- When outdoors, move to a clear area away from trees, buildings, signs, power lines, or other objects that might fall.
- If you are on the sidewalk near a building when an earthquake strikes, move into a doorway to protect yourself from falling plaster, bricks, glass or other debris.
- If you are in a store or other public building move away from windows, display cases or shelves with objects that might fall.
- When driving, pull over to the side of the road. Avoid overpasses and power lines. Stay in your vehicle until the shaking stops.

After an earthquake District facilities need to be inspected for their serviceability.

- Pumps and Wells - Carefully inspect the exterior of the well site for its stability before entering the site. If the building does not appear stable, do not enter it. Once inside inspect the alignment of the piping, motors and pumps. Do not try to run a pump or well if the associated piping or

the pump and motor appear to be mis-aligned. Control cabinets should be standing in their normal position with all conduits intact. Do not try to run a pump or well using a control cabinet that is in any way damaged or has exposed electrical components. Do not touch any exposed wiring. Assume that all electrical wiring is HOT.

- Reservoir - On the tank look for piping separations, and buckling of the walls. Check to see if the tank is still centered on its base ring. Look for leaks.
- Pipelines - Look for wet spots or water bubbling up along known distribution lines. Investigate no water of low water pressure customer complaints for indications of broken pipelines.

Flooding

Unusually heavy rains, or the over spilling of the Los Angeles and San Gabriel River, have the potential of creating a flood situation. To the extent possible, sandbagging can be utilized to protect District facilities. Motors or electrical switchgear that is in danger of coming in contact with floodwaters should be turned off and the main breakers deactivated. Never try to run any electrical appliance that is in contact with water unless the appliance (such as a submersible pump) is designed to operate in a wet environment, nor should any motor or switchgear that has been submerged be operated before it has been thoroughly inspected by a qualified electrician.

Water quality can be affected by flooding. Well and distribution system samples must be taken. Should contamination be indicated, immediate action must be taken. This can include, but not be limited to, additional chlorination, flushing, activation of interconnections, public notification or boil water orders.

Sabotage of Water Supplies

As the population of the area increases and political and other changes take place in our society, there unfortunately becomes an increased potential for the District's water storage and supply system to become the target of sabotage. This can be a simple prank, someone using a reservoir for recreational purposes, to a deliberate attempt to contaminate the potable water system. Should there be evidence of tampering; an open or damaged reservoir hatch; apparent tampering with wells or pumps, suspicious containers left on site; water having strange odor or color; the following steps must be taken:

- Isolate the affected system.
- Immediately notify your supervisor and management.
- Isolate the area and notify local law enforcement officials.
- Collect water samples for analysis.
- Notify the Health Department.

- Public Notification as appropriate.
- Flush and chlorinate as appropriate.
- Return the system to service only after testing has deemed it safe.

For additional instruction refer to the District's Emergency Chlorination Plan included in this booklet.

System Contamination

Should contamination occur within the distribution system, reservoir or wells, follow the procedures contained in the District's Emergency Chlorination Plan. Likewise the Emergency Chlorination Plan should be consulted should there be a malfunction with the chlorination system.

Disruption of Supply

In the event of a disruption of the normal supply due to well failure, commercial power failure, pipeline failure, etc., activate the emergency generators. Should the problem involve the operation of a well notify one of the Well/ Pump repair companies for assistance.

Civil Disorder

Civil Disorders could cause an emergency status. Complete cooperation and coordination with local peace keeping authorities is essential. To prevent sabotage or vandalism of District facilities, they should remain locked and, as is safe and practical, staffed by District staff. Should additional security be required, private security guards would be hired.

Disruption of Distribution Pumping

Should there be a disruption in distribution pumping, such as a fire in one of the well sites, shut it down and activate one of the alternate wells, and check your chlorine residual after starting the well. **Do not attempt to handle the situation without first calling for assistance**. **Contact your superintendent and inform him of the situation.**

Main Breaks

Should a main break be evidenced by water coming up out of the ground, loss of pressure in the service area, etc., repairs should be initiated immediately; District forces will make the necessary repairs unless General Manager and or the field superintendent deems that assistance will be necessary. These repairs are normally done under pressure utilizing the appropriate repair clamp. Repairs are made under pressure to minimize the possibility of back siphoning and contamination of the distribution system. Although in some cases when the water leaking out of the main is too excessive, an isolation of the area may be required by closing the closest line valves to the leak. If assistance is required General Manager Will notifying the District's licensed pipeline contractor for the emergency pipeline repair. A District

representative should monitor the repair activity to insure all repair work is in accordance with AWWA and District standards.

Fire Hydrants

Should a fire hydrant become damaged or sheered, isolate the hydrant by closing the hydrant lateral valve. If possible initiate repairs there after. If repairs for some reason can't be made then the area should be delineated and secured, if the hydrant still stands then a bag should be placed over the hydrant to prevent usage.
The local fire authority must be notified immediately of the hydrant's location and that it is out of service.

Commercial Power Outages

Commercial power outages will occur from time to time. These may be scheduled, due to maintenance or rolling blackouts, or unscheduled because of equipment damage or failure. At the time of a commercial power outage, contact the Southern California Edison District (SCE) for a determination as to the anticipated duration of the outage. The District has three portable diesel powered generator that can provide sufficient power for distribution pumping. The units must be manually started as per manufactures instructions and load must be manually transferred from commercial to standby power. Do not tamper with the normal generator connections as it can force motors to run in reverse or back feed the SCE system causing severe injury or death. Do not try to apply a load greater than that for which the generator is rated. Do not try to refuel the generator while it is running. Shut the unit down, refuel, and then return the generator to service. When commercial power is restored, allow time for the SCE system to stabilize before transferring load and stopping the generator. Once the load has been transferred, allow the generator to go through its cool down cycle before final shut down.

Building Evacuation

Should a District building evacuation be required, follow the posted evacuation route to the assigned staging area. Select an evacuation route that is farthest away from the emergency i.e. fire. Remain calm and move quickly, without running, to the nearest safe evacuation exit. The evacuation commander (individual assigned evacuation duties at the site or the most senior individual on site in their absence) is responsible to sound the evacuation alarm and oversee the evacuation. Providing it can be done safely, assigned individuals are to shut off the gas and electrical service to the building. Once assembled in the staging area, the Evacuation Commander, is to determine if all the known occupants have been safely evacuated. During an earthquake, do not evacuate the building until the earthquake has stopped. Do not reenter a building until it has been deemed safe.

Bomb Threats

Regardless of how they are received, bomb threats must be taken seriously. If the threat is to an occupied building, the building must be evacuated until the threat is

alleviated. District management, local police and fire authorities must be immediately notified of the threat. If you are the person receiving the threat, try to remain clam and note as much information about the person making the threat as possible. This information can be valuable to authorities trying to apprehend the individual making bomb or other threats. At no time is a District employee to try to disable a suspected bomb or other suspicious device. The area should be secured allowing access only to authorized personnel.

Emergency Water Disbursement

In the event it becomes impossible to distribute water through the normal distribution system, emergency water distribution is possible from the reservoir. The compound is ideal because of its security fences and gated entrances. Additional security may be required for crowd control while District forces fill allocation requests from reservoir taps. This approach would provide a safer environment and better control for District staff than utilizing trailers or other means of trying to satisfy water demands in the community at large.

Emergency Notification

Should an emergency event occur requiring public notification, the District will follow the directions ascribed by the state health department. As necessary, electronic media, radio and television, as well as print media (both English and Spanish) will be utilized as required under Title 22 of the California Code of Regulations, sections 64463.1 – 64467. Additionally, two vehicles equipped with loudspeakers could be utilized to notify the residents of the emergency and any special circumstances such as water conservation requests. Because of the size of the service area this should be accomplished in 2 to 2½ hours.

FREQUENTLY ASKED QUESTIONS

How will I know if I'm supposed to report to work? - If you are called, then you are to report. If you are not called, use your best judgment. During extreme emergencies it might be impossible for someone from the District to call you because of disruptions in the telephone system. Should there be a major event, such as a large scale earthquake, and your family and property are safe, you should make an effort to report to work or in some way make contact with the District.

How do I get through the roadblocks? - Roadblocks are a real potential. There are some things you can do to assist getting through. Always have your ID card handy. Politely inform the officer you are responding to an emergency. If possible, use a marked District vehicle. The EOC Director (General Manager or his designate) will try to notify the Los Angeles County Sheriff to allow employees into the service area.

If I'm at work and a major event occurs, will I be able to look after my family? - Yes. The well being of the District's employees and their families takes a top priority in the District's efforts in dealing with an emergency. How this is to be accomplished will depend upon conditions surrounding the event.

How will I communicate during an emergency? - Reliable communications is essential to combating the effects of an emergency. If there were a major event, such as a large earthquake, communications would be based upon what worked. The District has telephone, Nextel cellular phones, fax and Internet, commercial radio and television available for communications. Depending upon the severity of the event, you would use whatever communications, or mixture of communications, that still function, to communicate.

How long will the emergency last? - There is no way to tell how long an emergency will last. Generally emergency conditions will be in effect until the District's operation has returned to a normal state.

How long will I be required to work? - That depends upon the severity of the emergency, the number people who respond, and the need for your particular expertise and abilities.

What type of work will I be required to do? - During an emergency the District will be required to make the best of what it has. This means there is a good possibility you may be asked to perform a function you are not accustomed to.

Will we get any help? - That depends upon the severity of the emergency and how wide spread it is. For catastrophic emergencies, the general rule of thumb is to not expect any outside help for the first twenty-four (24) to forty-eight (48) hours after the initial event. During that time the District will have to survive the best it can on what it has available.

What do I say if asked a question by the Media? - Refer all questions to the EOC Director. The same is true for questions you might be asked from the general public. Do not make comments on your own. During an emergency, accurate information is essential. It is important that all questions about the emergency be handled by a central source.

Emergency Contacts

Pico Water District Contacts

Mark Grajeda – General Manager

Office	562-692-3756
Cellular	714-337-4590
Fax	562-695-5627
Home	714-578-5756
E-Mail	msgrajeda@picowaterdistrict.net

Joe D. Basulto - Field Superintendent

Office	562-692-3756
Cellular	562-842-7781
Fax	562-695-5672
Home	562-233-6706
E-mail	jbasulto@picowaterdistrict.net

Henry Barrientos – Assistant Field Superintendent

Office	562-692-3756
Cellular	562-842-4319
Fax	562-695-5627
Home	562-652-0158
E-mail	hbarrientos@picowaterdistrict.net

Hazardous Spill Clean up Contractor

Asbury Environmental 1-800-974-4495
1300 S. Santa Fe Ave.
Compton, Ca 90221

Pipeline Contractor

Brkich Construction
1508 Mayflower Ave.
Monrovia, Ca 91016

Office – Johnny Lima	626-305-7426
Donny Burk - Cellular	626-945-0681
Fax	626-305-7428

Valverde Construction, Inc.
10918 Shoemaker Ave.
Santa Fe Springs, Ca 90670

Office - Mike Valverde	562-906-1826
Cellular	310-877-2855
Fax	562-906-1918

Emergency Chlorination

Matt-Chlor Inc.
4107 N. Arden Dr.
El Monte, Ca 91731

James Woodward	
Mark Woodward	
Office	626-443-5034
Fax	626-443-2226

Well Service

General Pump District
159 N. Acacia St.
San Dimas, Ca 91773

Office	909-599-9606
Fax	909-599-6238
Contact Mike Bodart extension 222	

Layne Christensen Company
11001 Etiwanda Ave.
Fontana, Ca 92337

Office	909-390-2833
Fax	909-390-6097
Contact Tom Nanchy cellular	909-322-2343

Laboratory

Weck Lab- Industry
14859 E. Clark Ave.
Industry, Ca 91745

Office	626-336-2139
Fax	626-336-2634

Electrical Repairs

A&B Electric
248 Loranne Ave.
Pomona, Ca 91767

Office	**909-865-5886**
Fax	**909-865-7929**
Joseph Evanilla - cellular	951-741-5600

Generator Repairs
Quinn Shepard
2425 Kella Ave.
Whittier, Ca 90601

Ken Tolbert	
Office	562-463-6075
Fax	562-463-7151
Email	ktolbert@quinnpower.com

Engineering
Kabbaara Engineering
121 North Harwood Street
Orange, Ca 92866

Bill & Leah Kabbara	
Office	714-744-9400
Fax	714-744-9771
Email	bk@kabbara.net

Southern California Edison

800-655-4555

California Public Health Services – Hollywood District
Chi Diep, P.E. – Associate Sanitary Engineer
500 North Central Ave. Suite 500
Glendale, CA 91203

Direct	818-551-2016
Office	818-551-2004
Fax	818-551-2054
Email	Chi.Diep@cdph.ca.gov

Sheriff Department

Emergency	911
Office	562-949-2421

Fire Department

Emergency	911
Office	562-942-1015

Location of Emergency Equipment

Type of Equipment	Location
General	
Fire extinguishers	Office, Warehouse and Wells
First Aid Kit(s)	Warehouse and service vehicles
Spare Cell Phones	Office
Emergency Survival Kits	Field Office
Water Quality Items	
Chlorine Test Kits	Three colorimeter kits
Water Sample Kits	Office (Refrigerator)
Utility truck	Warehouse
Barricades	Warehouse
Repair Clamps	Warehouse
Air Compressor	Warehouse
Back hoe	

Training

Type of Training	Frequency	Topics Covered
Fire Extinguisher Training	Annually	Review types of extinguishers and general fire extinguisher use.
Generator Training	Annually	Review generator operating procedures and power failure scenarios.
Chlorination Training	Annually	Review CL2 safety, and emergency chlorination procedures.

Reference: California Code of Regulation, Title 8 Sections 3220.

Pico Water District
Fire Prevention and Fire Emergency Plan

General

A Fire Prevention and Fire Emergency Plan is part of the District's Emergency Response Plan. Its intent is to alert employees to potential fire hazards, abate those hazards, and provide an emergency plan in the event of a fire.

Typical Fire Hazards

Typical fire hazards consist of, but are not limited to the following:

- Combustible materials: These are any type of materials which when ignited will burn. Included would be paper products, plastics, packing material, wood, certain chemicals, petroleum products, (gasoline, diesel fuel, paint thinners, cleaning solvents etc.).
- Electrical appliances: Any electrical appliance such as coffee makers, computers, radios, office equipment, and pumps motors, switch gear, etc., is capable of being a fire hazard. This occurs when the equipment is mis-used, poorly maintained, used in an environment where it was not intended (using an appliance intended only for indoor use out of doors), or used to provide a function for which it was not intended, etc. Over-loading receptacles, bypassing fuses or circuit breakers, using frayed or damaged electrical cords or wiring, all contribute to creating an electrical fire hazard.
- Gas appliances and items that produce sparks during their operation: Gas appliances, such as heaters, gasoline fueled equipment, cutting or welding torches, that are improperly used or maintained can create a fire hazard. This is also true of tools such as grinders or saws that produce sparks.

Fire Prevention

Being aware of what constitutes a fire hazard and acting accordingly is an important aspect to a good fire prevention program. The following suggestions should be adhered to as part of the District's fire prevention program.

- Good housekeeping: Good housekeeping is essential to fire prevention. Clutter or accumulations of combustible material should not be allowed to accumulate, especially near an ignition source. Combustible materials must not be stored in closets or other places where there is a viable source of ignition. Example: storing combustible materials in the same closet with the furnace or water heater having a pilot light. Likewise, flammable liquids or chemicals must not be stored near an ignition source.

- Refueling of equipment: Refueling vehicles or equipment must be done with the engine off and in the appropriate location away from any source of ignition. Smoking is never permitted when refueling vehicles or equipment.
- Using electrical appliances: Never use any electrical device that is defective or has defective wiring, cords, connections, or switches. Only use the appliance for its intended purpose. Never overload an outlet, circumvent fuses or circuit breakers, and insure the appliances' grounding needs are properly adhered to.

Inspections and Maintenance

Inspections and proper maintenance are a part of the District's fire prevention program. Inspections are likewise a part of the District's overall safety program. Inspections are accomplished on a regular basis but need to be augmented by brief safety checks each time a tool, appliance, or piece of equipment is to be used. Any time a tool, appliance or piece of equipment appears to be damaged, does not work properly, or appears to be unsafe, DO NOT USE IT until it can be properly repaired or replaced. Do not use electrical equipment with frayed wiring, cords or plugs with the grounding or other prongs removed or altered.

Fire Control

None of the District's facilities are equipped with internal automatic sprinkler systems. All District facilities and vehicles are equipped with fire extinguishers. These portable fire extinguishers are dry chemical, or CO2, depending upon their location. All the fire extinguishers are checked monthly and serviced annually. Fire extinguisher locations must not be obstructed. Fire extinguishers must be in plain sight with easy access and clearly marked as appropriate. Fire extinguishers are for use on small non-structural fires such as wastebasket fires or small appliance fires. They are to be used only by persons who have been trained in their usage. To effectively use a fire extinguisher, do the following:

- Remove the fire extinguisher from its mounting point.
- Grasping the fire extinguisher with one hand on its handle and the other on the bottom, rotate the extinguisher, top to bottom, a couple times. This is of particular importance with dry chemical extinguishers as it loosens up the chemical allowing it to be expelled with the propellant.
- Holding the extinguisher with one hand in the upright position, remove the ring pin with the other hand.
- Keeping a safe distance from the fire, point the nozzle of the extinguisher at the base of the fire.
- Squeeze the trigger, using short bursts while moving the extinguishers blast across the fire.
- Continue using an arching motion and short bursts aimed at the base of the fire until the fire is out or the fire extinguisher is empty.

If the fire involved an electrical appliance, tool or equipment, do not try to re-start or run the device until it can be thoroughly inspected and repaired by a qualified electrician.

Fire Alarm Systems

The District facilities do not have any type of fire sensing or alarming equipment. Should a fire be discovered, the person discovering the fire should yell "FIRE" to alert any other building occupants and take the appropriate action. If the fire is small, such as a trash can fire, and a fire extinguisher is available, and you are trained in its proper operation, you may extinguish the fire. For larger fires, or fires that involve the building structure or fires that could not be successfully extinguished, call the local fire authority.

Anytime the fire alarm is sounded, the occupants of the affected facility must immediately engage in an orderly evacuation. Occupied District facilities have evacuation routes posted. The evacuation route posters include staging areas and the locations of fire extinguishers. The fire authority should be called for any fires that are larger than those that can be easily extinguished with a portable fire extinguisher. Fire alarms are serious and activation as a prank will result in the appropriate disciplinary action.

Employee Fire Prevention Safe Work Practices

Every employee must comply with safe work practices to minimize fire hazards and insure a safe response in the event of a fire. The following guidelines are designed to encourage safe work practices:

- Handle flammable or combustible liquids very carefully. Gasoline, paint thinners, diesel fuel, etc. should only be stored in small amounts (five gallons or less) in approved marked containers and away from any source of ignition.
- When refueling vehicles or other engine power equipment, never leave the engine running.
- Never smoke when refueling vehicles or engine driven equipment.
- Should a spill of a flammable liquid occur, immediately clean it up and properly dispose of the clean-up materials.
- Oily rags, or rags with other combustible liquids on them, must only be stored in the proper fire safe containers.
- Never store materials where they may block access to a fire extinguisher, fire sprinklers, or fire alarm.
- Never store combustible materials, including flammable liquids, near an ignition source.

- Do not block fire exits with stored materials. Always keep exits free and clear.
- Avoid overloading electrical receptacles and keep use of extension cords to a minimum.
- Do not use defective electrical equipment. This includes equipment with frayed wiring, defective plugs, bad switches, or that is improperly grounded.
- Never circumvent any electrical safety device such as a fuse or circuit breaker.
- Know how to use a fire extinguisher and its limitations. Do not try to fight a fire that is to big for the rating of the fire extinguisher being used. Do not use a fire extinguisher if you are not trained in its usage.
- Know where the fire alarms are, how to activate them, and what they sound like when activated.
- When working in a building, know where the exits and evacuation routes are.

Areas Subject to Periodic Inspection

The following areas will be periodically inspected for fire hazard. The following areas are scheduled monthly for inspected are:

District Office
Storage Facilities
Motor Control Centers (MCC)
Wells and associated areas
Pumps and associated areas
Chlorination equipment
All Fire Extinguishers

Reference: California Code of Regulation, Title 8 Sections 3221.

Pico Water District
Emergency Chlorination Plan

Name:	Pico Water District
Address:	4843 S. Church St Pico Rivera CA 90660
System Manager:	Mark Grajeda, General Manager (Distribution Grade 4, Treatment Grade 3)
System Operators:	Joe D. Basulto, Field Superintendent (Distribution Grade 3, Treatment Grade 2) Henry Barrientos, Assistant Field Superintendent (Distribution Grade 3, Treatment Grade 2) Joel Colin, Field Maintenance II (Distribution Grade 1, Treatment Grade 1) Cesar Garcia, Field Maintenance I (Distribution Grade 1) Saul Lopez, Field Maintenance I (Distribution Grade 1) Ernesto Ochoa, Field Maintenance I
Phone Number:	562-692-3756
System Type:	Community Water System
Population Served:	Approximately 24,000 +/-
Source Water:	The Pico Water District primary source is six groundwater wells drawing from common aquifers.
Treatment Provided:	Precautionary liquid chlorine (sodium hypochlorite) is provided at each of the wells when the system is utilizing its groundwater source.

System Overview

The District provides potable water to the residents of the City of Pico Rivera who lie within the District's service area, a population of approximately 24,000 through the use of a telemetry system that operates. The District's service area covers approximately 2.29 square miles and is comprised of residential and commercial customers. The District's water system is comprised of six ground water supply wells, one 1.25 million gallon reservoir, and three booster pumps. Average daily demand is approximately 3.7 million gallons (MGD). The District's well and reservoir supply system is operated based on pressure and flow set points registered in the telemetry system. All six active wells and the booster pumps at the Cate Reservoir are started and stopped based on sensing high and low pressure set points. Well nos. 5a, 7 and 8 have variable frequency/speed drives so these flow rate fluctuates based on system demand. Well Nos. 2, 4a, 10 and the three booster pumps are all constant speed pumps and operate at full flow when on. The system is operated to maintain as system pressure between 60 and 70 psi. The system is operated in a manner for redundancy and to always maintain at least one backup well and booster pump. The District also has plans to connect its system to another water purveyor as a secondary source of water in the event the District's groundwater supply is significantly impeded.

Normal Operation

Potable water for the District is provided through the operation of groundwater wells. Operation of the wells is controlled by system pressure directly related to system demand. As the system water pressure drops, indicated by pressure transducers for each well and booster pump connected to a PLC, which is controlled and monitored by a Supervisory Controlled Access Data Administration (SCADA) system. Once the desired system pressure is attained the well production is stopped. Each well has sufficient capacity to provide the system's daily needs. The wells alternate their duty cycles on a weekly basis.

Distribution system pressure is maintained at approximately 60 to 70 psi through the use of wells and booster pumps. The pumps flow is controlled by a Cla-Val valve which will open up to meet peak demands and fire flow and emergency backup. Pump activation is via pressure sensors monitoring the distribution system.

Reservoir levels and distribution system pressure are monitored 24/7 via the SCADA system and recorded on a daily basis by the individual checking the wells.

System Disinfection

Chlorine levels are monitored daily. Chlorine pumps are used to inject liquid chlorine (sodium hypochlorite) into the water flowing from the well and into the distribution line prior to the water entering the distribution system. The chlorine pumps are adjusted to provide a .75 mg/L dosage (ppm). This dosage has proven to provide an average residual of .56 mg/L to the farthest point in the distribution system. Daily chorine residuals are taken at each of the Districts well sites at a designated sample tap prior to the distribution system. Additionally, chlorine is monitored when water samples are taken throughout the distribution system. The District has four Hach Colorimeters for monitoring chlorine levels. Records are maintained at the District office. There are no known water quality issues that can affect the chlorination process.

Emergency chlorination connections are provided at the reservoir and at the discharge of the wells. Matt-Chlor Inc. provides emergency chlorination equipment on an as needed basis.

Monitoring

Chlorine sampling is accomplished daily with bacteria sampling being done weekly throughout the distribution system. Table 1 indicates the maximum chlorine levels allowed during normal system operation. Disinfectant residual levels for chlorine or chloramines shall not exceed those listed in Table 1 unless, under the direction of the Department of Health Services (DHS), higher levels of disinfectant are necessary to protect the public health or address a specific contamination issue. Table 2 indicates the sampling sites and their respective location to the source of supply. Figure 3 graphically shows the locations of the various distribution system sampling points and sources of supply.

Table 1 *Maximum Residual Disinfectant Levels*	
Chlorine	1.0 mg/L
Chloramines	0.0 mg/L

Table 2		
Site Number	**Site Address**	**Location**
1	4865 Tobias Ave	North East of the system
2	5502 Pico Vista Ave	South East part of the
3	9632 Rieshel Ave	South East part of the
4	9336 Call st	South of the system
5	6636 Loch Alene Ave	South of the system
6	8411 Carron Dr	South West part of the
7	5512 Manzanar Ave	Middle of the system
8	8710 Creeland Ave	West part of the system
9	9374 Bartola Ave	North part of the system
10	9348 Tilmont Ave	North part of the system

Figure # 3

Distribution system sampling points and sources of supply

Samples are tested by Weck Lab in the City of Industry for E.coli, fecal coli and coliform. The lab will immediately notify (within 24 hours) the District and the DHS of any positive samples. If a routine sample is total coliform-positive, a repeat

sample must be taken within 24 hours of notification. The repeat samples shall be taken within the same 24-hour period and shall consist of at least three samples for every total coliform-positive routine sample. When collecting repeat samples, at least one sample must be from the same sampling tap that produced the original total coliform-positive sample. At least one sample shall be taken within five service connections upstream and downstream of the point of the original positive sample unless there is no upstream or downstream service connection. If a repeat sample returns total coliform-positive, the DHS is to be immediately notified.

Chlorination Equipment

Disinfection of the District's water supply is performed by using liquid chlorine (sodium hypochlorite) injected at each well site during the operation of the well. The District also has the ability to inject liquid chlorine into the Cate Reservoir separately should the need arise. The District maintains all of its chlorine pumps, seven pumps of which can pump 1 gallon per hour and 2 pumps that can pump 2 gallons per hour of liquid chlorine. The District also maintains three spare LMI pumps and spare parts. Maintenance to chlorine system including pumps is all performed in house by trained District staff.

Four Hach Colorimeters are used for testing chlorine residual. Maintenance, calibration, and inspection (every 6 months) are provided by trained District Staff.

System Maintenance

An annual flushing program is utilized to flush all dead ends and areas of concern in the distribution system. Fire hydrants and isolation valves in these general areas are also exercised and tested at this time.

Main breaks on the older shallower lines are repaired under pressure utilizing repair clamps to minimize the possibility of back siphoning and contamination of the distribution system.

Record Keeping

Sampling reports and test results shall be retained for at least five years at the District office. Additionally, the laboratory shall submit copies of all required bacteriological monitoring results directly to the DHS.

Emergency Contamination Procedures

If repeat samples are total coliform-positive, District management and the DHS must be immediately notified and the effected system must be flushed, disinfected and resample until the contamination is alleviated. The General Manager in conjunction with one or both of the Districts's certified operators, under the direction of the DHS, will determine the need for and the oversight of all emergency events. The General Manager will have the responsibility to insure that

proper procedures are followed protecting the Pico Water District system and its customers.

Well Contamination: Should sampling reveal possible contamination of one or more of our wells do the following:

- Samples of the reservoir and the distribution system should be taken to insure the contamination has not entered the system.
- Notify the General Manager. He shall be responsible, under the direction of the DHS, for determining the need for and the oversight of all emergency events. It shall be his responsibility to insure that proper procedures are followed protecting the Pico Water District system and its customers.
- Notify General Pump Company for assistance in flushing and decontaminating the well(s).
- Return the system to normal operation only after it has been deemed safe to do so.

Reservoir Contamination: Should sampling reveal possible contamination of our reservoir, do the following:

- Samples of the distribution system should be taken to insure the contamination has not entered the system.
- Samples of the well(s) should be taken to determine if the contamination source is within the well(s).
- Notify the General Manager. He shall be responsible, under the direction of the DOHS, for determining the need for and the oversight of all emergency events. It shall be his responsibility to insure that proper procedures are followed protecting the Pico Water District system and its customers.
- If deemed necessary, notify Matt-Chlor Inc. for assistance in flushing and chlorinating the reservoir(s).
- Return the system to normal operation only after it has been deemed safe to do so.

Distribution System Contamination: Should sampling reveal possible contamination of our reservoir, do the following:

- Samples of the wells and the reservoir should be taken to determine the source of the contamination.
- Utilizing fire hydrants flush the effected area and resample.
- Notify the General Manager. He shall be responsible, under the direction of the DHS, for determining the need for and the oversight of all emergency events. It shall be his responsibility to insure that proper procedures are followed protecting the Pico Water District system and its customers.

- Notify Matt-Chlor Inc. if portable or spot chlorination of the distribution system is required.
- Return the system to normal operation only after it has been deemed safe to do so.

Should emergency or portable chlorination equipment be needed, or spot chlorination be required in the distribution system, contact Matt-Chlor Inc. Chlorine injection points are provided at each well discharge piping, each reservoir and on the discharge piping of the distribution pumps. Likewise, should a failure occur in the chlorination system, contact Matt-Chlor Inc. for service.

Public Notification

Should a contamination event occur requiring public notification as directed by DHS, the District will follow the dictates of Title 22, Sections 64463.1 – 664467 to the satisfaction of the DHS inspector. The following will be enacted based upon the direction of the DHS inspector:

- Electronic media notification via local radio and television as soon as possible but in no case more than 24 hours after being directed to do so by the DOHS.
- Print media via local daily newspapers of a Water Quality Failure given at least once within 14 days of the incident.
- If required, flyers containing information about the Water Quality Failure would be handed out door-to-door and posted in public places.
- Additionally, two vehicles equipped with loudspeakers could be utilized to notify the residents of the Water Quality Failure.
- In severe contamination cases, boil water notices would be handed out door-to-door, posted in public places and local media notified.

Liquid Chlorine Safety and First Aid

When transporting liquid chlorine proper safety equipment shall be used.
Do Not Attempt to repair a leak without proper safety equipment (PPE).

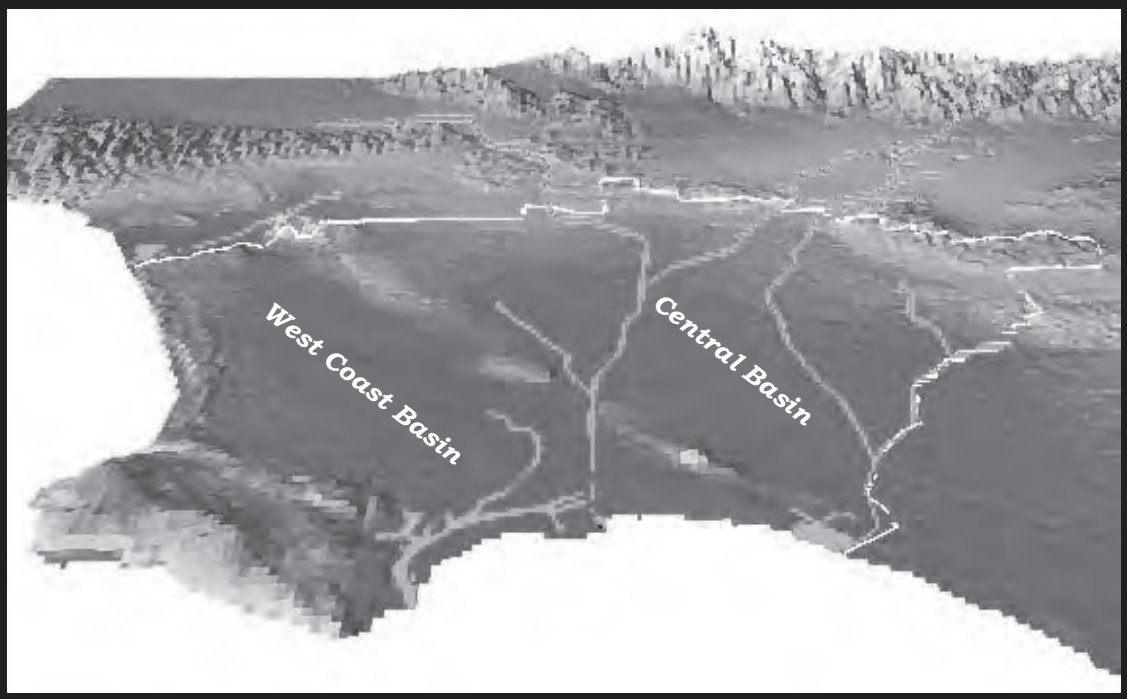
1. Prior to entering a room, turn on vents to allow proper ventilation to remove all liquid chlorine fumes. Cautiously approach leak area.
2. Leaks – Prior to entering leak area, the proper safety equipment must be worn at all time: goggles, face shield, chemical cloves and chemical apron. Shutoff chlorine pump, contain material, and wash down leak with plenty of water.
3. Always wear proper clothing and PPE.
4. Segregate from amines, ammonium aldehyde, ammonium carbonate, aziridine, methanol, phenylacetonitrile, ammonium nitrate, ammonium

oxylate, ammonium phosphate, cellulose, ethylene imine. Do not mix acid, aqua ammonia, or other organic or inorganic chemicals with the product. **It causes violent reactions.**

First Aid

1. Eye Contact - Flush with water. Remove contact [if applicable]. Hold eyelids open. Continue flushing with water for 15 minutes. Get prompt medical attention.
2. Skin Contact- Wash affected area with soap and water 15 minutes. Get medical attention.
3. Inhalation Contact– Carefully move to safe area, test for vital signs. Seek medical attention immediately.
4. Ingestion Contact– Drink large quantities of water. DO NOT give vinegar or other acids. DO NOT induce vomiting. Get prompt medical attention.
5. Refer to the Material Safety Data Sheets (MSDS) for further information.

Appendix F
WRD Engineering Survey Report 2011



Engineering Survey and Report

2011

WRD

March 4, 2011

Water Replenishment District
Of Southern California

ENGINEERING SURVEY AND REPORT, 2011

BOARD OF DIRECTORS	MANAGEMENT
Division 1	**General Manager**
Willard H. Murray, Jr., Vice President	Robb Whitaker
Division 2	**Chief Engineer**
Robert Katherman, Secretary	Vacant
Division 3	**Chief Hydrogeologist**
Lillian Kawasaki, Director	Theodore Johnson
Division 4	**Chief Financial Officer**
Sergio Calderon, President	Scott Ota
Division 5	**Manager of External Affairs**
Albert Robles, Treasurer	Elsa Lopez
District Counsel	**Manager of Finance and Administration**
Francisco Leal	Jenna Shaunessy

Professional Certification

This Engineering Survey and Report has been prepared under the direct supervision of the California Professional Geologist whose signature appears below. This individual certifies that the information contained in the report has been prepared in accordance with the generally accepted principles and practices of his profession.

(signature to be provided on revised ESR following Board adoption of Replenishment Assessment in May)

_____

Theodore A. Johnson, PG 6142, CHG 240

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GLOSSARY OF ACRONYMS

ABP	Alamitos Barrier Project
AF	Acre-Feet (equivalent to 325,851 gallons)
AFY	Acre-Feet per Year
APA	Allowed Pumping Allocation
CB	Central Basin
CBMWD	Central Basin Municipal Water District
CDPH	California Department of Public Health (formerly California Department of Health Services)
CEC	Chemicals of Emerging Concern
CEQA	California Environmental Quality Act
CHG	Certified Hydrogeologist
CIP	Capital Improvement Program
CPI	Consumer Price Index
CWCB	Central and West Coast Basins
DGBP	Dominguez Gap Barrier Project
DPH	California Department of Public Health
DTSC	California Department of Toxic Substances Control
DWR	State Department of Water Resources
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ESR	Engineering Survey and Report
FY	Fiscal Year (July 1 – June 30)
GAC	Granular Activated Carbon
GIS	Geographic Information System
IRWMP	Integrated Regional Water Management Plan
LACDHS	Los Angeles County Department of Health Services
LACDPW	Los Angeles County Department of Public Works (Flood Control)
LADWP	Los Angeles Department of Water and Power
LBWD	Long Beach Water Department
MAR	Managed Aquifer Recharge
Met	Metropolitan Water District of Southern California
MCL	Maximum Contaminant Level
MF	Microfiltration
MFI	Modified Fouling Index
mgd	Million Gallons per Day
MOU	Memorandum of Understanding

GLOSSARY OF ACRONYMS (continued)

msl	Mean Sea Level
MWD	Metropolitan Water District of Southern California
NDMA	N-Nitrosodimethylamine
O&M	Operations and Maintenance
PG	Professional Geologist
ppb	Parts Per Billion (µg/L)
ppm	Parts Per Million (mg/L)
PRC	Program Review Committee
PWRP	Pomona Water Reclamation Plant
RA	Replenishment Assessment
RO	Reverse Osmosis
RTS	Readiness-to-Serve
RWQCB	Regional Water Quality Control Board (Los Angeles Region)
SAT	Soil Aquifer Treatment
SDLAC	Sanitation Districts of Los Angeles County
SDWP	Safe Drinking Water Program
SGVMWD	San Gabriel Valley Municipal Water District
SJCWRP	San Jose Creek Water Reclamation Plant
TAC	Technical Advisory Committee
TITP	Terminal Island Treatment Plant
USGS	United States Geological Survey
USGVMWD	Upper San Gabriel Valley Municipal Water District
UV	Ultraviolet Light Treatment
VOC	Volatile Organic Compound
WAS	Water Augmentation Study
WBMWD	West Basin Municipal Water District
WCB	West Coast Basin
WCBBP	West Coast Basin Barrier Project
WIN	Water Independence Network
WNWRP	Whittier Narrows Water Reclamation Plant
WRD	Water Replenishment District of Southern California
WRP	Water Reclamation Plant
WY	Water Year (October 1 – September 30)

BOARD SUMMARY

District Staff is pleased to present the 2011 Engineering Survey and Report ("ESR"). It was prepared pursuant to the California Water Code, Section 60300 et seq. and determines the past, current, and ensuing year groundwater conditions in the Central and West Coast Basins ("CWCB"). The report contains information on groundwater production, annual and accumulated overdraft, water levels, quantity, source, and cost of replenishment water, and a discussion of necessary projects and programs to protect and preserve the groundwater resources of the basins.

The ESR provides the Board of Directors with the necessary information to justify the setting of a replenishment assessment ("RA") for the ensuing fiscal year (July 1 – June 30) to purchase replenishment water and to fund projects and programs related to groundwater replenishment and groundwater quality over the water year (October 1 – September 30).

The following is a summary of information presented in the ESR:

1. <u>Groundwater Production</u>

- Adjudicated Amount: 281,835 AF
- Previous Water Year: 241,329 AF
- Current Water Year: 241,000 AF (est)
- Ensuing Water Year: 243,000 AF (est)

2. <u>Annual Overdraft</u>

- Previous Water Year: 84,200 AF
- Current Water Year: 80,800 AF (est)
- Ensuing Water Year: 97,800 AF (est)

3. <u>Accumulated Overdraft</u>

- Previous Water Year: 726,300 AF
- Current Water Year: 703,600 AF (est)

4. <u>Groundwater Levels</u>

Groundwater levels are an indication of the amount of water in the basins. They indicate areas of recharge and discharge and reveal which way the groundwater is moving. Groundwater levels are used to determine when additional replenishment water is required and are used to calculate storage changes. The groundwater levels can also indicate possible source areas for saltwater intrusion and can show the effectiveness of the seawater barrier injection wells along the coast.

WRD staff tracks groundwater levels throughout the year by measuring the depth to water in production wells and monitoring wells. **Plate 3** shows changes in groundwater levels in the CWCB over the previous water year 2009/2010. Because of the storm water captured and purchase of untreated Tier 1 replenishment water by WRD, the Montebello Forebay area experienced a rise of up to 10 feet in some areas and the average increase was about 5 feet. This increase partially but not completely offset the losses incurred in storage over the past 10 years where mostly dry conditions prevailed. Parts of the Lakewood and Long Beach areas saw declines of up to 5 feet. The remainder of the CB was generally unchanged with the exception of a small area near Cerritos which saw an increase of nearly 15 feet. The West Coast Basin was less impacted because the inflows generally matched the outflows in the western and southern parts of the basin, with increases of 5 feet or less observed. But in the northeastern area around Gardena, a decline of nearly 10 feet was observed.

Based on the groundwater levels observed over various areas of the Central and West Coast Basins and the anticipated replenishment activities by WRD, the District anticipates having sufficient supplies of safe and reliable groundwater to meet the demands of the pumpers in the ensuing year.

5. <u>Quantity Required for Replenishment</u>

Chapter IV details the quantity of water that WRD must purchase in the ensuing water year to help offset the annual overdraft. A summary is listed below:

- Spreading Water: 71,000 AF (50,000 recycled; 21,000 imported)
- Seawater Barrier Water: 31,600 AF (14,800 AF recycled; 16,800 imported)
- In-Lieu Program Water: 10,303 AF
- Total Water: 112,903 AF

6. <u>Source of Replenishment Water</u>

The sources of replenishment water to the District for the ensuing water year are detailed in Chapter IV. Seasonal spreading water from MWD has not been available since May 2007 and is not anticipated to be available in the ensuing year. Therefore, like last year WRD is planning for untreated Tier 1 imported water for spreading. The In-Lieu water is not currently available from MWD but is being budgeted for in case it becomes available. If it does not, the collected monies will be placed in a water purchase reserve for replenishment water purchases at a later time. A summary of the sources of replenishment water is as follows:

- <u>Recycled Water:</u> Spreading water from the Sanitation Districts of Los Angeles County (SDLAC). West Coast Basin Barrier Project (WCBBP) water from the West Basin Municipal Water District's Edward C. Little Water Treatment Facility. Dominguez Gap Barrier Project (DGBP) water from the City of Los Angeles Terminal Island Treatment Plant. Alamitos Barrier Project (ABP) water from WRD's Leo J. Vander Lans Facility.

- Imported Water: Spreading water from Central Basin Municipal Water District or other MWD member agencies. WCBBP water and DGBP water from West Basin Municipal Water District. ABP water from the City of Long Beach.

7. Cost of Replenishment Water

WRD has estimated it will need 112,903 AF of replenishment water in the ensuing year. The MWD and their member agencies and the SDLAC set the price for the replenishment water WRD buys for the replenishment at the spreading grounds, barrier wells, and In-Lieu, and are a direct pass-through on WRD's replenishment assessment.

MWD in 2010 established a two-year budget with an anticipated price increase of around 7% for their water. MWD-member agencies such as CBMWD, WBMWD, and Long Beach have not yet set their rates so WRD does not know what their surcharges on the MWD water will be at this time. Over the next couple months, this information will become available and WRD will adjust its water cost estimates prior to adopting its replenishment assessment in May 2011.

Using currently available information and estimates for the cost of replenishment water to WRD in the ensuing year, the 112,903 AF required for purchase will cost approximately $42,156,493. This includes $16,100,428 for the spreading grounds, $22,356,257 for the seawater barrier injection wells, and $3,699,808 for In-Lieu water. **Tables 1 and 2** provide a detailed breakdown of these costs.

These estimated costs are for anticipated water purchases only in the ensuing year for normal WRD operations. They do not include possible makeup water purchases to help overcome the Optimum Quantity deficit as discussed on page 2 of Chapter IV. Nor do they include the additional costs for projects and programs required to replenish the basins and to protect groundwater quality. These projects and programs are discussed in the Chapter V. The anticipated costs for any makeup water and for the projects and programs to protect and preserve groundwater supplies in the District will be presented during the District's annual budgeting and rate setting process that will culminate in the Board's adoption of the 2011/2012 Replenishment Assessment in May 2011 effective July 1, 2011.

8. Projects and Programs

A list of the WRD projects and programs related to groundwater replenishment and the protection and preservation of water quality is shown on **Table 3**. Funds are required to finance these projects and programs. Sections 60221 and 60230 of the Water Replenishment District Act authorize the WRD to undertake a wide range of capital projects and other programs aimed at enhancing groundwater replenishment. Section 60224 of the Water Replenishment District Act states that WRD may establish projects or programs that will directly or indirectly preserve and protect the groundwater supplies within its boundaries.

These projects and programs address any existing or potential problems related to the basin's groundwater, and may extend beyond the District's boundaries if the threat of contamination is outside those boundaries. The programs span all phases of planning, design, and construction and are financed by the collection of a replenishment assessment. A more detailed description of each project and program is presented in Chapter V of the report.

9. Conclusions

Based upon the information presented in the ESR, a replenishment assessment is necessary in the ensuing year to purchase replenishment water for managed aquifer recharge to help make up the annual overdraft and to finance projects and programs to perform replenishment and water quality activities. These actions will ensure sufficient supplies of high quality groundwater within the District for the benefit of the residents and businesses in the Central and West Coast Basins.

CHAPTER I
INTRODUCTION

Purpose of the Engineering Survey & Report

To facilitate the Board of Directors' decisions and actions, the Water Replenishment District Act requires that an engineering survey and report ("ESR") be prepared each year. This *Engineering Survey and Report 2011* is in conformity with the requirements of Section 60300 et seq. Water Replenishment District Act and presents the necessary information on which the Board of Directors can declare whether funds shall be raised to purchase water for replenishment during the ensuing year, as well as to finance projects and programs aimed at accomplishing groundwater replenishment. With the information in this ESR, the Board can also declare whether funds shall be collected to remove contaminants from the groundwater supplies or to exercise any other power under Section 60224 of the California Water Code. The information presented in this report along with the District's strategic planning and budget preparation presents the necessary information on which the Board of Directors can base the establishment of a replenishment assessment for the ensuing year 2011/2012.

Scope of Engineering Survey & Report

This report contains specific information outlined in Chapter I, Part 6 of Division 18 of the Water Code (the Water Replenishment District Act, § 60300 and § 60301). The following is a brief description of the contents of this report:

1) *a discussion of groundwater production within the District (Chapter II);*
2) *an evaluation of groundwater conditions within the District, including estimates of the annual overdraft, the accumulated overdraft, changes in water levels, and the effects of water level fluctuations on the groundwater resources (Chapter III);*
3) *an appraisal of the quantity, availability, and cost of replenishment water required for the ensuing water year (Chapter IV); and*
4) *a description of current and proposed programs and projects to accomplish replenishment goals and to protect and preserve high quality groundwater supplies within the District (Chapter V).*

Schedule for Setting the Replenishment Assessment

The following actions are required by the Water Code to set the Replenishment Assessment:

1) *The Board shall order the preparation of the ESR by the second Tuesday in February (see Section 60300).*
2) *The Board shall declare by resolution whether funds shall be collected to purchase replenishment water and to fund projects and programs related to replenishment and/or water quality activities by the second Tuesday in March and after the ESR has been completed (see Section 60305).*
3) *A Public Hearing will be held for the purpose of determining whether District costs will be paid for by a replenishment assessment. The Public Hearing will be opened on or before the second Tuesday in April and may be continued from time to time to subsequent Board meetings but will be completed by the first Tuesday in May (see Section 60306).*

4) *The Board by resolution shall levy a replenishment assessment for the ensuing fiscal year by the second Tuesday in May (see Sections 60315; 60317).*

Although dates specified in the code refer generally to 'on or before certain Tuesdays', the Water Code (Section 60043) also states that "*Whenever any act is required to be done or proceeding taken on or set for a particular day or day of the week in any month, the act may be done or proceeding set for and acted upon a day of the month otherwise specified for a regular meeting of the board"*. Therefore, there is flexibility as to the actual dates when Board actions are taken regarding the ESR, adopting resolutions, conducting public hearings, and the setting the replenishment assessment.

The ESR is completed in March of each year to provide the Board with the necessary information to determine whether a replenishment assessment will be needed in the ensuing year to purchase replenishment water and to fund projects and programs related to water quality and replenishment activities. However, in the subsequent months leading up to the adoption of the replenishment assessment in April or May, new information is normally received that affects the findings presented in the March ESR. This new information is typically related to the price WRD has to pay for replenishment water since the rates set by the Metropolitan Water District of Southern California (MWD or Met) and the Met-member agencies are not typically finalized until after the March ESR is adopted. The final information used by the Board to adopt the replenishment assessment in April or May is reflected in an updated ESR published following the adoption of the replenishment assessment.

CHAPTER II
GROUNDWATER PRODUCTION

Adjudication and Demand

Prior to the adjudication of groundwater rights in the early 1960s, annual production (pumping) reached levels as high as 292,000 AF in the Central Basin ("CB") and 94,000 AF in the West Coast Basin ("WCB"). This was more than double the natural safe yield of the basins as determined by the California Department of Water Resources in 1962 (173,400 AF). Due to this serious overdraft, water levels declined, groundwater was lost from storage, and seawater intruded into the coastal aquifers. To remedy this problem, the courts adjudicated the two basins to put a limit on pumping. The West Coast Basin adjudication was set at 64,468.25 acre-feet per year ("AFY"). The Central Basin adjudication was set at 271,650 AFY, although the Judgment set a lower "Allowed Pumping Allocation" ("APA") of 217,367 AFY to impose stricter control. Therefore, the current amount allowed to be pumped from both basins is 281,835 AFY.

The adjudicated pumping amounts are greater than the natural replenishment of the groundwater aquifers, creating an annual deficit or annual overdraft. WRD is enabled under the California Water Code to purchase and recharge additional water to make up the overdraft, which is known as artificial replenishment or managed aquifer recharge (MAR). WRD has the authority to levy a replenishment assessment on all pumping within the District to raise the monies necessary to purchase the artificial replenishment water and to fund projects and programs necessary for replenishment and groundwater quality activities.

Production

Under the terms of Section 60326.1 of the Water Replenishment District Act, each groundwater producer must submit a report to the District summarizing their monthly production activities (quarterly for smaller producers). The information from these reports is the basis by which each producer pays the replenishment assessment. WRD then provides these production data to the State Department of Water Resources ("DWR"), which acts as the court-appointed Watermaster in connection with the adjudication of the Central and West Coast Basins ("CWCB").

Previous Water Year:

Per the Water Code, WRD tracks and reports on groundwater production (pumping) on a Water Year ("WY") basis covering the time frame of October 1 - September 30 for each year. For the previous WY (2009/2010), groundwater production in both basins totaled 241,329 AF (197,387 AF in CB and 43,942 AF in the WCB). This is 2,073 AF less than the previous water year (769 AF less in the CB and 1,304 AF less in the WCB).

Plate 1 illustrates the groundwater production in the CWCB during the previous water year and **Table A-5** presents historical pumping amounts in the CWCB.

Current Water Year:

For the first two months of the current WY (October and November 2010), production was 36,991 AF in the two groundwater basins (30,019 AF in the CB and 6,972 AF in the WCB). This is 258 AF more than in October and November of the previous year. However, due to the WRD Board's

declaration of a Water Emergency on November 19, 2010 (see below), it is anticipated that pumping may end up lower than in the previous year. Taking this into account, it is currently estimated that the pumping in the current WY will total 241,000 AF (197,000 AF in CB and 44,000 AF in the WCB).

Ensuing Water Year:

To estimate production for the ensuing year, recent averages are used in addition to knowledge of changing conditions that might affect pumping. Actual pumping patterns can vary considerably throughout the year based on a pumper's individual operational needs, water demands, conservation efforts and hydrology, making accurate forecasting difficult.

To estimate the ensuing year's groundwater production, WRD is using the average of the past 3 years actual pumping (rounded to nearest 500 AF). This equals 243,000 AF total for both basins including 200,500 AF in the CB and 42,500 AF in the WCB. **Table 1** shows the groundwater production amounts for the previous, current, and ensuing water years.

Measurement of Production

With few exceptions, meters installed and maintained by the individual producers measure the groundwater production from their wells. Through periodic testing, DWR as Watermaster verifies the accuracy of individual meters and orders corrective measures when necessary. The production of the few wells that are not metered is estimated on the basis of electrical energy consumed by individual pump motors, duty of water, or other reasonable means.

Carryover and Drought Provisions

The "carryover" of unused rights influences the actual amount of production for any given year. The "carryover" for any single year is 20% of the allotted pumping right in both the Central and West Coast Basins. This provision of the Judgments extends the flexibility with which the pumpers can operate. Conversely, the use of rights beyond the annual allotted quantity affects the annual production amount in the opposite manner.

During emergency or drought conditions, WRD can allow under certain conditions an additional 27,000 AF of extractions for a four-month period (17,000 for CB and 10,000 for WCB) assuming certain conditions are met. This provision has yet to be exercised but offers the potential use of an additional 7.8% pumping in the CB and 15% in the WCB.

Drought Carryover due to a WRD-Declared Water Emergency

The Central Basin Judgment also contains an additional Drought Carryover provision available to all Central Basin water rights holders after a declaration of a Water Emergency by the WRD Board of Directors. The Drought Carryover allows water rights holders to carryover an additional 35% of their APA (or 35 AF, whichever is larger) beyond the annual 20% described above during the period that the Declared Water Emergency is in effect.

The intent of the action is prevent further degradation of the groundwater basins by helping to restore groundwater levels and improving the water supply in the aquifers by providing an incentive to groundwater producers in the Central Basin to reduce pumping for a particular period of time.

A Declared Water Emergency is defined in the Judgment as:

> *"A period commencing with the adoption of a resolution of the Board of Directors of the Central and West Basin Water Replenishment District declaring that conditions within the Central Basin relating to natural and imported supplies of water are such that, without implementation of the water emergency provisions of this Judgment, the water resources of the Central Basin risk degradation. In making such declaration, the Board of Directors shall consider any information and requests provided by water producers, purveyors and other affected entities and may, for that purpose, hold a public hearing in advance of such declaration. A Declared Water Emergency shall extend for one (1) year following such resolution, unless sooner ended by similar resolution."*

In 2010 the District received formal requests to declare a Water Emergency from 21 Central Basin pumpers, representing 55.2% of the water rights holders in the Central Basin. Additionally, the Central Basin Water Association and the District's Technical Advisory Committee both recommended such a declaration. Staff reviewed the requests and analyzed the current groundwater conditions in the Central Basin as follows:

- Water years 2007-2009 were the 12th driest three-year period in the State's measured hydrologic record and also marked a period of severe restrictions in State Water Project diversions from the Sacramento-San Joaquin River Delta to protect endangered fish species. As a result, the Central Basin has seen a significant drop in water levels and storage due to reduced availability of both imported and local (stormwater) groundwater replenishment supplies.

- The Montebello Forebay key well 1601T was near 32-year lows.

- The average elevation of the four Central Basin key wells identified in the Central Basin Judgment to assess the health of the basin was near 32 year lows.

- Groundwater levels in the southern portion of the Central Basin were near historic lows.

- The accumulated overdraft of the Central and West Coast Basins is approximately 140,000 acre-feet below the WRD Board adopted optimum quantity.

- Future availability of discounted imported replenishment water from MWD, the water the District has relied upon for nearly 50 years to replenish the basins, was cut off by MWD in May 2007 and remains unavailable to this day with future availabilities uncertain.

- The next grade of water for replenishment is the more expensive untreated Tier 1 water. WRD does not have an agreement for this water and must rely on surplus Tier 1 that may be available from MWD member agencies within the District's service area.

Based on this information and the requests received from the Central Basin water rights holders, on November 19, 2010 the WRD Board held a Public Hearing to accept testimony and receive evidence on the Declared Water Emergency, and adopted Resolution 10-892 to declare the water emergency effective November 19, 2010 for a period of one year unless ended sooner by another WRD Resolution.

CHAPTER III
GROUNDWATER CONDITIONS

Introduction

The California Water Code Section 60300 requires WRD to determine annually in the Engineering Survey and Report ("ESR") the following items related to groundwater conditions in the Central and West Coast Basins ("CWCB"):

1) Total groundwater production for the previous water year and estimates for the current and ensuing water years;

2) The Annual Overdraft for the previous water year and estimates for the current and ensuing water years;

3) The Accumulated Overdraft for previous water year and an estimate for the current water year;

4) Changes in groundwater levels (pressure levels or piezometric heights) within the District and the effects these changes have on groundwater supplies within the District; and

5) An estimate of the quantity, source, and cost of water available for replenishment during the ensuing water year;

To meet these requirements, WRD's hydrogeologists and engineers closely monitor and collect data to manage the groundwater resources of the District throughout the year. They track groundwater levels from WRD's network of specialized monitoring wells and from groundwater producers' production wells. They update and run computer models developed by the United States Geological Survey ("USGS") and others to simulate groundwater conditions and to predict future conditions. They use their geographic information system ("GIS") and database management system to store, analyze, map, and report on the information required for the ESR. They work closely with the Los Angeles County Department of Public Works on spreading grounds and seawater barrier wells to determine current and future operational impacts to groundwater supplies. They work closely with the Metropolitan Water District of Southern California ("MWD" or "Met"), the local MWD member agencies, and the Sanitation Districts of Los Angeles County ("SDLAC") on the current and future availability of supplemental replenishment water. They also work with regulators on replenishment criteria for water quality and recycled water use, and with the groundwater pumpers, the pumpers' Technical Advisory Committee ("TAC"), and other stakeholders to discuss the current and future groundwater conditions within the District and in neighboring basins.

The information on Annual Overdraft, Accumulated Overdraft, water levels, and change in storage are discussed in the remainder of this chapter. Groundwater production was previously discussed in Chapter II. The estimated quantity, source, and cost of replenishment water will be discussed in Chapter IV.

Annual Overdraft

Section 60022 of the Water Replenishment District Act defines Annual Overdraft as "*...the amount...by which the quantity of groundwater removed by any natural or artificial means from the*

groundwater supplies within such replenishment district during the water year exceeds the quantity of non-saline water replaced therein by the replenishment of such groundwater supplies in such water year by any natural or artificial means other than replenishment under the provisions of Part 6 of this act or by any other governmental agency or entity." (Part 6 of the Act pertains to water that WRD purchases for replenishment). Therefore, the Annual Overdraft equals the natural inflows to basins (not including WRD purchased water) minus all of the outflows (mostly pumping). There is an Annual Overdraft almost every year for the simple fact that the groundwater extractions typically exceed the natural groundwater replenishment. It has been one of the District's main responsibilities since 1959 to help make up this Annual Overdraft by purchasing artificial replenishment water to recharge the aquifers and supplement the natural recharge.

To determine the Annual Overdraft for the previous water year, WRD determines the inflows and outflows of the CWCB. In Water Year 2009/2010, natural inflows (storm water capture, areal recharge, and underflow) totaled 157,125 AF and WRD purchased 111,201 AF of recharge water (at barrier wells and spreading grounds). The total net outflows from the basins were 241,326 AF from pumping. The difference between the inflows and outflows was +27,000 AF, which is a gain in storage. The Annual Overdraft is the natural inflows minus total outflows, or 84,201 AF.

For the current and ensuing WY estimates for Annual Overdraft, the concept of "Average Annual Groundwater Deficiency" is utilized. The Average Annual Groundwater Deficiency is the long-term average of natural inflows minus total outflows and represents the long term average deficit (Annual Overdraft) in the basins. The development of the USGS/WRD computer model derived these long term average inflow and outflow terms. **Table 4** presents this information, which concluded that the Average Annual Groundwater Deficiency is 105,385 AFY. Values of the average deficiency are based on the long term (30 year average) inflows and outflows as calculated by the computer model. Long-term average inflows are influenced by the amount of precipitation falling on the District as well as for storm water capture at the spreading grounds. **Table 5** and **Figure A** show the historical precipitation at LACDPW Station #107D, located in Downey near the Montebello Forebay.

The calculation of the Average Annual Groundwater Deficiency represents in general that WRD needs to replenish about 105,385 AFY assuming long-term average conditions for the water balance to reach equilibrium, the overall change in storage to equal zero, and groundwater levels to remain relatively constant. As shown in **Table 6**, adjustments are made to the long term average inflows and outflows for the current and ensuing WY to reflect estimates of the Annual Overdraft for those particular years. Based on these adjustments, the current year Annual Overdraft is estimated at 80,800 AF and for the ensuing year 97,800 AF.

Accumulated Overdraft

Section 60023 of the Water Replenishment District Act defines *"Accumulated Overdraft"* as "*...the aggregate amount…by which the quantity of ground water removed by any natural or artificial means from the groundwater supplies…during all preceding water years shall have exceeded the quantity of nonsaline water replaced therein by the replenishment of such ground water supplies in such water years by any natural or artificial means…"*

In connection with the preparation of Bulletin No. 104-Appendix A (1961), the DWR estimated that the historically utilized storage (Accumulated Overdraft) between the high water year of 1904 and

1957[1] was 1,080,000 AF (780,000 in CB, 300,000 in WCB). Much of this storage removal was from the forebay areas (Montebello Forebay and Los Angeles Forebay), where aquifers are merged, unconfined and serve as the "headwaters" to the confined pressure aquifers. Storage loss from the confined and completely full, deeper aquifers was minimal in comparison or was replaced by seawater intrusion, which can not be accounted for under the language of the Water Code since it is considered saline water.

The goal of groundwater basin management by WRD is to ensure a sufficient supply of safe and reliable groundwater in the basins for annual use by the pumpers, to keep a sufficient supply in storage for times of drought when imported water supplies may be curtailed for several consecutive years as well as to keep suitable room available in the basins to receive natural water replenishment in very wet years, such as an El Niño type year.

To compute the Accumulated Overdraft since this initial amount, WRD takes each consecutive year's Annual Overdraft and replenishment activities and determines the change in storage. It adds to or subtracts the corresponding value from the Accumulated Overdraft. Since the base level, the aggregate excess of extractions over recharge from the basins has been reduced due to the replenishment by WRD, the reduction of pumping from the adjudications, and the replenishment from seawater barrier injection. The Accumulated Overdraft at the end of the previous WY was determined to be 726,300 AF. For the current year, the Accumulated Overdraft is forecast to be 703,600 AF. This could change if hydrology or pumping patterns or planned artificial replenishment activities vary considerably.

Table 7 presents information for the previous and current Accumulated Overdraft estimate. The annual changes in storage since 1961/1962 are presented on **Table 8**.

Groundwater Levels

A groundwater elevation contour map representing water levels within the District in fall 2010 (end of the water year) was prepared for this report and is presented as **Plate 2**. The data for the map were collected from wells that are screened in the deeper basin aquifers where the majority of groundwater pumping occurs. These deeper aquifers include the Upper San Pedro Formation aquifers, including the Lynwood, Silverado, and Sunnyside. Water level data was obtained from WRD's network of monitoring wells and from groundwater production wells that are screened in the deeper aquifers.

As can be seen on **Plate 2**, groundwater elevations range from a high of about 170 feet above mean sea level (msl) in the northeast portion of the basin above the spreading grounds in the Whittier Narrows to a low of about 120 feet below msl in the Long Beach area and about 130 feet below msl in the Gardena area. With the exception of the Montebello Forebay and along the West Coast Basin Barrier Project, the majority of groundwater levels in the District are below sea level, which is why continued injection at the seawater barriers is needed to prevent saltwater intrusion.

Plate 2 also shows the location of the key wells used for long-term water level data. These long-term hydrographs have been presented in the ESR for years, and provide a consistent basis from

[1] DWR Bulletin 104-A did not refer to the ending year for the storage determination. WRD has assumed it to be the year 1957, as this is the end year for their detailed storage analysis presented in Bulletin 104-B – Safe Yield Determination.

which to compare changing water levels. A discussion of water levels observed in the key wells is presented below.

Los Angeles Forebay

The Los Angeles Forebay occupies the westerly portion of the Central Basin Non-Pressure Area. Historically a recharge area for the Los Angeles River, this forebay's recharge capability has been substantially reduced since the river channel was lined. Recharge is now limited to deep percolation of precipitation, in-lieu when available, subsurface inflow from the Montebello Forebay, the northern portion of the Central Basin outside of WRD's boundary, and relatively small amounts from the San Fernando Valley through the Los Angeles Narrows.

Key well **2S/13W-10A01** represents the overall water level conditions of the Los Angeles Forebay (see **Figure B**). The water level high was observed in 1938 and by 1962 water levels had fallen nearly 180 feet due to basin over-pumping and lack of sufficient natural recharge. Since then, basin adjudication and managed aquifer recharge by WRD and others have improved water levels in this area by over 80 feet. Over the past 10 years, groundwater levels in this well have remained relatively constant with only minor fluctuations. This past year saw a rise of less than a foot.

For the current water year, rainfall is about normal for a full year with a couple months to go in the rainy season. Therefore, it is expected that the water year will end up slightly above normal for precipitation amounts. This plus a pumping decrease that is expected (See Section II) and the spreading of untreated Tier 1 (firm delivery) imported water in the Montebello Forebay are expected to cause water levels in the Los Angeles Forebay to slightly rise in the current year.

Montebello Forebay

The Montebello Forebay lies in the northeastern portion of the Central Basin and connects with the San Gabriel Basin to the north to the Central Basin via the Whittier Narrows. The Rio Hondo and San Gabriel River Spreading Grounds in the forebay provide the vast majority of artificial recharge to the Central Basin aquifers. Three key wells help describe the water level conditions in the Montebello Forebay, a northern well, middle well, and southeastern well (**Plate 2**):

- **Well 2S/11W-18C07** (WRD Monitoring Well Pico#1, Zone 4) is in the northern part of the Montebello Forebay. It replaces the earlier production well 2S/11W-18K02 that had been used for over 50 years but has been destroyed. The upper chart on **Figure C** shows the water levels for this well. At the end of water year 2009/2010, groundwater levels in this well were 9 feet higher than the previous year due to natural and managed replenishment efforts.

- **Well 2S/12W-24M08** (LACDPW Well No. 1601T) is centrally located between the two spreading grounds. This well is monitored weekly by WRD to assess water levels in the forebay and as an indicator of the water levels in the middle of the Forebay and as an indicator for purchasing replenishment water. The middle chart on **Figure C** shows the water levels for this well. The historic water level high was observed in 1942, but by 1957 had fallen 117 feet to an all-time low due to basin over-pumping and insufficient natural recharge. As described above for the Los Angeles Forebay, adjudication of pumping rights and managed aquifer recharge helped restore water levels in the Montebello Forebay. Due to drought and lack of discounted replenishment water, this well had recently been experiencing dropping water levels and reached

a 32-year low in 2009. However in WY 2009/2010 it recovered somewhat due to precipitation recharge and purchase of untreated Tier 1 water by WRD for replenishment. At the end of WY 2009/2010, groundwater levels in this well were 8 feet higher than the previous year.

- **Well 3S/12W-01A06** (LACDPW Well No. 1615P) is located downgradient and southeast of the spreading grounds near the southern end of the Montebello Forebay and the water level responses in this well are less pronounced than the other two wells because it is further from the spreading grounds and the recharge that occurs there. The lower chart on **Figure C** shows the water levels for this well. At the end of water year 2009/2010, groundwater levels in this well were 0.5 feet lower than the previous year.

- For the current water year, rainfall is about normal for a full year with a couple months to go in the rainy season. Therefore, it is expected that the water year will end up slightly above normal for precipitation amounts. This plus a pumping decrease that is expected (See Section II) and the spreading of untreated Tier 1 (firm delivery) imported water in the Montebello Forebay are expected to cause water levels to rise in the current year.

Central Basin Pressure Area

The District monitors key wells **4S/13W-12K01** (LACDPW No. 906D) and **4S/12W-28H09** (LACDPW No. 460K) which represent the conditions of the pressurized groundwater levels in the Central Basin Pressure Area. The hydrographs for these two wells are shown on **Figure D**.

Groundwater highs were observed in these wells in 1935 when they began to continually drop over 110 feet until their lows in 1961 due to the over-pumping and insufficient natural recharge. Groundwater levels recovered substantially during the early 1960s as a result of replenishment operations and reduced pumping. Between 1995 and 2007 there have been 100-foot swings in water levels each year from winter to summer. These swings were due to pumping pattern changes by some of the Central Basin producers who operate with more groundwater in the summer months and less groundwater in the winter months, and took advantage of the MWD and WRD In-Lieu program. However, since May 2007 the In-Lieu water has not been available, so pumping has remained more constant throughout the year and water levels remain depressed as shown in the two hydrographs.

At the end of WY 2009/2010, water levels in well 4S/13W-12K01 were nearly a foot lower than the previous year, and well 4S/12W-28H09 was 7.5 feet lower than the previous year. This drop is expected due to an increase in pumping the past year in this area. Water levels in the CB Pressure area are expected to rise in the current year due to anticipated reduced pumping.

West Coast Basin

The West Coast Basin is separated from the Central Basin by the Newport-Inglewood Uplift which is a series of discontinuous, subparallel hills and faults that act as a partial barrier to groundwater flow. Groundwater moves across the uplift from one basin to the other based on water levels on either side of the uplift and the "tightness" of the fault along various reaches.

Figure E shows the hydrographs of key wells **3S/14W-22L01** (LACDPW No. 760C) and **4S/13W-21H05** (LACDWP No. 869). These two wells represent the general conditions of the water levels in the West Coast Basin. In 1955, the control of groundwater extractions in the West Coast Basin

resulted in stabilizing and reversal of the declining water levels in the center of the basin (well 3S/14W-22L01), whereas at the eastern end near the Dominguez Gap Barrier water levels continued to decline until about 1971, when a recovery began due mostly to the startup of the Dominguez Gap Barrier Project. For the previous year 2009/2010, water levels in both wells were about 2 feet higher than the previous year. Water levels in the West Coast Basin are expected to rise another couple feet in the current year due to reduced pumping and increased injection.

Plate 3 shows the water level changes over the entire CWCB over the previous water year. Because of the storm water captured and purchase of untreated Tier 1 replenishment water by WRD, the Montebello Forebay area experienced a rise of over 10 feet in some areas compared to the previous year and the average increase in the Forebay was about 5 feet. This increase partially but not completely offset the losses incurred in storage over the past 10 years where mostly dry conditions prevailed. Parts of the Lakewood and Long Beach areas saw declines of up to 5 feet. The remainder of the CB was generally unchanged with the exception of a small area near Cerritos which saw an increase of nearly 15 feet. The West Coast Basin was less impacted because the inflows generally matched the outflows in the western and southern parts of the basin, with increases of 5 feet or less, but in the northeastern area around Gardena a decline of nearly 10 feet was observed.

Based on the groundwater levels observed over various areas of the Central and West Coast Basins and the anticipated replenishment activities by WRD, the District anticipates having sufficient supplies of safe and reliable groundwater to meet the demands of the pumpers in the ensuing year.

Change in Storage

The District determines the change in storage by comparing water levels from one year to the next. Rising water levels means an increase in storage groundwater whereas a drop in water levels means a decrease in storage. Using groundwater elevation data collected from WRD's monitoring well network and selected production wells, the District constructs a groundwater level change map showing water level differences from one year to the next (**Plate 3**). The data from this map are multiplied by the storage coefficient values for the aquifers as obtained from the USGS calibrated model of the District to produce the change in storage estimate for the previous water year.

As reported in the Annual Overdraft discussion, the gain in storage in WY 2009/2010 was 27,000 AF. In the past 10 years, groundwater in storage has declined by 114,400 acre-feet, including the gain observed in 09-10. **Table 8** provides the historical tracking of storage changes in the CWCB.

Optimum Groundwater Quantity

In response to a 2002 State audit of the District's activities, the Board of Directors adopted an Optimum Quantity for groundwater amounts in the Central and West Coast Basins. The Optimum Quantity is based on the Accumulated Overdraft (AOD) concept described in the Water Code and in this ESR. The historic maximum groundwater drawdown due to over pumping reported in the CWCB between 1904 and 1957 was 1,080,000 AF. This is defined as the historic maximum AOD. As pumping eased and artificial replenishment occurred, more water was put back into the basins and the AOD was reduced resulting in rising water levels.

After considerable analysis and discussion, on June 18, 2003 the Board of Directors adopted the Optimum Quantity for the CWCB at an AOD of 400,000 AF, or 680,000 AF on top of the historic maximum AOD. The adopted value was based on the amount of groundwater necessary to meet the

pumpers' demands in a worst case scenario of a major 3-year major drought where pumping would be maximized due to a lack of MWD water and replenishment at the spreading grounds and other means is at a minimum.

In 2003 through 2006, however, new discussions were being held by the local water community on groundwater storage opportunities within the District. The original derivation of the Optimum Quantity of AOD = 400,000 AF did not take into full account storage projects. If this Optimum Quantity were fully realized, there would not be enough storage space in the aquifers for large storage projects. Therefore, to utilize the groundwater basins for both endeavors, the Board of Directors on April 19, 2006 established a new Optimum Quantity at an AOD of 612,000 AF. This value was based on an extensive review of over 70 years of water level fluctuations in the District and recognizing that in the year 2000, groundwater amounts were at a healthy quantity to sustain the adjudicated pumping rights in the basins. The AOD in the year 2000 was 612,000, and therefore was set by the Board of Directors as the new Optimum Quantity.

The Board of Directors at that April 19, 2006 meeting also adopted a policy to make up the Optimum Quantity should it fall too low. The policy is as follows:

> *An Accumulated Overdraft greater than the Optimum Quantity is a deficit. WRD will make up the deficit within a 20 year period as decided by the Board on an annual basis. If the deficit is within 5 percent of the Optimum Quantity, then no action needs to be taken to allow for natural replenishment to makeup the deficit.*

Since the year 2000 a total of approximately 114,300 AF have been lost from storage, brining the AOD down to 726,300 AF from its Optimum Quantity of 612,000 AF. Based on the adopted policy, the Board will be considering options to make up the AOD and return the basin to the Optimum Quantity over a period of time.

CHAPTER IV
GROUNDWATER REPLENISHMENT: QUANTITIES, AVAILABILITY, AND COSTS

As discussed in the previous chapter, the Central and West Coast Basins have an annual overdraft because more groundwater is pumped out than is replaced naturally. The District purchases supplemental water (artificial replenishment water) each year to help offset this overdraft through managed aquifer recharge. The purchased water enters the groundwater basins at the Montebello Forebay spreading grounds, at the seawater barrier injection wells, and through the District's In-Lieu Program. The purpose of this Chapter is to determine the quantities of water needed for purchase in the ensuing year and to determine the availability and cost of that water.

The District currently has available to it recycled and imported water sources for use as artificial replenishment water. These two sources are described below:

- ***Recycled Water****: Recycled water is wastewater from the sewer systems that is reclaimed through extensive treatment at water reclamation plants ("WRP"s). The water is treated to high quality standards so that it can be reused safely. Some agencies and businesses use recycled water for non-potable purposes, such as for irrigation of parks, golf courses, and street medians, or for industrial purposes. WRD has used recycled water for groundwater recharge since 1962. In semi-arid areas such as Southern California where groundwater and imported water are in short supply, recycled water has proven to be a safe and reliable additional resource to supplement the water supply. Recycled water is used at the spreading grounds and the seawater barrier wells. Although recycled water is high quality, relatively low cost, and a reliable supply all year long, the District is limited by regulatory agencies in the amount it can use for replenishment. Therefore, imported water is also used for recharge.*

- ***Imported Water****: River water from northern California (State Water Project) and the Colorado River is imported into Southern California by the Metropolitan Water District of Southern California ("MWD" or "Met"). MWD then sells this water to their member agencies for multiple uses, including potable water and recharge water. WRD uses raw (untreated) imported water at the spreading grounds and potable (treated) imported water at the seawater intrusion barriers and for the in-lieu program for groundwater recharge. Because of treatment and transportation costs, it is the most expensive source for recharge water. The supply is under full upstream control, and its availability at the spreading grounds is limited and variable, especially during drought years. In fact, since May 2007 MWD has stopped delivery of its historically available discounted surplus replenishment and In-Lieu waters due to reduced supply, environmental issues and judicial decisions. As a result, the District purchased the more expensive but more available untreated Tier 1 water from CBMWD and Long Beach in 2010/2011 for spreading. Because it is questionable that the discounted replenishment water will be available anytime soon, the District plans on purchasing the Tier 1 water in the ensuing year as well.*

Recommended Quantities of Replenishment Water

With information presented in the preceding chapters regarding the basins' pumping demands and the overall condition of the groundwater basins, WRD can estimate its projected need for replenishment water in the ensuing year.

Spreading

Groundwater recharge through surface spreading occurs in the Montebello Forebay Spreading Grounds adjacent to the Rio Hondo and the San Gabriel River, within the unlined portion of the San Gabriel River, and behind the Whittier Narrows Dam in the Whittier Narrows Reservoir. Owned and operated by the Los Angeles County Department of Public Works ("LACDPW"), they were originally constructed in 1938 for flood control and conservation of local storm water, but have been used since the 1950s to replenish the basins with imported water and since 1962 with recycled water.

Since recycled water is a high quality, less expensive, and available year-round source of replenishment water, the District maximizes its use within established regulatory limits. These limits are discussed below under "Expected Availability of Replenishment Water". In general, the District plans on purchasing 50,000 AF in the ensuing year to maximize the amount under regulatory limits, unless lack of dilution water (storm water and imported water) causes a reduction in the recycled water amounts.

Additional replenishment water is needed beyond the 50,000 AFY of recycled water and will have to come from imported water. In 2003, the WRD Board adopted the long term average of 27,600 AFY of imported water to purchase for spreading. This value was based on long-term (30 year) averages of the overall water budget of the basins using the USGS computer model. The 2003 ESR discusses the derivation of this value in more detail.

Since that time, the District has invested in cooperative projects with the LACDPW to capture more storm water and to lessen the need for imported water as part of WRD's Water Independence Now program, or WIN. Improvements to the Whittier Narrows Conservation Pool are expected to conserve an additional 3,000 AFY of storm water on average. Two new rubber dams were built in the San Gabriel River near Valley Boulevard and are expected to conserve an additional 3,600 AFY on average. Therefore, the new Long Term Average for imported spreading demands is 21,000 AFY. This amount plus the recycled demand cited earlier brings the total WRD basic spreading needs for the ensuing year to 71,000 AF (50,000 AF recycled and 21,000 AF imported). This is the amount planned for the ensuing year for spreading.

In addition, supplemental water may be needed to make up the deficit in the Optimum Quantity discussed at the end of Chapter 3. Per the Board's policy in 2006, the District would attempt to make up the Optimum Quantity deficit over a 20-year period. Much of this deficit, however, could be made up by rainfall if a few extremely wet years would occur. Therefore, focus is placed on making up the imported spreading water shortage which exists due to the District's inability to purchase planned amounts in recent years. Factors such as MWD ceasing to offer traditional replenishment water in May 2007 and construction and maintenance projects at the spreading grounds have been impedances to purchasing imported water for spreading. Between WY 2003/2004 and 2008/2009, the District was short 29,968 AF of planned imported water purchases for the spreading grounds. In 2009/2010 the District for the first time purchased untreated Tier 1 water for replenishment since the historical replenishment water was not available, including an extra 5,286 AF to help make-up some of the deficit. In the current year 2010/2011, the District has plans to purchase the normal 21,000 AF of spreading water plus an additional 3,500 AF to help makeup the deficit. This water will also be untreated Tier 1 water since discounted water remains

unavailable. The deficit at the start of ensuing year 2011/2012 will be 21,282 AF and the District will be considering reducing this amount by some margin in that year.

Table 9 presents the currently anticipated imported water replenishment needs.

Injection

Another way of replenishing the groundwater supply is to inject water at the three seawater intrusion barriers owned and operated by the LACDPW, including the West Coast Basin Barrier, Dominguez Gap Barrier, and Alamitos Barrier. Although the primary purpose of the barriers is for seawater intrusion control, groundwater replenishment also occurs as the freshwater is injected into the CWCB aquifers and then moves inland towards pumping wells.

To determine the amount of barrier water estimated for the ensuing year, WRD under an Agreement with LACDPW gets annual estimates from the expected demand at the barriers. WRD reviews these estimates and makes adjustments as necessary. For 2010/2011, no adjustments were made to estimates provided by the LACDPW, with the exception that their original 20,000 AF estimate for the West Coast Barrier was reduced to 18,000 AF based on current operating conditions.

For the West Coast Basin Barrier Project, 18,000 AF of demand is estimated, of which 10,000 AF is imported water and 8,000 AF is recycled water from WBMWD based on current delivery capabilities. For the Dominguez Gap Barrier Project, 7,400 AF are estimated, with 50% recycled water and 50% imported water. For the Alamitos Barrier on the WRD-side of the barrier, 6,200 AF are estimated with 50% recycled water and 50% imported water.

The total barrier demand for the ensuing year is estimated at 31,600 AF (**Table 9)**, including 14,800 AF recycled water (47%) and 16,800 AF imported water (53%).

In-Lieu Replenishment Water

The basic premise of WRD's In-Lieu Program is to offset the pumping in the basin to lower the annual overdraft and reduce the artificial replenishment needs. It helps provide an alternate means of replenishing the groundwater supply by encouraging basin pumpers to purchase surplus imported water when available instead of pumping groundwater. This can help raise water levels in areas that are otherwise more difficult to address. Since May 2007, the In-Lieu water has not been made available by MWD due to water shortages. However, WRD has planned for it in case the water became available. If monies raised go unspent, they are placed in a water purchase reserve for subsequent year water purchases. This concept was approved by the pumper's Technical Advisory Committee ("TAC") for the District in 2010 and will continue for ensuing year 2011/2012 at the same amount of 10,303 AF (6,000 AF in the Central Basin and 4,303 AF in the West Coast Basin).

Expected Availability of Replenishment Water

The availability of water supplies for the ensuing water year has been taken into account when determining how funds should be raised. If a particular resource is expected to be unavailable during a given year, money can still be raised to fund the purchase of that quantity of water in a succeeding year.

Groundwater Replenishment

Recycled Water

Recycled water is reliable all year round but its use is capped by regulatory limits. The current limits for recycled water spreading in the Montebello Forebay are established by the California Regional Water Quality Control Board (RWQCB) and are detailed in Order No. 91-100 adopted on September 9, 1991 with amendments on April 2, 2009 under Order No. R4-2009-0048. The District is limited to spreading 35% recycled water over a 5-year period based on the total inflow of all waters into the Montebello Forebay, meaning that at least 65% of the waters entering the forebay must be dilution waters such as storm water, underflow, rainfall, and imported water. As these dilution sources become scarce due to dry years or continued lack of imported replenishment water, the amount of recycled water will have to be reduced to maintain the 35% regulatory cap.

The Sanitation Districts of Los Angeles County (SDLAC) provides the recycled water to WRD for spreading by LACDPW. This water comes from the Whittier Narrows Water Reclamation Plant ("WNWRP"), San Jose Creek Water Reclamation Plant ("SJCWRP"), and Pomona Water Reclamation Plant ("PWRP"). WRD purchases water from the WNWRP and SJCWRP, whereas the water from the PWRP is considered incidental recharge and is not purchased. For planning purposes, the District assumes purchasing 50,000 AFY of recycled water each year to meet the regulatory cap. **Table 2** shows the breakdown amounts for these purchases.

Recycled water for injection into the seawater barrier wells comes from different agencies depending on the specific barrier. At the WCBBP, the water is provided by WBMWD's Edward C. Little Water Recycling Facility. Per regulatory limits, this resource can provide up to 75% of the water injected into the West Coast Basin Barrier with an increase up to 100% being planned. Because of recent operational issues at the treatment, only about 40% to 60% recycled water has been available to the barriers with imported water making up the difference. Since 18,000 AF is anticipated for the total barrier demand in the ensuing year, and 8,000 AF appears to be the current maximum capability for recycled water, imported demand is estimated at 10,000 AF.

Recycled water for the DGBP is available from the City of Los Angeles' Terminal Island Treatment Plant (Harbor Recycled Water Project). The plant is permitted to provide the barrier with up to 5 million gallons per day (mgd) or 5,600 AFY, or 50% of the total barrier supply, whichever is less. Since 7,400 AF is anticipated for the ensuing year, 3,700 AF will be recycled water and 3,700 AF will be imported water.

Recycled water for the ABP is available from WRD's Leo J. Vander Lans Water Treatment Facility. This treatment plant is permitted to provide up to 50% of barrier water with recycled water with the remainder being imported. Since 6,200 AF is anticipated for the ensuing year, 3,100 AF will be recycled water and 3,100 AF imported water.

Imported Water

All indications from MWD are that seasonal discounted spreading water and In-Lieu water will once again not be available in the ensuing year due to drought, environmental issues, and judicial decisions on the Bay Delta. As imported deliveries are cut back during dry years or with climate change or extended periods of drought, WRD may need to look at other sources for replenishment water, such as increased used of recycled water and storm water, or purchasing more expensive but more available imported water such as untreated Tier 1 (firm delivery) water. The purchase of

untreated Tier 1 water occurred for the first time in 2009/2010 and continued into 2010/2011 due to the continued unavailability of surplus water, and is expected to occur in the ensuing year.

For the imported water used for injection at the seawater barrier wells, the District pays the premium price for "non-interruptible" treated Tier 1 water meaning that it will be available all year long. Because of the increasing water costs at the barriers, the District is looking at ways to minimize costs such as reduction of pumping near the barriers, increased recycled water to offset imported water, or banking water at lower seasonal rates. At the ABP, the City of Long Beach and WRD have entered into an agreement to bank seasonal treated water and Tier 1 water through inland injection wells and then extract the water for injection at the barriers when needed, thus saving considerable costs on barrier water. In 2009/2010, the 2,000 AF of Tier 1 water banked in 2008/2009 was utilized. The seasonal water banked in 2004/2005 through 2006/2007 has 2,160 AF remaining and can be called at any time that serves the District most effectively.

Projected Cost of Replenishment Water

WRD has estimated it will need 112,903 AF of replenishment water in the ensuing year. The MWD and their member agencies and the SDLAC set the price for the replenishment water WRD buys for the replenishment at the spreading grounds, barrier wells, and In-Lieu, and are a direct pass-through on WRD's replenishment assessment.

MWD in 2010 established a two-year budget with an anticipated price increase of around 7% for their water. MWD-member agencies such as CBMWD, WBMWD, and Long Beach have not yet set their rates so WRD does not know what their surcharges on the MWD water will be at this time. Over the next couple months, this information will become available and WRD will adjust its water cost estimates prior to adopting its replenishment assessment in May 2011.

Using currently available information and estimates for the cost of replenishment water to WRD in the ensuing year, the 112,903 AF required for purchase will cost approximately $42,156,493. This includes $16,100,428 for the spreading grounds, $22,356,257 for the seawater barrier injection wells, and $3,699,808 for In-Lieu water.

Tables 1 and 2 of the ESR provide a detailed breakdown of these costs.

These estimated costs are for anticipated water purchases only in the ensuing year for normal WRD operations. They do not include possible makeup water purchases to help overcome the Optimum Quantity deficit as discussed on page 2. Nor do they include the additional costs for projects and programs required to replenish the basins and to protect groundwater quality. These projects and programs are discussed in the next chapter. The anticipated costs for any makeup water and for the projects and programs to protect and preserve groundwater supplies in the District will be presented during the District's annual budgeting and rate setting process that will culminate in the Board's adoption of the 2011/2012 Replenishment Assessment in May 2011 effective July 1, 2011.

CHAPTER V
PROJECTS AND PROGRAMS

California Water Code Sections 60220 through 60226 describe the broad purposes and powers of the District to perform any acts necessary to replenish, protect, and preserve the groundwater supplies of the District. In order to meet its statutory responsibilities, WRD has instituted numerous projects and programs in a continuing effort to effectively manage groundwater replenishment and groundwater quality in the Central and West Coast Basins ("CWCB"). These projects and programs include activities that enhance the replenishment program, increase the reliability of the groundwater resources, improve and protect groundwater quality, and ensure that the groundwater supplies are suitable for beneficial uses.

These projects and programs have had a positive influence on the basins, and WRD anticipates continuing these activities into the ensuing year. The following is a discussion of the projects and programs that WRD intends to continue or initiate during the ensuing year.

001 – Leo J. Vander Lans Water Treatment Facility Project

The Leo J. Vander Lans Water Treatment Facility provides advanced treated recycled water to the Alamitos Seawater Intrusion Barrier. The facility receives tertiary-treated water from the Sanitation Districts and provides the advanced treatment through a process train that includes microfiltration, reverse-osmosis, and ultraviolet light. The facility's operations permit was approved by the Los Angeles Regional Water Quality Control Board on September 1, 2005, and the replenishment operations of this facility started in October 2005. The product water has since been discharging to the barrier to replace up to 50% of the potable imported water currently used, thereby improving the reliability and quality of the water supply to the barrier. The plant is designed to produce approximately 3,000 acre-feet per year (AFY) for delivery to the barrier. The Long Beach Water Department (LBWD) is responsible for operation and maintenance of the treatment plant under contract with WRD.

Preliminary engineering design is in progress to potentially expand the capacity of the facility so that it can provide up to 100% of the barrier water demands thereby eliminating the need for the imported water. Expected costs for the coming year will involve operation and maintenance of the plant, final design for plant expansion, as well as groundwater monitoring at the barrier. Because the primary purpose of this project is to provide a more reliable means of replenishing the basin through injection, 100% of the costs are considered to be drawn from the Replenishment Fund.

002 – Robert W. Goldsworthy Desalter Project

The Robert W. Goldsworthy Desalter has been operating since 2002 to remove brackish groundwater from a saline plume in the Torrance area that was stranded inland of the West Coast Basin Barrier after the barrier was put into operation in the 1950s and 1960s. The production well and desalting facility are located within the City of Torrance (City), and the product water is delivered for potable use to the City's distribution system. The treatment plan capacity is about 2,200 AFY. The City is responsible for operation and maintenance of the treatment plant under contract with WRD.

The District is evaluating the expansion of the treatment plant and plans to conduct feasibility studies for the expansion. Expected costs for the coming year will involve operation and maintenance of the plant and feasibility studies for the expansion. The purpose of the desalter is directly related to remediating degraded groundwater quality, and costs are thus attributed 100% to the Clean Water Fund.

Additional measures may be necessary in the future to fully contain and remediate the saline plume, which extends outside of the Torrance area. WRD is actively pursuing long-term solutions to this problem and continues to work with the City of Torrance Municipal Water Department, the pumpers' Technical Advisory Committee, and other stakeholders on the future of the saline plume removal in the West Coast Basin.

004 – Recycled Water Program

Recycled water (reclaimed municipal wastewater) has been used for groundwater recharge by WRD since 1962. Using recycled water to replenish the groundwater basins provides a reliable source of high quality water for surface spreading in the Montebello Forebay and injection at the seawater intrusion barriers. In view of the drought conditions that periodically occur in California and uncertainty in the future availability and cost of imported supplies, this resource has become increasingly vital as a replenishment source.

WRD participates in various research and testing activities to ensure that the use of recycled water continues to be a safe and reliable resource for groundwater recharge. WRD, along with other stakeholders, is working closely with the California Department of Public Health ("CDPH") to review and revise regulations on groundwater recharge using recycled water. Through this dialogue, WRD and CDPH exchange information and develop a mutual understanding of each agency's perspectives.

From an operational standpoint, the District continues to coordinate with the SDLAC with permit compliance activities, including groundwater monitoring and reporting, to ensure that the current practice and operation of replenishing with recycled water continues to be safe. Many monitoring wells and production wells are sampled frequently by WRD staff, and the results are reported as required to the regulatory agencies.

In addition to regular monitoring and sampling around the spreading grounds, WRD is partnering with others to more fully investigate the effectiveness of soil aquifer treatment ("SAT") during recharge activities. Research is being conducted by specialists and experts and includes specific tests to characterize the percolation process and quantify the filtering and purifying properties of the underlying soil on constituents of concern such as nitrogen, total organic carbon, and emerging chemicals of concern (CECs). The District continues to be vigilant in monitoring research on the detection, significance, and treatment of CECs, such as pharmaceuticals and personal care products.

Three separate groundwater tracer studies to track and verify the movement of water from the spreading grounds and monitoring wells and production wells have been performed in 2003-2005, 2005-2006, and 2010-2011. Results showed that it is the depth and not the horizontal distance from the recharge ponds that is the key factor in arrival times of water to wells (travel time to deeper wells is greater than to shallower wells, even if the deeper wells are very near the spreading grounds). In some cases, WRD made modifications to wells to seal off their shallow perforations so that the wells

only produced from the deeper aquifers. The tracer tests were then repeated to demonstrate that the travel time had been increased. These efforts, in addition to periodic studies assessing health effects and toxicological issues, are necessary to provide continued assurances that recycled water for groundwater recharge remains safe and compliant with regulatory standards in the local basins.

Recycled water is also injected into the three seawater intrusion barriers in Los Angeles County (Alamitos, West Coast Basin, and Dominguez Gap). Work associated with the use of recycled water at those facilities is maintained under the specific project (e.g., Leo J. Vander Lans Water Treatment Facility) that delivers that resource to the barriers or under the program related to recycled water use at the specified barrier.

Projects under this program help to improve the reliability and utilization of an available local resource. This resource is used to improve replenishment capabilities and is thus funded 100% from the Replenishment Fund.

005 – Groundwater Resources Planning Program

The Groundwater Resources Planning Program was instituted to evaluate basin management issues and to provide a means of assessing project impacts over the CWCB. Prior to moving forward with a new project, an extensive evaluation is undertaken. Within the Groundwater Resources Planning Program, new projects and programs are analyzed based on benefits to overall basin management. This analysis includes performing an extensive economic evaluation to compare estimated costs with anticipated benefits. As part of this evaluation process, all new capital projects are brought to the District's Technical Advisory Committee for review and recommendation.

One of the main programs currently underway under this Program is a Master Plan of the two groundwater basins. Efforts are underway to interview groundwater producers in these two basins to identify future pumping demands so that the District can be prepared for future replenishment needs. Also under this program, District staff will continue to monitor State and Federal funding programs to determine applicability to the District's list of potential projects. In the coming year, the District will continue participation in Integrated Regional Water Management Planning ("IRWMP") for Greater Los Angeles County. Collaborative development of the region's IRWM plan is a requirement for entities to secure grant funding under Proposition 84 and Proposition 1E which were passed in November 2006. It is expected that this plan will play a significant role in future grant funding opportunities at the Local, State and Federal levels. District staff will also monitor the ongoing AB303 and WaterSMART grant funding programs.

Projects under the Groundwater Resources Planning Program serve to improve replenishment operations and general basin management. Accordingly, this program is also wholly funded through the Replenishment Fund.

006 – Groundwater Quality Program

This comprehensive program constitutes an ongoing effort to address water quality issues that affect WRD projects and the pumpers' facilities. The District monitors and evaluates the impacts of proposed, pending and recently promulgated drinking water regulations and proposed legislation. The District assesses the justification and reasoning used to draft these proposals and, if warranted, joins in coordinated efforts with other interested agencies to resolve concerns during the early phases of the regulatory and/or legislative process.

Projects and Programs

The District continually evaluates current and proposed water quality compliance in production wells, monitoring wells, and spreading/injection waters of the basins. If noncompliance is identified, WRD staff quickly investigates to determine the causes of noncompliance, develops recommended courses of action and estimates their associated costs to address the problem, and implements the best alternative to achieve compliance.

Effective January 1, 2007, the District assumed responsibility for the Central Basin Title 22 Groundwater Monitoring Program that had been administered previously by the Central Basin Municipal Water District. This program provides services for monitoring of drinking water wells as required by state statutes to ensure that they continue to be safe for domestic use. Currently, twenty pumpers with 80 wells are participating in this program. In addition, a new contract for sample collection and laboratory analysis was issued for this work. This program is paid for by the participants, and therefore, does not impact the District's replenishment assessment.

In recent years, new CECs have been identified as potentially impacting local surface water and groundwater, not only in the CWCB but also in neighboring regions such as the Main San Gabriel Basin, Orange County Basin, Chino Basin, etc. Constituents such as perchlorate, n-nitroso dimethylamine (NDMA), hexavalent chromium, and 1,4-dioxane have emerged as CECs and may pose a potential threat to the local resources; although just their detection in the environment does not mean that they pose a public health threat at their measured concentrations. Monitoring associated with surface spreading groundwater recharge facilities may increase, specifically for CECs pending future adoption of a resolution by the State Water Resources Control Board regarding its Scientific Advisory Panel's recommendations for monitoring CECs in recycled water.

WRD's service area contains a large and diverse industrial and commercial base. Consequently, many potential groundwater contamination sources exist within District boundaries. Examples of potential contamination sources include leaking underground storage tanks, petroleum pipeline leaks at refineries and petrochemical plants, and discharges from dry cleaning facilities, auto repair shops, metal works facilities, and others. Such contamination sources may pose a threat to the drinking water aquifers. Accordingly, WRD established its Groundwater Contamination Prevention Program as a key component of the Groundwater Quality Program, in an effort to minimize or eliminate threats to groundwater supplies.

The Groundwater Contamination Prevention Program includes several ongoing efforts:

- Central and West Coast Basin Groundwater Contamination Forum: More than seven years ago, WRD established this data-sharing and discussion forum with key stakeholders including the U.S. Environmental Protection Agency ("USEPA"), the California Department of Toxic Substances Control ("DTSC"), the California Regional Water Quality Control Board – Los Angeles ("RWQCB-LA"), the California Department of Public Health ("CDPH"), the U.S. Geological Survey ("USGS"), and various cities and pumpers. Stakeholders drafted and signed a Memorandum of Understanding ("MOU") agreeing to meet regularly (meetings are held 3 to 4 times per year at WRD) and share data on contaminated groundwater sites within the District. WRD has acted as the meeting coordinator and data repository/distributor, helping stakeholders to characterize the extent of contamination to identify pathways for ~~shallow~~ contaminants in shallow aquifers to reach

deeper drinking water aquifers and develop optimal methods for remediating contaminated groundwater.

- With the cooperation and support of all stakeholders in this Forum, WRD developed a list of high-priority contaminated groundwater sites within the District. This list is a living document, subject to cleanup and "closure" of sites, as well as discovery of new sites warranting further attention. Currently, the list includes over 45~~0~~ sites across the CWCB. WRD works with the lead regulatory agencies for each of these sites to keep abreast of their status, offer data collection, review and recommendations as needed, and facilitate progress in site characterization and cleanup.

- In 2003, WRD developed a scope of work with the Los Angeles County Department of Health Services ("LACDHS") to clarify the status of 217 potentially abandoned (a.k.a., "unknown status") wells located within District boundaries, as identified through researching WRD's groundwater production database. WRD completed numerous tasks to determine the status of these wells, including: distributing, collecting and tallying a survey questionnaire to all well owners associated with the potentially abandoned wells; searching through thousands of hard-copy well construction and destruction permits at the DWR, LACDHS, and City of Long Beach; conducting field reconnaissance trips to locate and photograph wells. These efforts were successful: WRD was able to reduce the number of "unknown status" wells from 217 to 20, and most of the remaining 20 are suspected to have been paved over during development of industrial and residential neighborhoods. At this time, WRD is reviewing its groundwater production database, to identify any new "unknown status" wells~~,~~ and to repeat the tasks listed above to clarify their status.

- Beginning in April 2010, WRD commenced work with the U.S. Geological Survey on the Central Basin Groundwater Contamination Study. The purpose of this study is to characterize the threat of multiple contaminant plumes moving downward through any preferential pathways to deeper potable aquifers in the Central Basin. The study area encompasses a large portion of the Central Basin, including the locations of several high-priority contaminated groundwater sites. Study tasks include compilation of existing data, sequence stratigraphic analysis, water quality sampling, geochemical analyses, and characterization of the groundwater flow system. The study is expected to be completed at the end of 2011. WRD received AB303 grant funding to support this project.

WRD is also participating in the Water Augmentation Study ("WAS") of the Los Angeles and San Gabriel Rivers Watershed Council. This is a multi-year investigation to evaluate the feasibility of capturing more storm runoff at localized sites in lieu of discharge into the storm drains, channels, and ultimately to the ocean. It is a potential source of new replenishment water~~,~~ and would be in addition to stormwater currently captured and retained for percolation at the existing spreading grounds within the District. The underlying concept for the WAS is to retain more stormwater rather than allow it to be lost to the ocean; however, precautions must be taken to ensure that this new water does not degrade groundwater quality if allowed to percolate at local sites. More stormwater could be saved by utilizing Best Management Practices (BMPs), e.g., bioswales, infiltration basins, and porous pavements. Much of the WAS is focused on evaluating the technical feasibility of this project and the potential impacts on groundwater quality. Other aspects of the WAS include modeling to estimate the amount of water that can be percolated in the local watershed and the

economic value of this additional source of water. In 2009, the Elmer Avenue neighborhood BMP demonstration project was constructed to evaluate the effectiveness and potential of a large-scale project. Extensive monitoring of the BMP demonstration project is planned for the coming years to assess the effectiveness of the BMPs in water capture and maintaining or improving groundwater quality.

Much of the work for the coming year will involve additional investigations at well sites known to have contaminated water, continued monitoring of water quality regulations and proposals affecting production and replenishment operations, further characterization of contaminant migration into the deeper aquifers, and monitoring and expediting cleanup activities at contaminated sites. All work under this program is related to water quality and cleanup efforts; therefore, 100% of it is funded from the Clean Water Fund.

010 – Geographic Information System (GIS)

The District maintains an extensive database and Geographic Information System (GIS) in-house. The database includes water level and water quality data throughout the entire WRD service area with information drawn not only from the District's Regional Groundwater Monitoring Program and permit compliance monitoring, but also from water quality data obtained from the CDPH. The system requires continuous update and maintenance but serves as a powerful tool for understanding basin characteristics and overall basin health.

The GIS is used to provide better planning and basin management. The system is used to organize and store an extensive database of spatial information, including well locations, water level data, water quality information, well construction data, production data, aquifer locations, and computer model files. Staff uses the system daily for project support and database management. Specific information is available to any District pumper or stakeholder upon request and can be delivered through the preparation of maps, tables, reports, or other compatible format. Additionally, the District has made its web-based Interactive Well Search tool available to selected users. This web site provides these users with limited access to WRD's water quality and production database.

District staff will continue to streamline and refine the existing data management system and website as well as satisfy both internal and external data requests. As part of the streamlining of the data, staff will fully automate the transfer of water quality data from the laboratory directly into the District's water quality database. Additionally, District staff will continue the development of applications to more efficiently manage and report groundwater production information. Continued use, upkeep, and maintenance of the GIS are planned for the coming year. The use of the system supports both replenishment activities and groundwater quality efforts. Accordingly, the cost for this program is equally split between the Replenishment and Clean Water Funds.

011 – Regional Groundwater Monitoring Program

WRD has been monitoring groundwater quality and water levels in the CWCB for over 50 years. The Regional Groundwater Monitoring Program provides for the collection of basic information used for groundwater basin management including groundwater level data and water quality data. It currently consists of a network of nearly 300 WRD and USGS-installed monitoring wells at over 50 locations throughout the District, supplemented by the existing groundwater production wells. The information generated by this program is stored in the District's GIS and provides the basis to better understand the dynamic changes in the Central and West Coast Basins. WRD staff, comprised of

hydrogeologists and engineers, provides the in-house capability to collect, analyze and report groundwater data.

Water quality samples from the monitoring wells are collected twice a year. Water levels are measured in most monitoring wells with automatic data loggers daily, while water levels in all monitoring wells are measured by WRD field staff a minimum of four times per year. On an annual basis, staff prepares a report that documents groundwater level and groundwater quality conditions throughout the District.

Most of the work during the coming year will involve continuous field activities including quarterly and semi-annual data collection, continuous well and equipment maintenance, and annual reporting activities. In addition, new nested monitoring wells will be constructed. Work associated with the Regional Groundwater Monitoring Program also supports activities relating to both replenishment and water quality projects. The program, therefore, is funded 50% each from the Replenishment and Clean Water Funds.

012 – Safe Drinking Water Program

WRD's Safe Drinking Water Program ("SDWP") has operated since 1991 and is intended to promote the cleanup of groundwater resources at specific well locations. Through the installation of wellhead treatment facilities at existing production wells, the District hopes to remove contaminants from the underground supply and deliver the extracted water for potable purposes. Projects implemented through this program are accomplished through direct input and coordination with well owners. Two treatment facilities were constructed in 2010. Both treatment systems were constructed for the removal of iron and/or manganese. The removal mechanism is a pressurized filtration system.

The current program focuses on the removal of VOCs and offers financial assistance for the design and equipment of the selected treatment facility. Another component of the program offers no-interest loans for other constituents of concern that affect a specific production well. The capital costs of wellhead treatment facilities range from $800,000 to over $2,000,000. Due to financial constraints, this initial cost is generally prohibitive to most pumpers. Financial assistance through the District's SDWP makes project implementation much more feasible.

There are several current projects in various stages of completion and new candidates for participation are on the rise. A total of fifteen (15) facilities are already completed and online and one facility has successfully completed removal of the contamination and no longer needs treatment. While continued funding of this program is anticipated for next year, the District has revised the guidelines of the SDWP to place a greater priority on projects involving VOC contamination or other anthropogenic (man-made) constituents, now classified as Priority A Projects. Further, any treatment projects for naturally-occurring constituents would be classified as Priority B Projects and funded on a secondary priority, on a case-by-case basis, and only if program monies are still available during the fiscal year. While such projects are of interest to WRD, availability of funding for them will not be determined until after the budget process.

Projects under the SDWP involve the treatment of contaminated groundwater for subsequent beneficial use. This water quality improvement assists in meeting the District's groundwater

cleanup objectives. Thus, funding for the costs of the program is drawn wholly from the Clean Water Fund.

018 – Dominguez Gap Barrier Recycled Water Injection

This Project involves the delivery of recycled water from the City of Los Angeles Department of Water and Power's ("LADWP") Terminal Island Treatment Plant ("TITP") Advanced Water Treatment Facility ("AWTF") to the Dominguez Gap Barrier ("DGB"). Deliveries of recycled water to the barrier commenced in late February 2006 and have continued into 2011.

This water is being treated with microfiltration, reverse osmosis, and chlorination before being injected into the DGB. The project is permitted to maintain an overall ratio of 50% recycled water and 50% potable water to the entire barrier to satisfy regulatory requirements. Additional water quality requirements, including turbidity and modified fouling index ("MFI"), must also be met to minimize potential fouling of injection wells in the DGB, which is owned and operated by the County of Los Angeles Department of Public Works.

While LADWP is responsible for the treatment and delivery of the recycled water and all the water quality sampling associated with those activities, WRD has responsibility over groundwater monitoring compliance. As part of the permit, groundwater monitoring is required to observe water quality conditions and to anticipate potential problems before recycled water travels to downgradient drinking water wells. In addition, a tracer study was conducted at the start of recycled water injection (February 2006) through fall 2010 to determine the extent of travel and movement of the recycled water blend. The tracer study confirmed that adequate mixing and further blending in the ground is occurring and that groundwater samples being collected are representative of the recycled water blend.

Recycled water use at the seawater intrusion barriers in Los Angeles County improves the reliability of a supply that is needed on a continuous basis. Traditionally, water purchases for the barriers have been viewed as a replenishment function. Therefore, this program is funded 100% through the Replenishment Fund.

023 – Replenishment Operations

WRD actively monitors the operation and maintenance practices at the LACDPW-owned and operated spreading grounds and seawater barriers within the District. Optimizing replenishment opportunities is fundamentally important to WRD, in part because imported and recycled water deliveries directly affect the District's annual budget. Consequently, the District seeks to ensure that the conservation of stormwater is maximized, and that imported and recycled water replenishment is optimized.

Due to the reduction and unreliability of imported water for replenishment, WRD is working on its Water Independence Now ("WIN") program to eventually become independent from imported water for groundwater recharge. Currently, the District needs about 31,000 AF of imported water for recharge; 21,000 AF for spreading and 10,000 AF for injection at the seawater barriers. By maximizing the use of recycled water and stormwater, the amount of imported water can eventually be reduced or eliminated, thereby providing the groundwater basins with full replenishment needs through locally-derived water.

WRD coordinates regular meetings with LACDPW, MWD, SDLAC, and other water interests to discuss replenishment water availability, spreading grounds operations, scheduling of replenishment deliveries, seawater barrier improvements, upcoming maintenance activities, and facility outages or shutdowns. The District tracks groundwater levels in the Montebello Forebay weekly to assess general basin conditions and determine the level of artificial replenishment needed. WRD also monitors the amount of recycled water used at the spreading grounds and seawater barriers to maximize use while complying with pertinent regulatory limits.

Recently, the District worked with LACDPW to complete construction of the Interconnection Pipeline. This jointly-funded project is a new, dedicated pipeline and pumping station constructed between the Rio Hondo and San Gabriel Coastal Spreading Grounds to transfer replenishment water in either direction, via gravity flow from the Rio Hondo to San Gabriel or pumping in the reverse direction. The project is expected to conserve approximately 1,300 AFY of additional stormwater on average, help maximize the amount of recycled water conserved by approximately 5,700 AFY, and provide operational flexibility to mitigate obstacles to performing replenishment at these spreading grounds. The Interconnection Pipeline project is a key component of the District's WIN.

While improvements undertaken in recent years by LACDPW/WRD (e.g., expansion of Whittier Narrows Conservation Pool, installation of rubber dams on San Gabriel River, Interconnection Pipeline) have considerably increased the stormwater portion of WRD's supply portfolio, the potential for further increasing the use of stormwater for groundwater augmentation remains significant. Results of the Water Augmentation Study (described under Project 006 above) suggest that nearly 180,000 AFY of stormwater runoff is lost to the ocean from WRD's service area. Accordingly, the District plans to work with the LASGRWC on the Stormwater Recharge Feasibility Study and Pilot Project Development effort. This effort will identify regional and parcel-based locations and pilot project concepts and their respective costs and benefits within the District to achieve maximum stormwater capture for water supply benefit. Existing but independent analyses, datasets and modeling tools will be combined to identify where potential pilot projects may be located and to provide concept designs within a focused area. The study will identify with great specificity the best locations for stormwater capture and filtration and the technologies best suited to the locations.

As its name implies, this program deals primarily with replenishment issues and its costs are borne completely by the Replenishment Fund.

025 – Hydrogeology Program

This program accounts for the projects and programs related to hydrogeologic investigations of the District and surrounding areas to ensure safe and reliable groundwater. Work performed under this program includes the preparation of the annual Engineering Survey and Report, which incorporates the calculation and determination of annual overdraft, accumulated overdraft, change in storage, pumping amounts, and replenishment water availability into a document to help the District assess its replenishment needs and costs in the ensuing year. Extensive amounts of data are compiled and analyzed by Staff to determine these values. Maps are created showing water levels in the basins and production patterns and amounts. The updates, maintenance, and use of the Regional Groundwater Flow Model developed by the USGS and WRD are part of this program. This model is a significant analytical tool utilized by WRD to determine basin benefits and impacts of changes proposed in the management of the Central and West Coast Basins.

Projects and Programs

An ongoing effort at the District to better characterize the hydrogeologic conditions across the Central and West Coast Basins is called the "Hydrogeologic Conceptual Model". This long-term project involves compiling and interpreting the extensive amounts of data generated during drilling and logging of the WRD/USGS monitoring wells, and collected from historical information for production wells and oil wells within the District. The ultimate goal of this project is to incorporate these data in WRD's database/GIS and apply the system to generate aquifer surfaces and cross-sections for comparison with historical interpretations of basin hydrogeology. The final conceptual model will significantly improve the understanding of the aquifer depths, extents, and thicknesses throughout the District, and will assist Staff, pumpers and stakeholders with planning for groundwater resource projects such as new well drilling, storage opportunities, or modeling. The data will also be made available on WRD's website to be used as a reference source for hydrogeologic interpretations and fulfilling project-related data requests.

Hydrogeologic analysis is also needed for projects associated with groundwater quality concerns and specific cleanup projects. Staff work may include investigative surveys, data research, and oversight of specific project studies. Such efforts are used to relate water quality concerns with potential impact to basin resources. An example of this type of Staff work is the District's Well Profiling Program. The District assists pumpers in evaluating drinking water supply well contamination. Services may include existing data collection and review, and field tasks such as spinner logging and depth-discrete sampling. WRD's evaluation helps pumpers to determine the best course of action; e.g., sealing off a particular screened interval of a well, wellhead treatment, or well destruction.

Salt / Nutrient Management Plans are a new State requirement for all groundwater basins throughout California. The Plans are required as part of the Recycled Water Policy issued by the State Water Resources Control Board (SWRCB) and effective as of May 14, 2009. As stated in the Policy, its purpose is to "establish uniform requirements for recycled water use and to develop sustainable water supplies throughout the state". The SWRCB therefore "supports and encourages every region…to develop a Salt / Nutrient Management Plan by 2014". With one exception (elevated TDS concentrations near the coast due to historic seawater intrusion, now controlled through freshwater barrier injection), salts and nutrients have not been shown to be a concern in the CWCB. However, since Salt / Nutrient Management Plans are required, WRD began meeting with other stakeholders and the Regional Water Quality Control Board (RWQCB, the agency responsible for bringing stakeholders' Salt / Nutrient Management Plans to the SWRCB for approval) to initiate development of a Salt / Nutrient Management Plan for the CWCB. WRD will continue to take the lead in working with the RWQCB and stakeholders to develop a Plan for the CWCB.

For the ensuing year, it is expected that additional investigative research projects into the saline plume, well testing, and recycled water travel time using tracers will be performed. In 2011/2012, a major update to the regional groundwater flow model will continue to be performed by the USGS to incorporate 8 years of new information since the model was last updated.

The Hydrogeology Program addresses both groundwater replenishment objectives and groundwater quality matters. This dual service warrants that the cost of the program be split evenly between the Replenishment and Clean Water Funds.

033 – Groundwater Reliability Improvement Program ("GRIP")

The WRD continues to pursue projects through its WIN program that develop local, sustainable sources of water for use in groundwater replenishment. This has become increasingly important in light of the environmental and political issues limiting delivery of imported water to Los Angeles area together with the potential for a drought to hit California.

To address these issues WRD is seeking alternative sources of water to offset the imported water used for replenishment in the Montebello Forebay. This program is referred to as the Groundwater Reliability Improvement Program (GRIP). The effort of this program is to evaluate all feasible alternatives for replacing or offsetting the current quantity of imported water used for replenishment. One alternative being considered is the use of advanced treated recycled municipal wastewater (microfiltration, reverse osmosis, ultra-violet light with hydrogen peroxide.) from the Sanitation Districts of Los Angeles County's (SDLAC) San Jose Creek Water Reclamation Plant.

To determine the viability of this concept, in 2009 WRD entered into a partnership with the Upper San Gabriel Valley Municipal Water District ("USGVMWD") and the SDLAC to share in the cost for a consultant to perform a conceptual design of a facility for the purpose of developing preliminary cost estimates. The concept will be to deliver advanced treated water to the San Gabriel River spreading basins to meet a portion of WRD's replenishment requirements along with delivery to proposed spreading basins near the Santa Fe Dam to help satisfy the needs of the USGVMWD.

Upon finding the concept feasible, the same partners have more recently created a Joint Powers Authority (JPA) to fund a consultant to perform an Alternatives Analysis to evaluate various options in addition to the proposed treatment facility in order to bring replenishment water to the spreading grounds. This effort is expected to be completed in early 2011. The JPA has also hired an outreach consultant to educate and solicit input from the pumping community, elected officials, non-governmental organizations, as well as the general public. Any new source of replenishment water developed through the GRIP will help to improve the reliability and utilization of an available local resource. This resource is used to improve replenishment capabilities and is thus funded 100% from the Replenishment Fund.

TABLES

Table 1

GROUNDWATER CONDITIONS AND REPLENISHMENT SUMMARY

ITEM	WATER YEAR Oct 1 - Sep 30		
	2009-2010	*2010-2011 (a)*	*2011-2012 (a)*
Total Groundwater Production	241,329 AF	241,000 AF	243,000 AF
Annual Overdraft	(84,200) AF	(80,800) AF	(97,800) AF
Accumulated Overdraft	(726,300) AF	(703,600) AF	

Quantity Required for Artificial Replenishment for the Ensuing Year

Spreading		
Imported for Spreading in Montebello Forebay	21,000	AF
Recycled for Spreading in Montebello Forebay	50,000	
Subtotal Spreading	71,000	
Injection		
Alamitos Seawater Barrier Imported Water (WRD side only)	3,100	
Alamitos Seawater Barrier Recycled Water (WRD side only)	3,100	
Dominguez Gap Seawater Barrier Imported Water	3,700	
Dominguez Barrier Seawater Barrer Recycled Water	3,700	
West Coast Seawater Barrier Imported Water	10,000	
West Coast Seawater Barrier Recycled Water	8,000	
Subtotal Injection	31,600	
In-lieu (b)		
Subtotal In-lieu	10,303	
Total	**112,903**	AF

Source and Unit Cost of Replenishment Water for the Ensuing Year

Spreading	**Oct-Dec**		**Jan-Sep**	
MWD Commodity Rate for Tier 1 Untreated Imported	*$ 527*	*/AF*	*$ 560*	*/AF*
CBMWD Administrative Surcharge	*$ 90*	*/AF*	*$ 90*	*/AF*
*CBMWD Readiness to Serve (RTS) charge **	*$ 26*	*/AF*	*$ 26*	*/AF*
Cost to WRD (sum of above)	**$ 644**	**/AF**	**$ 677**	**/AF**
plus CBMWD Water Service Charge	$ 72	/cfs/mo	$ 72	/cfs/mo
SDLAC recycled water from San Jose Creek	$ 34.40	/AF	$ 34.40	/AF
SDLAC recylced water from Whittier Narrows WRP	$ 7	/AF	$ 7	/AF
SDLAC makeup for undercharges in 2007-2009	$ 19,074.86	/mo	$ 19,074.86	/mo
Injection				
Alamitos Barrier				
MWD Commodity Rate for Tier 1 Treated Imported	*$ 744*	*/AF*	*$ 794*	*/AF*
Long Beach Administrative Surcharge	*$ 5*	*/AF*	*$ 5*	*/AF*
Cost to WRD (sum of above)	**$ 749**	**/AF**	**$ 799**	**/AF**
plus Long Beach Capacity Charge *	$ 600	/cfs/mo	$ 600	/cfs/mo
Recycled water from WRD Vander Lans plant	$ 406	/AF	$ 406	/AF
Dominguez Gap and West Coast Barriers				
MWD Commodity Rate for Tier 1 Treated Imported	*$ 744*	*/AF*	*$ 794*	*/AF*
WBMWD Administrative Surcharge	*$ 85*	*/AF*	*$ 85*	*/AF*
*WBMWD RTS **	*$ 125*	*/AF*	*$ 166*	*/AF*
Cost to WRD (sum of above)	**$ 954**	**/AF**	**$ 1,045**	**/AF**
plus WBMWD Water Service Charge	$ 41	/cfs/mo	$ 41	/cfs/mo
plus WBMWD Capacity Charge *	$ 529	/cfs/mo	$ 529	/cfs/mo
Recycled water from LADWP (Dominguez Gap)	$ 431	/AF	$ 431	/AF
Recycled water from WBMWD (West Coast)	$ 567	/AF	$ 567	/AF
In-lieu (b)				
MWD Member Agency			$ 336	/AF
WBMWD Customer			$ 421	/AF

(a) Estimated values

(b) Amounts and rates for In-lieu are estimated. Not yet been established by the Board for ensuing year

** Amount is a direct pass through to MWD*

Table 2

QUANTITY AND COST OF REPLENISHMENT WATER FOR WY 2010-2011

	Item	Quantity (AF)	Total Cost
Summary - All Water	Spreading - Tier 1 Untreated Imported	21,000	$ 14,425,530
	Spreading - Recycled	50,000	$ 1,674,898
	Alamitos Barrier - Imported	3,100	$ 2,468,390
	Alamitos Barrier - Recycled*	3,100	$ -
	Dominguez Barrier - Imported	3,700	$ 3,722,765
	Dominguez Barrier - Recycled	3,700	$ 1,594,700
	West Coast Barrier - Imported	10,000	$ 10,034,402
	West Coast Barrier - Recycled	8,000	$ 4,536,000
	In-Lieu MWD Member	7,503	$ 2,521,008
	In-Lieu WBMWD Customer	2,800	$ 1,178,800
	TOTAL	**112,903**	**$ 42,156,493**

Detailed Breakout of Water Costs and Surcharges to WRD

	Item	Quantity	Oct-Dec	Jan-Sep	Melded	Total
Imported Water	**CBMWD**					
	MWD Untreated Tier 1 - Spreading ($/af)	21,000	$ 527	$ 560	$ 552	$ 11,586,750
	MWD RTS ($/af)	21,000	$ 26	$ 26	$ 26	$ 551,250
	CBMWD Administrative Surcharge ($/af)	21,000	$ 90	$ 90	$ 90	$ 1,896,300
	CBMWD Water Service Charge ($/cfs/month)	450	$ 72	$ 72	$ 72	$ 391,230
	Total to CBMWD					**$ 14,425,530**
	LBWD					
	MWD Treated Tier 1 - Alamitos Barrier ($/af)	3,100	$ 744	$ 794	$ 782	$ 2,422,650
	MWD Capacity Charge ($/cfs/month)	4.20	$ 600	$ 600	$ 600	$ 30,240
	LBWD Administrative Surcharge ($/af)	3,100	$ 5	$ 5	$ 5	$ 15,500
	Total to LBWD					**$ 2,468,390**
	WBMWD					
	MWD Tier 1 - Barriers (DG,WCB) ($/af)	13,700	$ 744	$ 794	$ 782	$ 10,706,550
	MWD RTS ($/af)	13,700	$ 94	$ 125	$ 117	$ 1,606,325
	MWD Capacity Charge ($/cfs/month)	34	$ 529	$ 529	$ 529	$ 215,832
	WBMWD Administrative Surcharge ($/af)	13,700	$ 85	$ 85	$ 85	$ 1,164,500
	WBMWD Water Service Charge ($/cfs/month)	130	$ 41	$ 41	$ 41	$ 63,960
	Total to West Basin MWD					**$ 13,757,167**
	IN-LIEU				IL-PMT	
	MWD Member Agency ($/af)	7,503	-	-	$ 336	$ 2,521,008
	WBMWD Member Agency ($/af)	2,800	-	-	$ 421	$ 1,178,800
	Total for In-Lieu Payments					**$ 3,699,808**
Recycled Water	**LADWP**					
	LADWP Recycled Water ($/af)	3,700	$ 431	$ 431	$ 431	$ 1,594,700
	Total to LADWP					**$ 1,594,700**
	SDLAC					
	SDLAC - San Jose Creek WRP ($/af)	40,000	$ 34	$ 34	$ 34	$ 1,376,000
	SDLAC - Whittier Narrows WRP ($/af)	10,000	$ 7	$ 7	$ 7	$ 70,000
	SDLAC - Makeup Payment ($)					$ 228,898
	Total to SDLAC					**$ 1,674,898**
	WBMWD					
	WBMWD Recycled Water ($/af)	8,000	$ 567	$ 567	$ 567	$ 4,536,000
	Total to WBMWD					**$ 4,536,000**
	WRD					
	WRD Recycled Water Vander Lans ($/af)	3,100	$ 406	$ 406	$ 406	**$ 1,258,600**
	WRD Recycled Water Vander Lans ($/af)*	3,100	$ 406	$ 406	$ 406	**$ (1,258,600)**
	Total to WRD					**$ -**
	TOTAL					**$ 42,156,493**

* Cost is based on O&M less MWD rebate. Shown as a water cost but deducted out since it's part of the Vander Lans project

Table 3

WRD PROJECTS AND PROGRAMS

PROJECT / PROGRAM	DISTRICT FUNCTION	
	Replenishment	Clean Water
001 Leo J. Vander Lans Water Treatment Facility Project	100%	
002 Robert W. Goldsworthy Desalter Project		100%
004 Recycled Water Program	100%	
005 Groundwater Resources Planning Program	100%	
006 Groundwater Quality Program		100%
010 Geographic Information System	50%	50%
011 Regional Groundwater Monitoring Program	50%	50%
012 Safe Drinking Water Program		100%
018 Dominguez Gap Barrier Recycled Water Injection	100%	
023 Replenishment Operations (Spreading & Barriers)	100%	
025 Hydrogeology Program	50%	50%
033 Groundwater Resources Improvement Program (GRIP)	100%	0%

Table 4

30-YEAR AVERAGE GROUNDWATER BALANCE FROM USGS & WRD REGIONAL MODEL

INFLOWS	Average AFY	OUTFLOWS	Average AFY
Natural Inflows:		**Artificial Outflows:**	
Local water conserved at spreading grounds [1]	48,825	Pumping	250,590
Interior and mountain front recharge	47,900		
Net underflow from adjacent basins [2]	48,480		
Subtotal Natural Inflows:	145,205		
Artificial Inflows:			
Imported and recycled spreading [3]	74,075		
Barrier injection water [4]	34,600		
Subtotal Artificial Inflows:	108,675		
Total Inflows:	**253,880**	**Total Outflows:**	**250,590**

Average Annual Groundwater Deficiency (afy) = Natural Inflows - Total Outflows = (105,385)

[1] includes stormwater and base flow water captured and recharged at the spreading grounds

[2] does not include average of 7,100 afy of seawater intrusion, which can not be considered as replenishment per the water code

[3] includes all imported purchased, all recycled purchased, and Pomona Plant (free) recycled water.

[4] includes all injected water at the three barrier systems, including all of Alamitos Barrier. Model value may differ slightly from actual purchases.

Description of the model can be found in USGS, 2003, Geohydrology, Geochemistry, and Ground-Water Simulation - Optimization of the Central and West Coast Basins, Los Angeles County, California; Water Resources Investigation Report 03-4065 by Reichard, E.G., Land, M., Crawford, S.M., Johnson, T., Everett, R.R., Kulshan, T.V., Ponti, D.J., Halford, K.J., Johnson, T.A., Paybins, K.S., and Nishikawa, T.

Table 5

HISTORICAL RAINFALL

Station #107D, Downey Fire Department

Water Year	Inches	Water Year	Inches	Water Year	Inches	Water Year	Inches
1925-26	12.63	1950-51	8.27	1975-76	9.55	2000-01	14.98
1926-27	16.92	1951-52	24.68	1976-77	11.23	2001-02	2.52
1927-28	11.97	1952-53	10.53	1977-78	33.85	2002-03*	19.89
1928-29	11.52	1953-54	12.33	1978-79	18.68	2003-04	7.73
1929-30	10.84	1954-55	11.84	1979-80	28.29	2004-05	23.43
1930-31	10.45	1955-56	13.97	1980-81	8.74	2005-06	11.36
1931-32	14.52	1956-57	9.89	1981-82	13.41	2006-07	1.95
1932-33	10.02	1957-58	24.65	1982-83	30.3	2007-08	17.11
1933-34	11.1	1958-59	6.68	1983-84	11.96	2008-09	9.49
1934-35	21.94	1959-60	9.84	1984-85	12.44	2009-10	10.42
1935-36	9.65	1960-61	4.3	1985-86	19.47		
1936-37	22.11	1961-62	18.46	1986-87	6.49		
1937-38	21.75	1962-63	10.9	1987-88	11.47		
1938-39	18.69	1963-64	6.86	1988-89	7.82		
1939-40	12.81	1964-65	13.27	1989-90	7.87		
1940-41	34.21	1965-66	17.02	1990-91	12.22		
1941-42	14.66	1966-67	17.78	1991-92	16.07		
1942-43	17.91	1967-68	11.46	1992-93	26.55		
1943-44	17.89	1968-69	22.33	1993-94	9.26		
1944-45	11.25	1969-70	7.52	1994-95	26.82		
1945-46	10.31	1970-71	11.45	1995-96	10.68		
1946-47	15.24	1971-72	6.4	1996-97	13.95		
1947-48	8.62	1972-73	18.57	1997-98	32.47		
1948-49	9.04	1973-74	14.51	1998-99	7.29		
1949-50	10.14	1974-75	15.01	1999-00	9.21		
			Period of Record	**85 years**			
			Running 85 Year Average	**14.2 inches**			
			Minimum	**2.0 inches**			
			Maximum	**34.2 inches**			

* 2002/03 from station 388D (City of Paramount Fire Station), since 107D data are incomplete

Table 6

ANNUAL OVERDRAFT CALCULATION

for Current and Ensuing Water Years (in acre-feet)

Item	WATER YEAR 2010-2011	WATER YEAR 2011-2012
Average Annual Groundwater Deficiency (from Table 4)	(105,385)	(105,385)
Adjustments/Variances to AAGD		
(1) Local Water at Spreading Grounds[a]	10,000 [d]	0 [d]
(2) Precipitation, mountain front recharge, applied water[a]	5,000 [d]	0 [d]
(3) Subsurface inflow[b]	0 [d]	0 [d]
(4) Groundwater Extractions[c]	(9,600) [d]	(7,600) [d]
ANNUAL OVERDRAFT [AAGD+(1)+(2)+(3)-(4)]	(80,800)	(97,800)

Note: Numbers in parentheses represent negative values.

(a) Difference between actual and model average. Positive value indicates increased recharge.

(b) Difference between annual model value and average model value. Positive value indicates increased inflow. Does not include seawater intrusion inflow

(c) Difference between actual and model average. Positive value indicates increased pumpage.

(d) Estimated Values. A value of zero indicates average year was assumed.

Table 7

ACCUMULATED OVERDRAFT CALCULATION (in acre-feet)

ITEM	AMOUNT
Accumulated Overdraft at end of Previous Water Year	(726,300)
Estimated Annual Overdraft for Current Year	(80,800)
Subtotal without artificial replenishment	(807,100)
Planned Artificial Replenishment for Current Year	
Imported Water Purchased for Spreading*	24,500
Recycled Water Purchased for Spreading	50,000
Imported and Recycled Water Purchased for Barrier Wells	29,000
Replenishment Subtotal	103,500
PROJECTED ACCUMULATED OVERDRAFT FOR CURRENT YEAR	**(703,600)**

Note: Numbers in parentheses represent negative values.

* - 21,000 for normal annual amount + 3,500 af of planned but unpurchased water from previous years. Unpurchased due to unavailabilitiy of discounted replenishment water or other factors.

Table 8

CHANGES IN GROUNDWATER STORAGE

WATER YEAR	ANNUAL CHANGE IN STORAGE (AF)	CUMULATIVE CHANGE IN STORAGE (AF)	WATER YEAR	ANNUAL CHANGE IN STORAGE (AF)	CUMULATIVE CHANGE IN STORAGE (AF)	WATER YEAR	ANNUAL CHANGE IN STORAGE (AF)	CUMULATIVE CHANGE IN STORAGE (AF)
1961-62	88,500	88,500	1985-86	10,600	238,200	2009-10	27,000	141,500
1962-63	(11,100)	77,400	1986-87	4,000	242,200	2010-11	-	-
1963-64	10,300	87,700	1987-88	(11,700)	230,500	2011-12	-	-
1964-65	35,200	122,900	1988-89	10,400	240,900	2012-13	-	-
1965-66	21,100	144,000	1989-90	13,600	254,500	2013-14	-	-
1966-67	21,400	165,400	1990-91	28,400	282,900	2014-15	-	-
1967-68	11,400	176,800	1991-92	1,600	284,500	2015-16	-	-
1968-69	(7,500)	169,300	1992-93	45,800	330,300	2016-17	-	-
1969-70	(800)	168,500	1993-94	(28,500)	301,800	2017-18	-	-
1970-71	(3,400)	165,100	1994-95	19,400	321,200	2018-19	-	-
1971-72	(50,600)	114,500	1995-96	12,500	333,700	2019-20	-	-
1972-73	34,800	149,300	1996-97	15,700	349,400	2020-21	-	-
1973-74	(2,400)	146,900	1997-98	16,700	366,100	2021-22	-	-
1974-75	(14,100)	132,800	1998-99	(80,200)	285,900	2022-23	-	-
1975-76	(40,200)	92,600	1999-00	(30,000)	255,900	2023-24	-	-
1976-77	(32,900)	59,700	2000-01	(400)	255,500	2024-25	-	-
1977-78	88,600	148,300	2001-02	(36,500)	219,000	2025-26	-	-
1978-79	30,100	178,400	2002-03	(10,500)	208,500	2026-27	-	-
1979-80	(1,100)	177,300	2003-04	(43,000)	165,500	2027-28	-	-
1980-81	17,100	194,400	2004-05	89,100	254,600	2028-29	-	-
1981-82	18,400	212,800	2005-06	12,000	266,600	2029-30	-	-
1982-83	46,800	259,600	2006-07	(59,000)	207,600	2030-31	-	-
1983-84	(22,400)	237,200	2007-08	(41,600)	166,000	2031-32	-	-
1984-85	(9,600)	227,600	2008-09	(51,500)	114,500	2032-33	-	-

Note: Numbers in parentheses represent negative values.

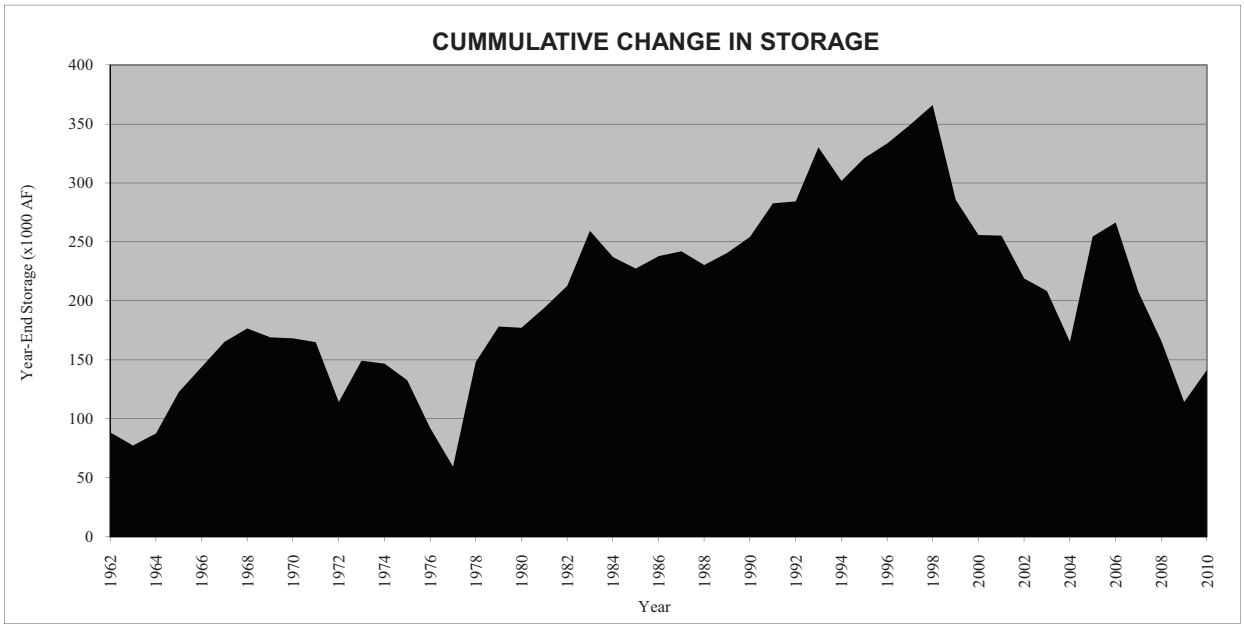


Table 9

QUANTITY OF WATER REQUIRED FOR ARTIFICIAL REPLENISHMENT

WATER TYPE	AMOUNT (AF)
Long Term Average for Imported Spreading (updated, see below)*	21,000
Recycled Water for Spreading (WRD Purchases)	50,000
Total Spreading	**71,000**
West Coast Barrier - Imported	10,000
West Coast Barrier - Recycled	8,000
Dominguez Gap - Imported	3,700
Dominguez Gap - Recycled	3,700
Alamitos Barrier - Imported - WRD portion only	3,100
Alamitos Barrier - Recycled - WRD portion only	3,100
Total Barriers	**31,600**
In-Lieu Central Basin	6,000
In-Lieu West Coast Basin	4,303
Total In-Lieu	**10,303**
Total Water Purchase Estimate for Ensuing Year	**112,903**

* - Derivation of new Long Term Imported Spreading Requirement is possible due to new projects that will capture more stormwater for conservation, and thus less imported needs:

1. Long Term Average of 27,600 af defined in 2003 ESR
2. Minus 3,000 afy for increasing Whittier Narrows Conservation Pool
3. Minus 3,600 afy for two new rubber dams on San Gabriel River
4. Equals new Long Term Average of **21,000** afy imported spreading

HISTORICAL AMOUNTS OF WATER REPLENISHED IN THE MONTEBELLO FOREBAY SPREADING GROUNDS

(In Acre-feet)

WATER YEAR	Imported Water		Recycled Water			Local Water [a]	Make-up Water		TOTAL
	LACFCD or Other	WRD	Whittier WRP	San Jose Creek WRP	Pomona WRP[g]	Stormwater & River Baseflow	USGVMWD & SGVMWD	CBMWD	
1953-54	30,000								30,000
1954-55	24,800								24,800
1955-56	54,500								54,500
1956-57	50,000								50,000
1957-58	105,100					87,558			192,658
1958-59	54,400					31,787			86,187
1959-60	80,900					20,064			100,964
1960-61	80,800	66,400				9,118			156,318
1961-62	39,500	168,600	1,178			39,548			248,826
1962-63	4,800	75,800	12,405			14,565			107,570
1963-64		104,900	13,258			9,992			128,150
1964-65	75,500	84,600	14,528			13,097			187,725
1965-66	67,800	53,900	15,056			45,754	6,500		189,010
1966-67	74,100	10,200	16,223			59,820	-		160,343
1967-68	66,600	28,800	18,275			39,760	-		153,435
1968-69	12,500	5,300	13,877			119,395	-		151,072
1969-70	25,800	43,100	17,158			52,917	-		138,975
1970-71	46,700	25,400	19,494			89,514	-		181,108
1971-72		34,450	17,543			17,688	-	-	69,681
1972-73		71,900	13,622	8,327		45,077	-	20,000	158,926
1973-74		68,200	13,385	7,064		29,171	-	23,900	141,720
1974-75		71,900	14,650	6,549		29,665	-	-	122,764
1975-76		50,800	12,394	9,062		22,073	-	-	94,329
1976-77		9,300	10,158	12,705		19,252	14,500	6,900	72,815
1977-78		39,900	13,104	5,997		147,317	-	-	206,318
1978-79		65,300	10,716	11,741		68,859	-	-	156,616
1979-80		10,200	14,568	9,815		106,820	10,900	-	152,303
1980-81	3,300	28,700	11,464	14,645		50,590	31,500	-	140,199
1981-82		4,600	14,133	15,285		47,930	30,900 [c]	-	112,848
1982-83		2,000	12,818	4,217		126,076	8,900 [c]	-	154,011
1983-84		1,500	13,194	14,590		60,710	20,800 [c]	-	110,794
1984-85		40,600	12,905	14,093		39,099	-	-	106,697
1985-86		21,500	13,827	11,487		66,966	-	-	113,780
1986-87		49,200	15,280	20,041		27,613	-	6,500	118,634
1987-88		23,300	14,585	27,182		50,068	5,800 [c]	-	120,935
1988-89		50,300	13,830	33,327		17,096	6,500 [c]	-	121,053
1989-90		52,700	15,043	33,498	1,568	9,388	13,600 [c]	-	125,797
1990-91		56,287	13,841	38,603	1,420	35,717	100 [c]	-	145,968
1991-92		43,103	12,620	31,326	2,957	136,357	-	-	226,363
1992-93		16,561	11,026	29,811	8,027	147,699	-	-	213,124
1993-94		20,411	10,249	40,768	2,965	55,896	-	-	130,288
1994-95		21,837	10,642	18,431	4,228	100,578	-	-	155,715
1995-96		17,961	9,971	40,922	2,969	62,920	-	-	134,743
1996-97		19,990	9,850	36,977	3,132	58,262	-	-	128,211
1997-98		953	8,378	26,483	2,156	96,706	-	-	134,676
1998-99		-	10,968	34,782	1,451	32,013	-	-	79,214
1999-00		45,037	8,950	30,481	3,839	20,607	-	-	108,914
2000-01		23,451	8,253	35,165	2,925	39,725	-	-	109,519
2001-02		42,875 [d]	8,474	50,194	1,928	17,000	-	-	120,471
2002-03		22,365 [e]	5,156	35,320	2,320	58,202	-	-	123,363
2003-04		27,520 [f]	8,195	34,033	2,697	30,467	-	-	102,912
2004-05		25,145 [f]	6,741	20,547	2,215	148,674	-	-	203,322
2005-06		33,229	8,868	30,180	2,973	60,377	-	-	135,628
2006-07		40,214	7,334	34,823	2,882	11,495	-	-	96,748
2007-08	1,510	- [b]	6,212	29,131	4,424	54,518	-	-	95,795
2008-09		-	5,202	29,999	4,410	35,348	-	-	74,959
2009-10		26,286	5,431	45,538	4,762	35,398	-	-	117,415
TOTAL	898,610	1,846,574	575,032	933,139	66,246		150,000	57,300	**7,379,207**
	Import:	2,745,184		Recycled:	1,574,417	Local: 2,852,306	Make-up:	207,300	

(a) Local water is stormwater or river baseflow captured at the Montebello Forebay Spreading Grounds.
(b) CBMWD purchased 1,510 af of imported water for spreading for Downey, Lakewood, and Cerritos.
(c) Includes State Project water imported by the San Gabriel Valley Municipal Water District.
(d) Includes 1,607 af of EPA extracted groundwater from Whittier Narrows considered imported water to WRD. Paid for in 2003.
(e) Includes 5,069 af of EPA extracted groundwater from W.N. considered imported water to WRD. Paid for in June 2005.
(f) includes 13,000 af of water banked by Long Beach under a storage agreement with WRD (792 af 02/03, 12,210 af 3/04).
(g)Pomona WRP data reliable starting 1989/90. May have been discharges to spreading grounds prior to this, but not verifiable.

HISTORICAL AMOUNTS OF WATER PURCHASED FOR INJECTION

(In Acre-feet)

Water Year	West Coast Barrier (a)			Dominguez Gap Barrier (b)			Alamitos Barrier							TOTAL
							WRD			OCWD			Total	
	Imported	Recycled	Total	Imported	Recycled	Total	Imported	Recycled	Total	Imported	Recycled	Total		
1952-53	1,140		1,140											1,140
1953-54	3,290		3,290											3,290
1954-55	2,740		2,740											2,740
1955-56	2,840		2,840											2,840
1956-57	3,590		3,590											3,590
1957-58	4,330		4,330											4,330
1958-59	3,700		3,700											3,700
1959-60	3,800		3,800											3,800
1960-61	4,480		4,480											4,480
1961-62	4,510		4,510											4,510
1962-63	4,200		4,200											4,200
1963-64	10,450		10,450											10,450
1964-65	33,020		33,020				2,760		2,760	200		200	2,960	35,980
1965-66	44,390		44,390				3,370		3,370	350		350	3,720	48,110
1966-67	43,060		43,060				3,390		3,390	490		490	3,880	46,940
1967-68	39,580		39,580				4,210		4,210	740		740	4,950	44,530
1968-69	36,420		36,420				4,310		4,310	950		950	5,260	41,680
1969-70	29,460		29,460				3,760		3,760	720		720	4,480	33,940
1970-71	29,870		29,870	2,200		2,200	3,310		3,310	822		822	4,132	36,202
1971-72	26,490		26,490	9,550		9,550	4,060		4,060	936		936	4,996	41,036
1972-73	28,150		28,150	8,470		8,470	4,300		4,300	883		883	5,183	41,803
1973-74	27,540		27,540	7,830		7,830	6,140		6,140	1,148		1,148	7,288	42,658
1974-75	26,430		26,430	5,160		5,160	4,440		4,440	658		658	5,098	36,688
1975-76	35,220		35,220	4,940		4,940	4,090		4,090	565		565	4,655	44,815
1976-77	34,260		34,260	9,280		9,280	4,890		4,890	885		885	5,775	49,315
1977-78	29,640		29,640	5,740		5,740	4,020		4,020	833		833	4,853	40,233
1978-79	23,720		23,720	5,660		5,660	4,220		4,220	898		898	5,118	34,498
1979-80	28,630		28,630	4,470		4,470	3,560		3,560	459		459	4,019	37,119
1980-81	26,350		26,350	3,550		3,550	3,940		3,940	524		524	4,464	34,364
1981-82	24,640		24,640	4,720		4,720	4,540		4,540	392		392	4,932	34,292
1982-83	33,950		33,950	6,020		6,020	3,270		3,270	1,946		1,946	5,216	45,186
1983-84	28,000		28,000	7,640		7,640	2,440		2,440	1,402		1,402	3,842	39,482
1984-85	25,210		25,210	7,470		7,470	3,400		3,400	1,444		1,444	4,844	37,524
1985-86	20,260		20,260	6,160		6,160	3,410		3,410	1,863		1,863	5,273	31,693
1986-87	26,030		26,030	6,230		6,230	4,170		4,170	2,887		2,887	7,057	39,317
1987-88	24,270		24,270	7,050		7,050	3,990		3,990	2,173		2,173	6,163	37,483
1988-89	22,740		22,740	5,220		5,220	3,900		3,900	1,674		1,674	5,574	33,534
1989-90	20,279		20,279	5,736		5,736	4,110		4,110	1,929		1,929	6,039	32,054
1990-91	16,039		16,039	7,756		7,756	4,096		4,096	1,818		1,818	5,914	29,709
1991-92	22,180		22,180	6,894		6,894	4,172		4,172	1,552		1,552	5,724	34,798
1992-93	21,516		21,516	4,910		4,910	3,350		3,350	1,565		1,565	4,915	31,341
1993-94	15,482		15,482	5,524		5,524	2,794		2,794	1,309		1,309	4,103	25,109
1994-95	14,237	1,480	15,717	4,989		4,989	2,883		2,883	890		890	3,773	24,479
1995-96	12,426	4,170	16,596	5,107		5,107	3,760		3,760	2,010		2,010	5,770	27,473
1996-97	11,388	6,241	17,629	5,886		5,886	4,015		4,015	1,750		1,750	5,765	29,280
1997-98	8,173	8,308	16,481	3,771		3,771	3,677		3,677	1,504		1,504	5,181	25,433
1998-99	10,125	6,973	17,097	4,483		4,483	4,012		4,012	1,689		1,689	5,700	27,280
1999-00	11,172	7,460	18,632	6,010		6,010	4,028		4,028	1,707		1,707	5,735	30,377
2000-01	13,988	6,838	20,826	3,923		3,923	3,710		3,710	1,964		1,964	5,674	30,423
2001-02	12,724	7,276	20,000	5,459		5,459	3,961		3,961	2,232		2,232	6,193	31,652
2002-03	10,419	6,192	16,611	8,056		8,056	3,445		3,445	1,197		1,197	4,642	29,309
2003-04	9,304	3,669	12,973	6,089		6,089	3,876		3,876	2,092		2,092	5,968	25,030
2004-05	4,548	3,920	8,468	8,557		8,557	2,870		2,870	1,685		1,685	4,555	21,580
2005-06	5,997	4,249	10,246	7,259	1,450	8,709	1,042	921	1,963	330	254	584	2,547	21,502
2006-07	4,373	10,960	15,333	5,510	1,733	7,243	1,568	219	1,787	543	165	708	2,495	25,071
2007-08	3,662	10,954	14,616	4,468	2,452	6,920	3,467	1,284	4,751	1,283	475	1,758	6,509	28,045
2008-09	7,178	6,434	13,612	4,550	2,414	6,964	4,145	1,275	5,420	1,518	535	2,053	7,473	28,049
2009-10	9,661	7,620	17,281	5,495	2,037	7,532	2,596	1,775	4,371	659	470	1,129	5,500	30,313
TOTAL	1,041,271	102,743	1,144,014	237,792	10,086	247,878	169,467	5,474	174,941	57,069	1,899	58,967	233,908	1,625,799

(a) Prior to 10/1/71, water was purchased by the State, West Basin Water Association, local water interests, Zone II of the LA County Flood Control District and WRD. After 10/1/71, all purchases have been by WRD

(b) In 1970-71, purchases were shared by WRD and Zone II. After 10/1/71, all purchases have been by WRD

17,752 11,432 29,184 29,184

HISTORICAL AMOUNTS OF THE IN-LIEU PROGRAM

(In Acre-Feet)

WATER YEAR	CENTRAL BASIN	WEST COAST BASIN	TOTAL
1965-66	-	745	745
1966-67	-	851	851
1967-68	-	850	850
1968-69	-	850	850
1969-70	-	900	900
1970-71	-	881	881
1971-72	-	756	756
1972-73	-	901	901
1973-74	-	901	901
1974-75	-	400	400
1975-76	-	400	400
1976-77	-	400	400
1977-78	11,316	4,815	16,131
1978-79	9,723	8,655	18,378
1979-80	10,628	4,333	14,961
FISCAL YEAR			
1980-81	17,617	6,206	23,823
1981-82	14,050	4,833	18,883
1982-83	13,813	5,939	19,752
1983-84	29,216	12,524	41,740
1984-85	23,246	13,594	36,840
1985-86	15,505	10,627	26,132
1986-87	16,205	12,997	29,202
1987-88	15,518	12,893	28,411
1988-89	11,356	14,069	25,425
1989-90	16,858	12,293	29,151
1990-91	11,886	10,153	22,039
1991-92	13,000	6,104	19,104
1992-93	37,652	15,654	53,306
1993-94	83,488	26,093	109,581
1994-95	32,904	17,994	50,898
1995-96	37,517	13,816	51,333
1996-97	34,547	4,847	39,394
1997-98	22,995	7,335	30,330
1998-99	13,213	10,303	23,516
1999-00	18,799	3,479	22,278
2000-01	18,364	2,817	21,181
2001-02	11,931	8,789	20,720
2002-03	6,866	4,339	11,205
2003-04	-	-	-
2004-05	6,000	1,804	7,804
2005-06	7,475	2,414	9,889
2006-07	5,779	3,480	9,259
2007-08	-	-	-
2008-09	-	-	-
2009-10	-	-	-
TOTAL	567,468	272,035	839,503

HISTORICAL AMOUNTS OF WATER FOR REPLENISHMENT

(In Acre-feet)

WATER YEAR	SPREADING					INJECTION*			IN-LIEU	TOTAL
	IMPORTED WATER	RECLAIMED WATER	LOCAL WATER	MAKEUP WATER	TOTAL	Imported	Recycled	Total		
1952-53						1,140	-	1,140		1,140
1953-54	30,000			-	30,000	3,290	-	3,290		33,290
1954-55	24,800			-	24,800	2,740	-	2,740		27,540
1955-56	54,500			-	54,500	2,840	-	2,840		57,340
1956-57	50,000			-	50,000	3,590	-	3,590		53,590
1957-58	105,100		87,558	-	192,658	4,330	-	4,330		196,988
1958-59	54,400		31,787	-	86,187	3,700	-	3,700		89,887
1959-60	80,900		20,064	-	100,964	3,800	-	3,800		104,764
1960-61	147,200		9,118	-	156,318	4,480	-	4,480		160,798
1961-62	208,100	1,178	39,548	-	248,826	4,510	-	4,510		253,336
1962-63	80,600	12,405	14,565	-	107,570	4,200	-	4,200		111,770
1963-64	104,900	13,258	9,992	-	128,150	10,450	-	10,450		138,600
1964-65	160,100	14,528	13,097	-	187,725	35,980	-	35,980		223,705
1965-66	121,700	15,056	45,754	6,500	189,010	48,110	-	48,110	745	237,865
1966-67	84,300	16,223	59,820	-	160,343	46,940	-	46,940	851	208,134
1967-68	95,400	18,275	39,760	-	153,435	44,530	-	44,530	850	198,815
1968-69	17,800	13,877	119,395	-	151,072	41,680	-	41,680	850	193,602
1969-70	68,900	17,158	52,917	-	138,975	33,940	-	33,940	900	173,815
1970-71	72,100	19,494	89,514	-	181,108	36,202	-	36,202	881	218,191
1971-72	34,450	17,543	17,688	-	69,681	41,036	-	41,036	756	111,473
1972-73	71,900	21,949	45,077	20,000	158,926	41,803	-	41,803	901	201,630
1973-74	68,200	20,449	29,171	23,900	141,720	42,658	-	42,658	901	185,279
1974-75	71,900	21,199	29,665	-	122,764	36,688	-	36,688	400	159,852
1975-76	50,800	21,456	22,073	-	94,329	44,815	-	44,815	400	139,544
1976-77	9,300	22,863	19,252	21,400	72,815	49,315	-	49,315	400	122,530
1977-78	39,900	19,101	147,317	-	206,318	40,233	-	40,233	16,131	262,682
1978-79	65,300	22,457	68,859	-	156,616	34,498	-	34,498	18,378	209,492
1979-80	10,200	24,383	106,820	10,900	152,303	37,119	-	37,119	14,961	204,383
1980-81	32,000	26,109	50,590	31,500	140,199	34,364	-	34,364	23,823	198,386
1981-82	4,600	29,418	47,930	30,900	112,848	34,292	-	34,292	18,883	166,023
1982-83	2,000	17,035	126,076	8,900	154,011	45,186	-	45,186	19,752	218,949
1983-84	1,500	27,784	60,710	20,800	110,794	39,482	-	39,482	41,740	192,016
1984-85	40,600	26,998	39,099	-	106,697	37,524	-	37,524	36,840	181,061
1985-86	21,500	25,314	66,966	-	113,780	31,693	-	31,693	26,132	171,605
1986-87	49,200	35,321	27,613	6,500	118,634	39,317	-	39,317	29,202	187,153
1987-88	23,300	41,767	50,068	5,800	120,935	37,483	-	37,483	28,411	186,829
1988-89	50,300	47,157	17,096	6,500	121,053	33,534	-	33,534	25,425	180,012
1989-90	52,700	50,109	9,388	13,600	125,797	32,054	-	32,054	29,151	187,002
1990-91	56,287	53,864	35,717	100	145,968	29,709	-	29,709	22,039	197,716
1991-92	43,103	46,903	136,357	-	226,363	34,798	-	34,798	19,104	280,265
1992-93	16,561	48,864	147,699	-	213,124	31,341	-	31,341	53,306	297,771
1993-94	20,411	53,981	55,896	-	130,288	25,109	-	25,109	109,581	264,978
1994-95	21,837	33,300	100,578	-	155,715	22,999	1,480	24,479	50,898	231,092
1995-96	17,961	53,862	62,920	-	134,743	23,304	4,170	27,473	51,333	213,549
1996-97	19,990	49,959	58,262	-	128,211	23,039	6,241	29,280	39,394	196,885
1997-98	953	37,017	96,706	-	134,676	17,125	8,308	25,433	30,330	190,439
1998-99	-	47,201	32,013	-	79,214	20,308	6,973	27,280	23,516	130,010
1999-00	45,037	43,270	20,607	-	108,914	22,917	7,460	30,377	22,278	161,569
2000-01	23,451	46,343	39,725	-	109,519	23,585	6,838	30,423	21,181	161,123
2001-02	42,875	60,596	17,000	-	120,471	24,376	7,276	31,652	20,720	172,843
2002-03	22,365	42,796	58,202	-	123,363	23,117	6,192	29,309	11,205	163,877
2003-04	27,520	44,925	30,467	-	102,912	21,361	3,669	25,030	-	127,942
2004-05	25,145	29,503	148,674	-	203,322	17,660	3,920	21,580	7,804	232,706
2005-06	33,229	42,022	60,377	-	135,628	14,628	6,874	21,502	9,889	167,019
2006-07	40,214	45,039	11,495	-	96,748	11,994	13,077	25,071	9,259	131,078
2007-08	1,510	39,767	54,518	-	95,795	12,880	15,165	28,045	-	123,840
2008-09	-	39,611	35,348	-	74,959	17,391	10,658	28,049	-	103,008
2009-10	26,286	55,731	35,398	-	117,415	18,411	11,902	30,313	-	147,728
TOTAL	2,745,184	1,574,417	2,852,306	207,300	7,379,207	1,505,597	120,202	1,625,799	839,503	9,844,510

** - Including Orange County sidc of Alamitos Barrier*

HISTORICAL AMOUNTS OF GROUNDWATER PRODUCTION

(In Acre-feet)

YEAR	CENTRAL BASIN	WEST COAST BASIN	TOTAL
WATER YEAR			
1960-61	292,500	61,900	354,400
1961-62	275,800	59,100	334,900
1962-63	225,400	59,100	284,500
1963-64	219,100	61,300	280,400
1964-65	211,600	59,800	271,400
1965-66	222,800	60,800	283,600
1966-67	206,700	62,300	269,000
1967-68	220,100	61,600	281,700
1968-69	213,800	61,600	275,400
1969-70	222,200	62,600	284,800
1970-71	211,600	60,900	272,500
1971-72	216,100	64,800	280,900
1972-73	205,600	60,300	265,900
1973-74	211,300	55,000	266,300
1974-75	213,100	56,700	269,800
1975-76	215,300	59,400	274,700
1976-77	211,500	59,800	271,300
1977-78	196,600	58,300	254,900
1978-79	207,000	58,000	265,000
1979-80	209,500	57,100	266,600
1980-81	211,915	57,711	269,626
1981-82	202,587	61,874	264,461
1982-83	194,548	57,542	252,090
1983-84	196,660	51,930	248,590
1984-85	193,085	52,746	245,831
1985-86	195,972	53,362	249,334
1986-87	196,660	48,026	244,686
1987-88	194,704	43,837	238,541
1988-89	200,207	44,323	244,530
1989-90	197,621	48,047	245,668
1990-91	187,040	53,660	240,700
1991-92	196,400	56,318	252,718
1992-93	150,495	40,241	190,736
1993-94	156,565	41,826	198,391
1994-95	180,269	41,729	221,998
1995-96	182,414	52,222	234,636
1996-97	187,561	52,576	240,137
1997-98	188,305	51,859	240,164
1998-99	204,418	51,926	256,344
1999-00	198,483	53,599	252,082
2000-01	195,361	53,870	249,231
2001-02	200,168	50,063	250,231
2002-03	190,268	51,946	242,214
2003-04	200,365	48,013	248,378
2004-05	188,707	41,297	230,004
2005-06	191,030	36,809	227,839
2006-07	198,115	37,655	235,770
2007-08	206,260	38,472	244,732
2008-09	198,156	45,246	243,402
2009-10	197,387	43,942	241,329
TOTAL	10,189,326	2,663,067	12,852,393

HISTORICAL AMOUNTS OF TOTAL WATER USE IN THE WATER REPLENISHMENT DISTRICT*

(In Acre-feet)

YEAR	GROUNDWATER PRODUCTION	IMPORTED WATER FOR DIRECT USE*	RECLAIMED WATER FOR DIRECT USE*	TOTAL
WATER YEAR				
1960-61	354,400	196,800		551,200
1961-62	334,900	178,784		513,684
1962-63	284,500	222,131		506,631
1963-64	280,400	257,725		538,125
1964-65	271,400	313,766		585,166
1965-66	283,600	308,043		591,643
1966-67	269,000	352,787		621,787
1967-68	281,700	374,526		656,226
1968-69	275,400	365,528		640,928
1969-70	284,800	398,149		682,949
1970-71	272,500	397,122		669,622
1971-72	280,900	428,713		709,613
1972-73	265,900	400,785		666,685
1973-74	266,300	410,546		676,846
1974-75	269,800	380,228		650,028
1975-76	274,700	404,958		679,658
1976-77	271,300	355,896		627,196
1977-78	254,900	373,116		628,016
1978-79	265,000	380,101	100 [a]	645,201
1979-80	266,600	397,213	200	664,013
1980-81	269,626	294,730	300	564,656
1981-82	264,461	391,734	300	656,495
1982-83	252,090	408,543	400	661,033
1983-84	248,590	441,151	1,800	691,541
1984-85	245,831	451,549	2,000	699,380
1985-86	249,334	427,860	2,400	679,594
1986-87	244,686	478,744	2,300	725,730
1987-88	238,541	479,318	3,500	721,359
1988-89	244,530	466,166	5,300	715,996
1989-90	245,668	448,285	5,900	699,853
1990-91	240,700	485,109	5,000	730,809
1991-92	252,718	395,191	4,900	652,809
1992-93	190,736	388,949	824	580,509
1993-94	198,391	483,287	3,413	685,091
1994-95	221,998	437,191	6,143	665,332
1995-96	234,636	426,699	19,804	681,139
1996-97	240,137	436,569	25,046	701,752
1997-98	240,164	375,738	27,075	642,977
1998-99	256,344	396,655	30,510	683,509
1999-00	252,082	395,681	33,589	681,352
2000-01	249,231	395,024	32,589	676,844
2001-02	250,231	395,799	38,694	684,724
2002-03	242,214	381,148	38,839	662,201
2003-04	248,378	389,233	36,626	674,237
2004-05	230,004	402,660	33,988	666,652
2005-06	227,839	366,815	35,301	629,955
2006-07	235,770	376,492	41,899	654,161
2007-08	244,732	346,035	45,120	635,887
2008-09	243,402	320,711	43,153	607,266
2009-10	241,329	278,857	43,547	563,734
TOTAL	12,852,393	19,058,840	570,561	32,481,793

(a) Los Coyotes on-line in 1979; Long Beach on-line in 1980

** - Includes imported & recycled at seawater barriers, but not spreading grounds.*

WRD GROUNDWATER BANKING PROGRAM

(In Acre-feet)

WATER YEAR	CITY OF LONG BEACH			LONG BEACH/ALAMITOS BARRIER Seasonal Water			LONG BEACH/ALAMITOS BARRIER Tier 1 Water			TOTAL		
	Banked	Called	Balance	Banked	Called	Balance	Banked	Called	Balance	Banked	Called	Balance
2002-03	4,864	-	4,864	-	-	-	-	-	-	4,864	-	4,864
2003-04	8,136	-	13,000	-	-	-	-	-	-	8,136	-	13,000
2004-05	-	-	13,000	3,652	-	3,652	-	-	-	3,652	-	16,652
2005-06	-	-	13,000	1,324	56	4,919	-	-	-	1,324	56	17,919
2006-07	-	-	13,000	300	1,561	3,658	-	-	-	300	1,561	16,658
2007-08	-	2,416	10,584	-	1,498	2,160	-	-	-	-	3,914	12,744
2008-09	-	4,182	6,402	-	-	2,160	2,000	-	2,000	2,000	4,182	10,562
2009-10	-	-	6,402	-	-	2,160	-	2,000	-	-	2,000	8,562
TOTAL	13,000	6,598		5,275	3,115		2,000	2,000		20,275	11,713	

* Numbers were updated from last year's ESR following MWD accounting

FIGURES

HISTORICAL RAINFALL
DPW Station #107D - WRD Tracking Station

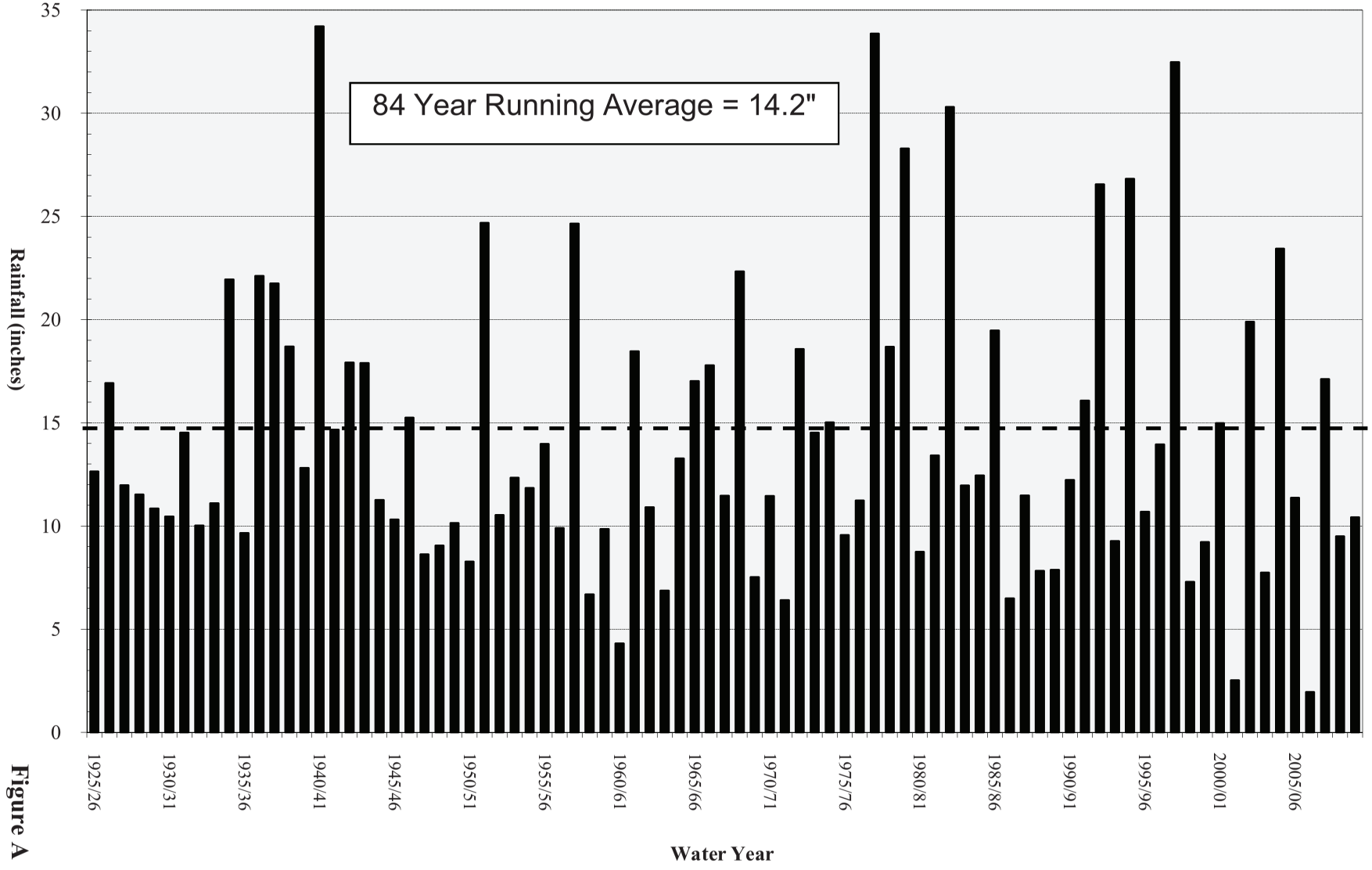
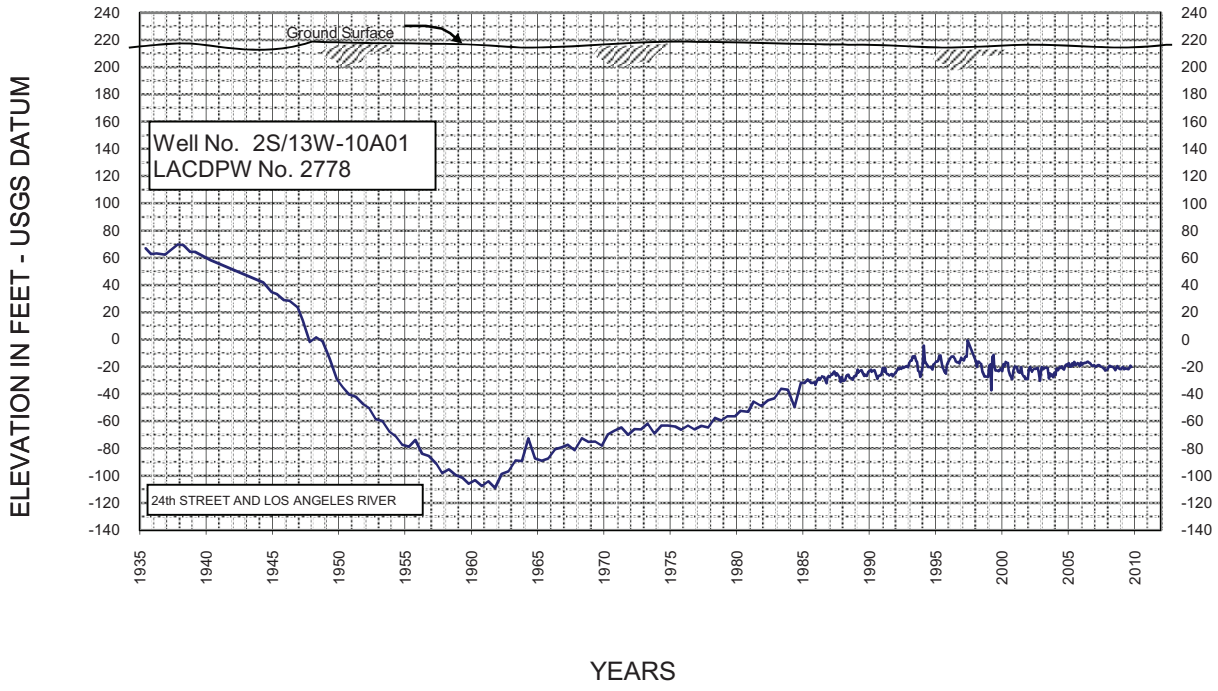


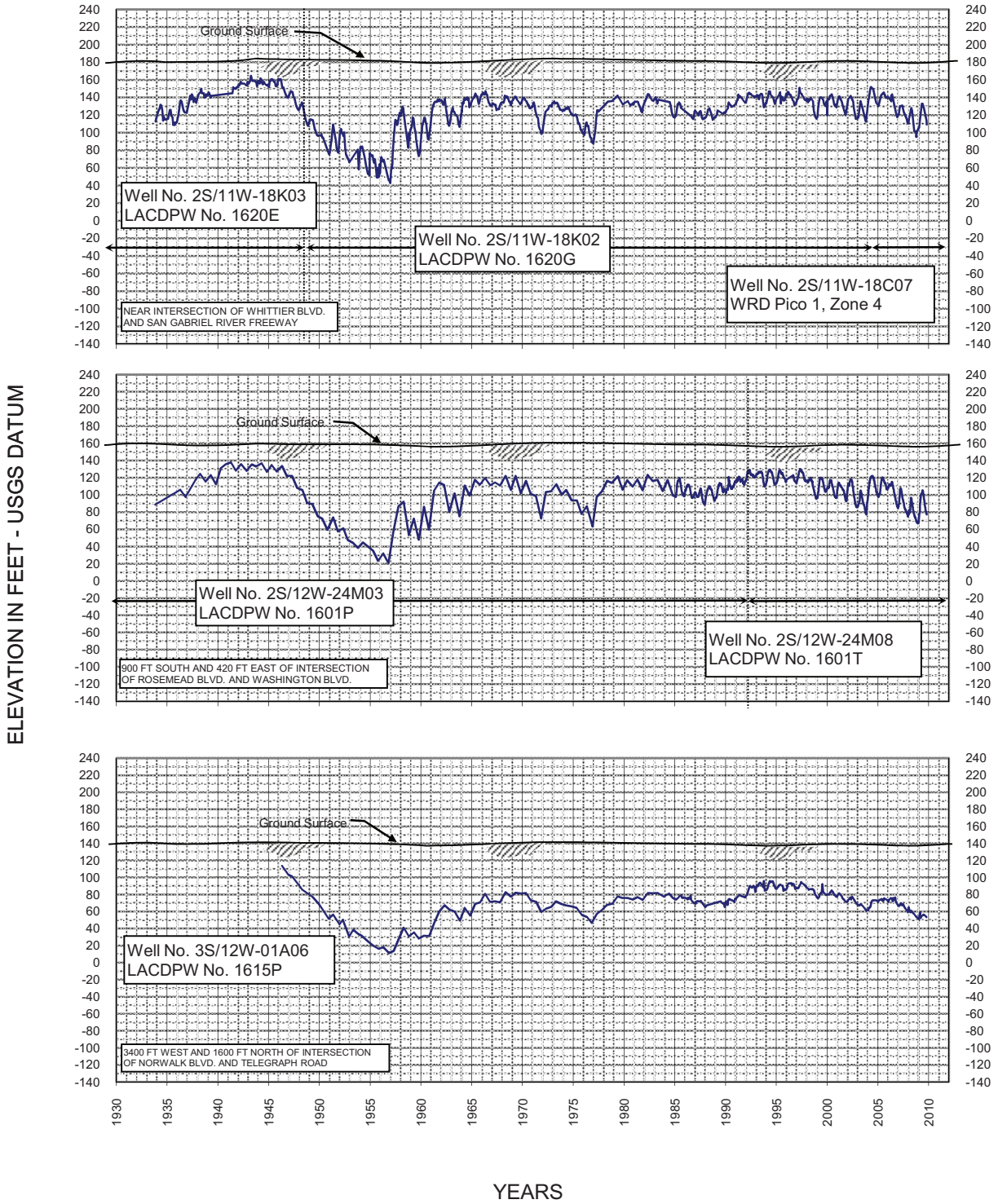
Figure A



FLUCTUATIONS OF WATER LEVEL AT WELLS

LOS ANGELES FOREBAY

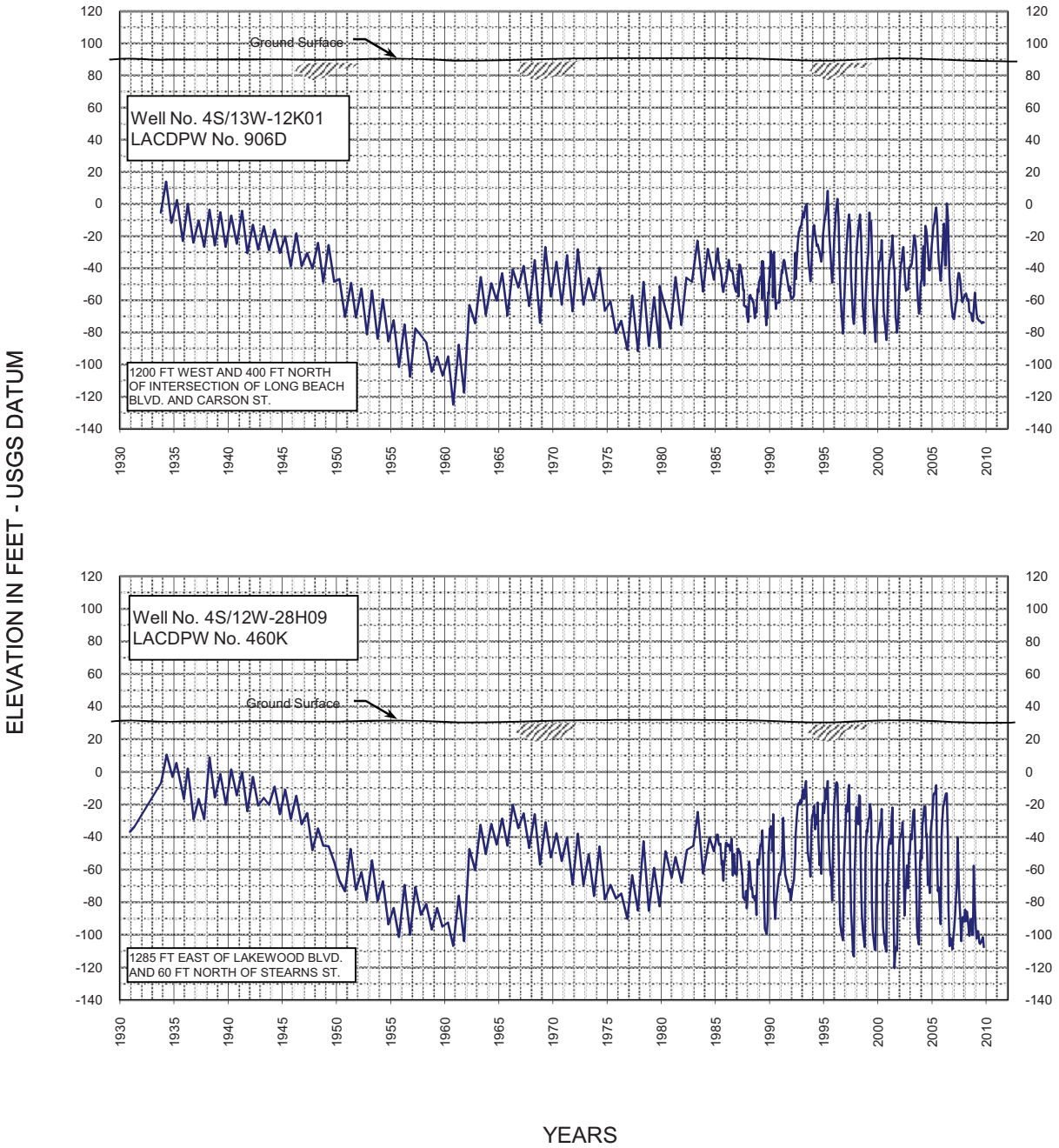
Figure B



FLUCTUATIONS OF WATER LEVEL AT WELLS

MONTEBELLO FOREBAY

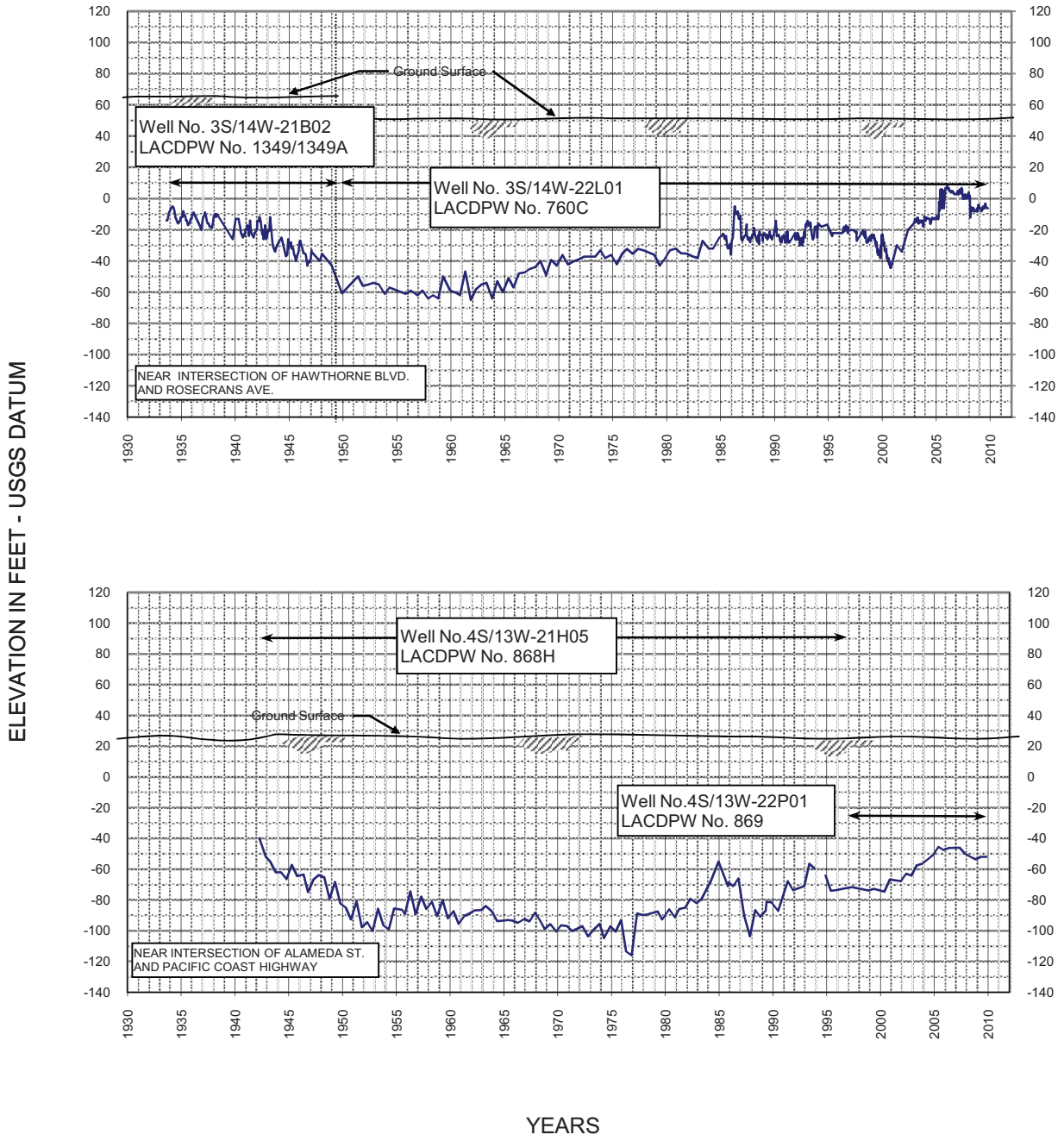
Figure C



FLUCTUATIONS OF WATER LEVEL AT WELLS

CENTRAL BASIN PRESSURE AREA

Figure D



FLUCTUATIONS OF WATER LEVEL AT WELLS

WEST BASIN

Figure E

PLATES

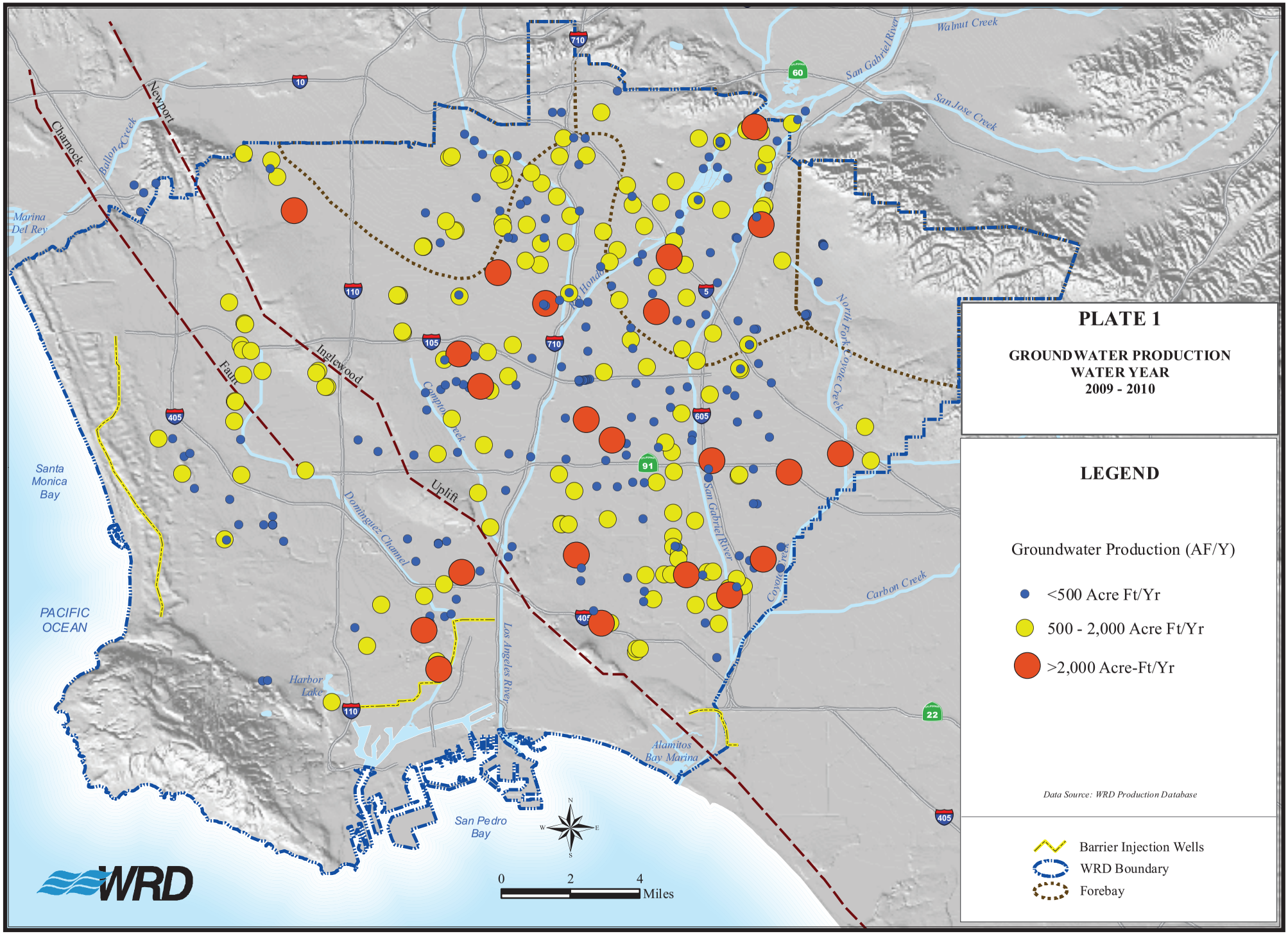


PLATE 1
GROUNDWATER PRODUCTION
WATER YEAR
2009 - 2010
LEGEND
Groundwater Production (AF/Y)
<500 Acre Ft/Yr
500 - 2,000 Acre Ft/Yr
>2,000 Acre-Ft/Yr
Data Source: WRD Production Database
Barrier Injection Wells
WRD Boundary
Forebay
Santa Monica Bay
PACIFIC OCEAN
Marina Del Rey
Ballona Creek
Chamock
Newport
Inglewood
Fault
Uplift
Dominguez Channel
Compton Creek
Los Angeles River
San Gabriel River
Coyote Creek
North Fork Coyote Creek
Carbon Creek
Walnut Creek
San Jose Creek
Harbor Lake
Alamitos Bay Marina
San Pedro Bay
0 2 4 Miles
WRD

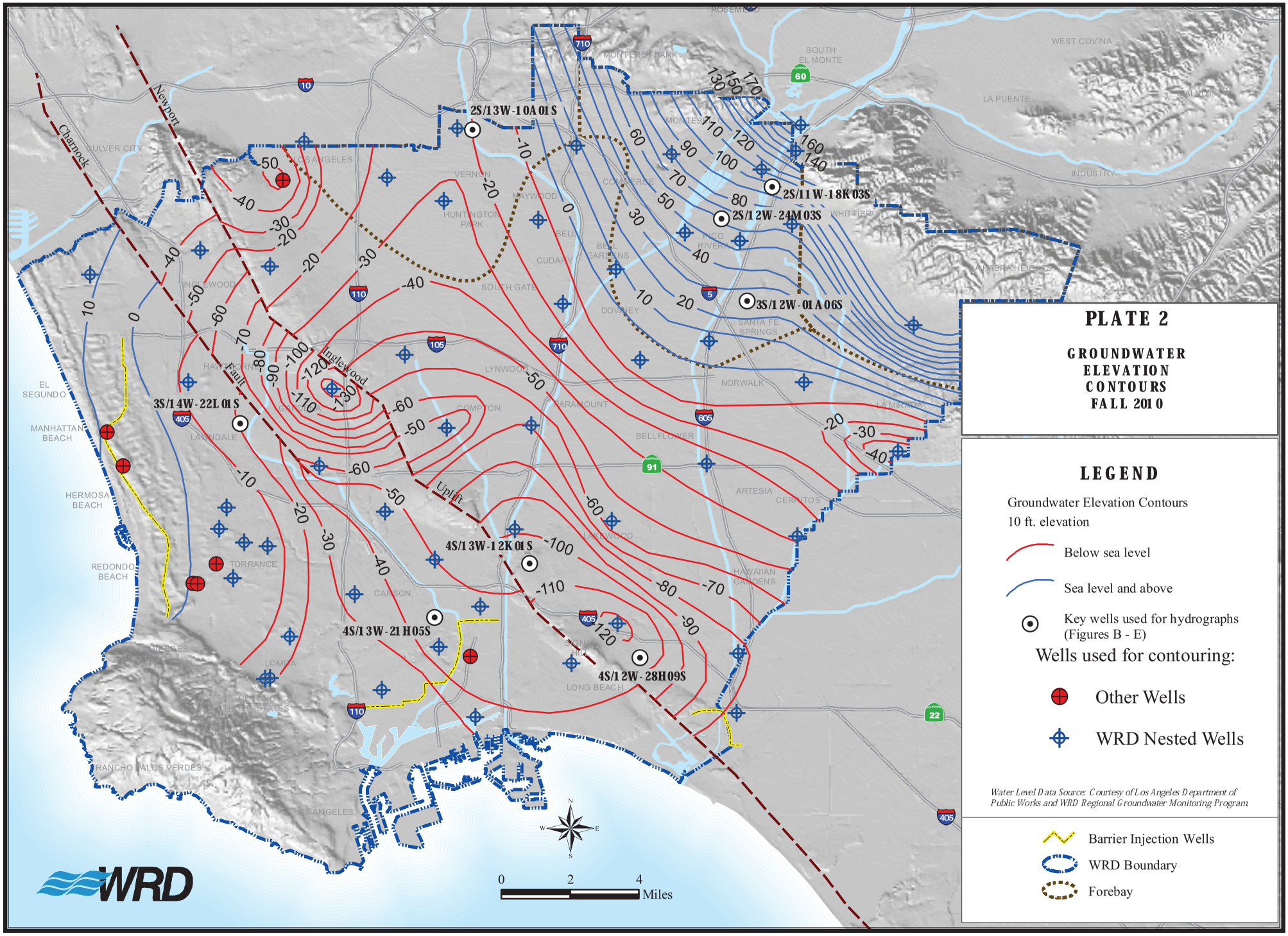


PLATE 2
GROUNDWATER ELEVATION CONTOURS FALL 2010
LEGEND
Groundwater Elevation Contours
10 ft. elevation
Below sea level
Sea level and above
Key wells used for hydrographs (Figures B - E)
Wells used for contouring:
Other Wells
WRD Nested Wells
Water Level Data Source: Courtesy of Los Angeles Department of Public Works and WRD Regional Groundwater Monitoring Program
Barrier Injection Wells
WRD Boundary
Forebay
2S/13W-10A01S
2S/11W-18K03S
2S/12W-24M03S
3S/12W-01A06S
3S/14W-22L01S
4S/13W-12K01S
4S/13W-21H05S
4S/12W-28H09S
Charnock
Newport
Inglewood
Fault
Uplift
WRD
0 2 4 Miles

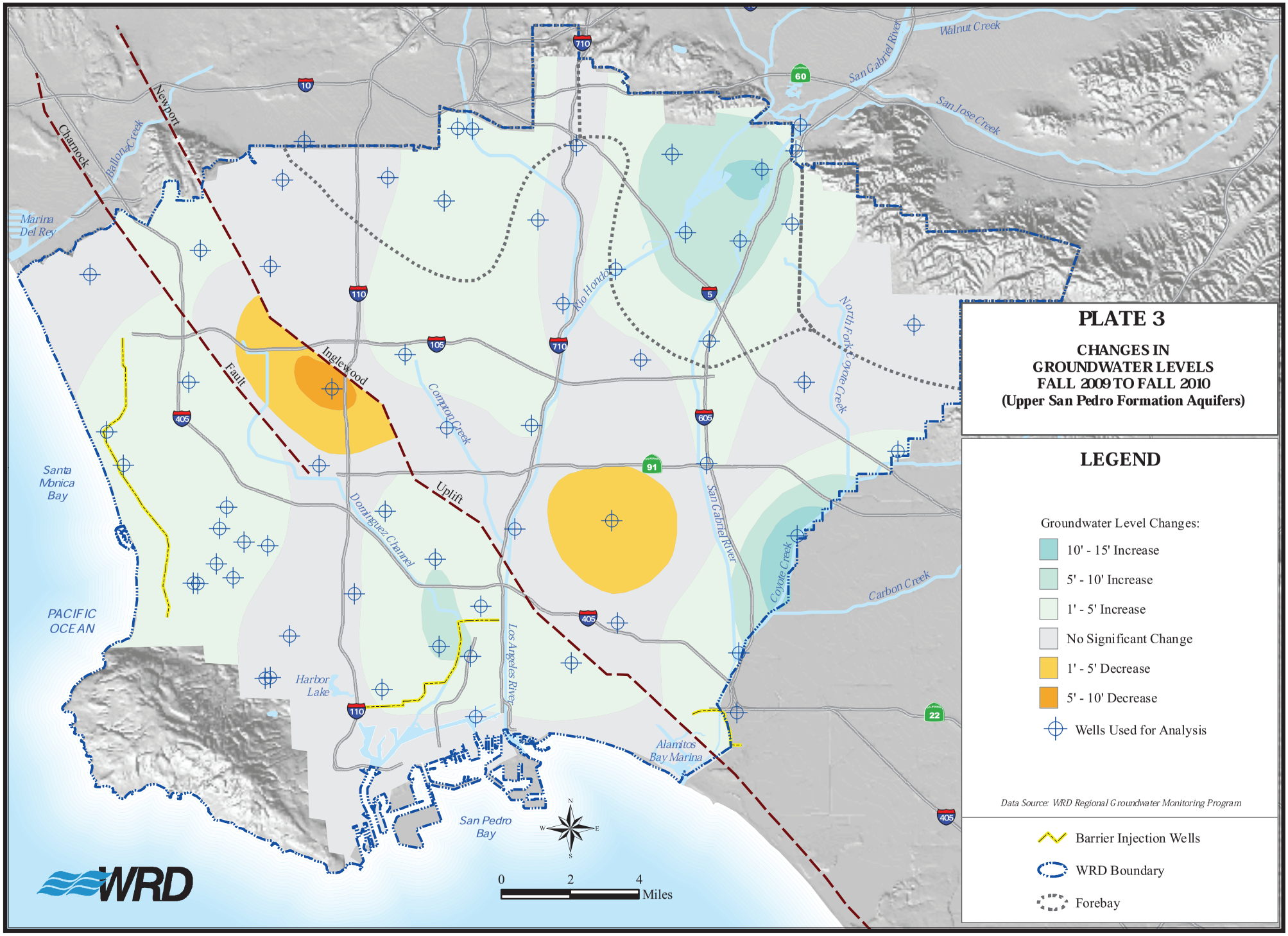


PLATE 3
CHANGES IN GROUNDWATER LEVELS FALL 2009 TO FALL 2010 (Upper San Pedro Formation Aquifers)
LEGEND
Groundwater Level Changes:
10' - 15' Increase
5' - 10' Increase
1' - 5' Increase
No Significant Change
1' - 5' Decrease
5' - 10' Decrease
Wells Used for Analysis
Data Source: WRD Regional Groundwater Monitoring Program
Barrier Injection Wells
WRD Boundary
Forebay
Newport
Charnock
Fault
Inglewood
Uplift
Ballona Creek
Marina Del Rey
Santa Monica Bay
PACIFIC OCEAN
Harbor Lake
San Pedro Bay
Alamitos Bay Marina
Los Angeles River
Dominguez Channel
Compton Creek
Rio Hondo
San Gabriel River
Coyote Creek
North Fork Coyote Creek
Carbon Creek
San Jose Creek
Walnut Creek
0 2 4 Miles
WRD

Appendix G
WRD Technical Bulletin Volume 12 – Summer 2007

WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

Technical Bulletin

Volume 12 ~ Summer 2007

SURVIVING "THE BIG ONE" - WATER SUPPLY RECOVERY AFTER A MAJOR SOUTHERN CALIFORNIA EARTHQUAKE

By: Ted Johnson, Chief Hydrogeologist
tjohnson@wrd.org

Introduction

Southern California is in earthquake country. Since 1933, there have been 23 significant quakes of magnitude 5.9 or greater. And more earthquakes are coming, including the infamous "Big One" that could shake 10 times harder than, and minutes longer than, the 1994 Northridge earthquake that caused at least 33 deaths and $40 billion in damage.

The San Andreas Fault, the major fault line running through California, is expected to be the source for the "Big One". It has on average a major earthquake every 150 years, but the southernmost segment has not had one since 1680, over 300 years ago (**Figure 1**). This is why scientists believe that a major earthquake is overdue.

The message is that earthquakes are expected in Southern California, and large ones can cause cause wide spread damage. Preparations are required to not only survive them, but to recover from them as quickly as possible (e.g. weeks instead of months).

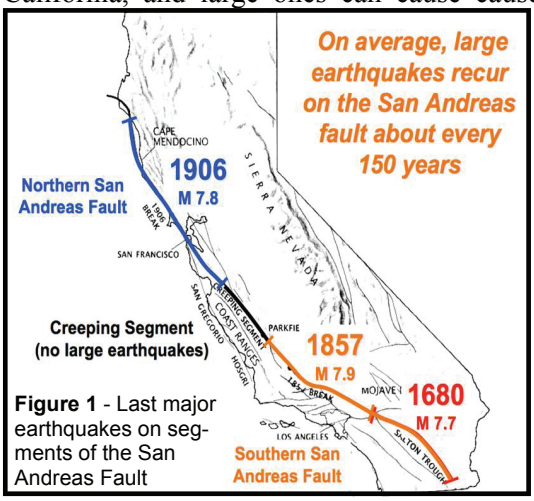


Figure 1 - Last major earthquakes on segments of the San Andreas Fault

Although the focus of this Technical Bulletin is on the recovery of water supplies after a large temblor, all facets of life will be affected by a major earthquake. Proper advanced planning, however, can save lives and hasten the return of services to our communities.

Southern San Andreas Fault Earthquake Scenario

The U.S. Geological Survey (USGS) is leading an effort along with the California Institute of Technology (Caltech) and others to create a hypothetical but possible earthquake scenario for a magnitude 7.8 temblor on the southern portion of the San Andreas Fault. If this massive earthquake hits, it is expected to cause loss of life and serious injuries. It will also cause major damage to lifelines that cross the fault or are affected by the intense shaking, including water and sewer lines, petroleum pipelines, fiber optics cables, bridges, buildings, dams, overhead transmission lines, roads and railways.

Even though Los Angeles is 60 miles from the San Andreas Fault, because it sits on a deep basin of sediments (which gives us our good groundwater aquifers), it will shake like a bowl of gelatin and the ground could shift up and down from 10 to 20 feet, causing severe damage to structures. Modeling of expected ground shaking shows how the shock waves will resonate from the epicenter near Palm Springs into the Los Angeles area (**Figure 2**).

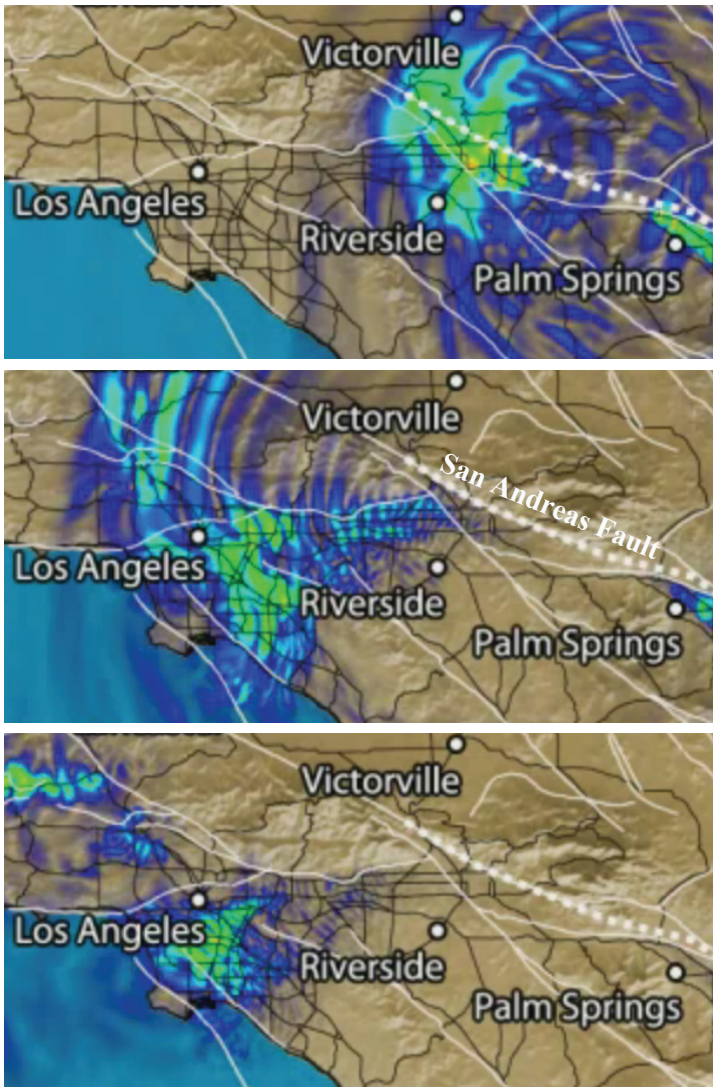


Figure 2 - Modeled ground shaking after 60 seconds (above), 90 seconds (middle), and 120 seconds (bottom) of a M7.8 earthquake on the San Andreas Fault originating near Palm Springs and moving northwest

The result of the USGS/Caltech work will be a document that describes the expected effects of the earthquake. A detailed report is expected in Spring 2008 leading up to an area-wide disaster drill on November 13, 2008 at 10:00 am (simulated day and time that the "Big One" hits).

Impact to Water Supply

As part of the scenario work, the USGS and Caltech convened a panel of water supply experts on July 31, 2007, to determine the potential effects that the major earthquake will have on water supplies. Members from the Water Replenishment District of Southern California (WRD), the Metropolitan Water District of Southern California (Met), Los Angeles Department of Water and Power (LADWP), and others participated in the half-day session.

The panel was asked questions about what infrastructure was in jeopardy (pipelines, water tanks, wells, aqueducts, reservoirs), how the damage would be assessed, how repairs would be conducted, how long water supply outages would occur, and where emergency water supply sources could be obtained. Some of the conclusions were:

- Fault movement will likely cause major damage of the infrastructure crossing it, including the main aqueducts bringing water to Southern California from Northern California and the Colorado River. Repairs may be hampered due to damaged roads and large scale-fires.
- The most severe damage will be closest to the fault, but even in the Los Angeles area there will be damage to pipelines and other infrastructure due to intense shaking. In addition, the Met / LADWP outages from aqueduct damage will impact the local water supply.
- In the first few days after the quake, there may be no water available due to infrastructure breaks and loss of power. After that, repairs will bring supplies online slowly. Each agency will be busy with their own systems, and repairs may take weeks to 6 months or more. New water pipelines may be in very short supply, as they are not in stock and will need to be manufactured.
- A "Potable Water Plan" should be devised to describe to the public how to use water during the first few days of the emergency, when treatment plants may be offline. Avoid "Boil Water Orders" because gas lines in homes may be ruptured and people with gas stoves may cause unintended explosions. Instead, a "Purified" or "Bottled" water order should be made to emphasize drinking treated water instead of boiling it.

Groundwater Basins - Our Emergency Reservoirs

To paraphrase one panelist, "The groundwater basins are our savings account and can help us get by during this emergency. They can be tapped to make up the water shortages when imported supplies are unavailable." Met agreed and will request that groundwater users take more during an emergency to reduce the imported demand.

To prepare for these emergencies, the groundwater basins should be fully utilized as underground reservoirs and the overlying users prepared to tap into these reservoirs. Water wells should be maintained and have the ability to pump excess capacity. Interconnections should be made with adjacent municipalities to provide water distribution redundancy so that water can be re-routed if one community's system fails. Available aquifer storage space should be utilized. Emergency pumping ordinances should be in place to allow additional pumping in adjudicated basins.

Another study underway by the USGS is looking at how the Central and West Coast groundwater basins can be utilized in such an emergency. They are using computer models to assess land subsidence and seawater intrusion implications for over pumping the basins on a short term basis to provide the water needed during an imported water outage. The results of this two-year study are due in 2008.

"Dare to Prepare" is the slogan being used for the earthquake scenario, and those of us in the water supply business have the responsibility to prepare in order to quickly and properly respond in the aftermath of "The Big One".

For More Information:

Additional information on the "Southern Andreas Fault Earthquake Scenario" can be obtained by contacting the author, or from scenario managers Dale Cox of USGS at dacox@usgs.gov, or Keith Porter of Caltech at keith@cohen-porter.net. Information on earthquake preparedness can be found at www.daretoprepare.org.

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WRD
WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

4040 Paramount Blvd., Lakewood, CA 90712
Phone: (562) 921-5521

Copies of this and previous Technical Bulletins can be found on our web site www.wrd.org

Appendix H
CBMWD School Education Current and Future Program

made available throughout Central Basin's service area.

HET Direct Installation Programs
Since 2005, Central Basin has completed more than 5,000 High-Efficiency Toilet (HET) direct installations in single family, multifamily, and commercial, industrial and institutional (CII) facilities throughout Central Basin's service area.

Local HET Partnership Programs
Central Basin receives requests to participate in various local partnerships to provide disadvantaged residents with HETs. Central Basin's service area is home to many disadvantaged residents, and the need for free, water-conserving toilets remains high. Given the current economic down-turn, the conservation coordinator is focusing attention on securing additional sources of funding to make HET programs possible.

6.4. 15 ADDITIONAL CONSERVATION PROGRAMS

CONSERVATION PARTNERSHIPS

Central Basin continues to take advantage of opportunities to achieve additional water savings through new and creative partnerships with local cities, schools, government agencies and non-profit organizations. One such partnership with the Los Angeles County Conservation Corps brought free, educational gardening workshops to local residents. The workshops, which are offered in English and Spanish, provide information on California native plants and gardening tips for residents, business owners, and local landscapers. In another example, ongoing partnerships with Southern California Edison and the Gas Company have made it possible to provide educational conservation programs to sixth grade students throughout the service area.

These partnerships have proven to be diverse in nature and valuable in strengthening the conservation efforts within Central Basin's service area, particularly within the more disadvantaged areas.

Water Wasting Prohibition City Ordinances
Following the call for increased conservation efforts under the state's 20X2020 Plan, the District formed a *Shut Your Tap!* Water Conservation Ordinance Task Force to advocate the adoption of mandatory water conservation ordinances in each city in the District's service area. As a result of the efforts of the Task Force's efforts, 18 cities now have mandatory conservation ordinances in place.

6.4. 16 GRANT PROGRAMS

Central Basin has been successful in receiving grant funding for conservation programs at the federal, state, and local levels through agencies such as the United States Department of Energy (DOE), the Department of Water Resources (DWR), and MWD. The following list provides a brief summary of the individual water conservation grants that have been implemented since 2005:

MWD Grant (Innovative Conservation Program Grant) - 200 HET Direct Install
Central Basin has successfully completed a MWD Innovative Conservation Grant Program, installing 200 HETs in multi-family homes and commercial facilities. The total budget for this grant was $43,800.

MWD Grant (Innovative Conservation Program Grant) – Bell Gardens: California Friendly City – A Model for Inner City Transformation
In 2006, Central Basin was awarded $102,250 to transform the City of Bell Gardens into the first California Friendly City in the State of California through the installation of water saving devices and systems throughout the City's public facilities. These included high-efficiency toilets, urinals, synthetic turf at the public soccer field, water-brooms, native plants and a weather-based irrigation system.

MWD (Enhanced Conservation Program Grant) – Landscape High Efficiency Living Program (HELP)
In 2008, Central Basin was awarded a MWD Enhanced Conservation Program Grant in the amount of $90,000 to provide HELP Landscape Workshops to local residents to teach the benefits of utilizing an MP Rotator irrigation device and planting low water-use plants. The use of MP Rotators alone can save 4.16 to 16.8 gallons of water per minute.

DWR Grant (Prop 50) – High Efficiency Living Program (HELP) 10,000 HET Direct Install
In 2007, Central Basin was awarded a DWR grant in the amount of $1,563,900. The grant program provides funding to market, purchase and install 10,000 HETs in multi-family residential units throughout the service area. The water savings for this program will reach 242 acre-feet annually for 25 years.

DWR Grant (Prop 50) - Conservation Outreach Targeting Multicultural Communities
In 2007, Central Basin was awarded a DWR grant program in the amount of $100,000 to provide cities and water retailers with conservation outreach training and tools. The funding provides for website design, research services and bill-stuffer templates to be used by the District's water retailers. The purpose of the program is to promote water conservation within the multicultural and multilingual communities prevalent in the service area.

DWR Grant (Prop 50) – Urban City Makeover Program
Through the DWR Prop 50 Urban City Makeover Program, grant funding in the amount of $113,746 will provide nine disadvantaged cities with a number of

water-saving resources. These include: high-efficiency toilets (HETs), Waterfree urinals, native plants, weather-based irrigation controllers and water brooms. The participating cities are: Bell Gardens, Commerce, Cudahy, Hawaiian Gardens, Huntington Park, Lynwood, Maywood, Paramount, and South Gate.

DWR Grant (Prop 50) – Helping Our People and Environment (HOPE) 3,000 HET Direct Install

Since 2009, Central Basin has administered the "Helping Our People and Environment" (HOPE) grant program on behalf of the City of Maywood. This Prop 50 grant program provides funding to install 3,000 High-Efficiency Toilets (HETs) in residences throughout the city of Maywood.

DWR Grant (Prop 50) – Zero Water Consumption Urinal Retrofit Program – 2,600 Urinal Retrofit Program

In 2003, Central Basin secured a DWR grant entitled Zero Water Consumption Urinal Retrofit Program in the amount of $780,000. The program provided no-cost installations of 2,600 water-free urinals to qualified commercial, industrial, and institutional buildings located within the Central Basin service area.

DWR Grant (Prop 50) – Commercial Landscape Wireless Valve End Use Management Research Project

The Commercial Landscape Wireless Valve End Use Management Research Project awarded to Central Basin by DWR in the amount of $302,052, involves the implementation of wireless valve evapotranspiration (ET) controllers in non-residential sites. The research goal is to enhance water management and water efficiency at the local, regional, and statewide levels.

DWR Grant (Prop 50) – Large Landscape Water Conservation, Runoff Reduction and Educational Program

The Large Landscape Water Conservation, Runoff Reduction and Educational Program provides $900,000 in funding for the implementation of a water management program using weather-based irrigation controllers and wireless technologies to significantly reduce the amount of runoff from large landscapes, street medians, and residential properties.

Included in the grant funding are five large community demonstration gardens. Central Basin will partner with local public agencies such as cities and school Districts to create Demonstration Gardens that enrich the environmental awareness of the community and promote the benefits of water efficient gardens.

U.S. D.O.E. (Energy Efficiency Conservation Block) Water and Energy Emergency End Use Demand Management Measures Grant

The Water and Energy Emergency End Use Demand Management Measures Grant in the amount of $2,000,000 was awarded to Central Basin under the United States Department of Energy Recovery Act - Energy Efficiency and Conservation Block Grant Program. Under this program, funding will be provided to purchase and install a series of wireless (ET) controllers in residential and commercial settings that utilize radio commands for periodic pressure and management adjustments. A second element of the grant addresses water and energy demand management in recycled pipelines.

6.5 CURRENT AND FUTURE EDUCATION PROGRAMS

6.5. 1 CURRENT PROGRAMS

Water Squad Investigations (Grades 4 – 12)

Launched in September 2006, Water Squad Investigations is a collaborative environmental education program that joins Central Basin, the Los Angeles County Sanitation Districts and LA County's Whittier Narrows Center to provide students with a fun-filled day of water awareness. By the end of June 2010, over 5,000 primary through secondary school students will have participated in the program. Table 6-1 shows the number of students who have participated in Central basin education programs since 2005.

Each Friday morning throughout the school year, participating students are driven from their school to the San Jose Creek Water Recycling Plant (SJCWRP), and later, to the Whittier Narrows Nature Center in a charter bus provided by Central Basin. At these sites, students are introduced to the concepts of water recycling and conservation through multimedia presentations, fun activity book exercises and guided tours of the facilities.

By the day's end, students gain a solid understanding of how water recycling can help conserve valuable drinking water and about the simple but effective ways they can conserve at home.

From September 2005 through June 2010, 5,835 students have participated in Water Squad Investigations.

Water Wanderings (Grades 4 – 5)

Water Wanderings is a collaborative classroom visitation program between Central Basin and the S.E.A. Lab in Redondo Beach, a program of the Los Angeles Conservation Corps. This collaborative hands-on classroom program takes fourth and fifth graders on a 2 ½-hour journey through California's water.

Each class that participates will have the opportunity to visit three action-packed stations where they will experience a multimedia game called California Water Jeopardy, a food chain/food web activity and touch live marine animals and plants on board the "traveling tidepool," a van outfitted with touch tanks.

Water Wanderings is correlated to many of the fourth through fifth grade State standards for social science and science. By participating in this free program, students learn to appreciate California's water as a scarce, valuable resource.

From September 2005 through June 2010, 26,670 students have participated in Water Wanderings.

Think Watershed (Grades 4 – 6)
Think Watershed educates students about the San Gabriel River Watershed's impact on our coastal waters and inspires them to become stewards of the environment. Students participate in hands-on activities to see how human behavior affects the quality of air, water, and habitat, as well as plant, animal, and human life.

Components of Think Watershed include:

Floating Lab Boat Trip – On a 3-hour cruise through the Long Beach Harbor, with a morning or an afternoon departure, students will participate in: a plankton lab, ocean bottom sediment study, water visibility testing, water chemistry interactions, and wildlife observation.

Curriculum – Aligned to the California Content Standards, a Think Watershed Teacher's Guide is distributed to all participating classroom teachers. The guide includes: pre-trip activities, cruise plan and preparation guidelines, and post-trip activities such as website data reporting and service learning projects.

Bus Transportation – Free transportation from the students' school to the Long Beach Harbor is provided to schools that qualify.

From September 2008 through June 2010, over 5,000 students have participated in Think Watershed.

Think Earth! It's Magic (Grades K – 5)
What does a magician have to do with water conservation? On the surface, it wouldn't seem like much, but *Think Earth! It's Magic* is a collaborative program between Central Basin and the Think Earth Environmental Education Foundation that uses an award-winning curriculum and magic shows to teach elementary school students about their environment.

As the magician makes water disappear, he teaches the importance of water conservation. As he makes a rabbit disappear, he explains the effects of toxic waste on the environment. The magician's show follows the curriculum of the Think Earth Environmental Education Foundation and correlates to the California State Content Standards in the areas of Language Arts, Science, Social Science, and Mathematics. The Think Earth Environmental Education Foundation is a non-profit organization dedicated to developing and maintaining a sustainable environment through education.

Each year, elementary schools throughout Central Basin's service area enhance their Think Earth curriculum with this exciting magic show. It is an opportunity to reinforce the classroom lessons and remind students about the importance of implementing environmentally sound practices around their homes and schools.
From September 2005 through June 2010, 37,800 students have participated in Think Earth! It's Magic.

Think Water! It's Magic (After School Program for Grades K – 5)
Think Water! It's Magic is a **FREE** environmental education program for students in extended daycare/after school programs. This innovative program features an energetic *Think Water! It's Magic* assembly by eco-magician Paul Cash that students will remember for many years.

The *Think Water! It's Magic* shows are approximately 45-minutes in duration. While performing magic tricks and illusions, eco-magician Paul Cash engages students in a fun way and teach them about the limited water availability on Earth, the water cycle, water quality, and water recycling. Most importantly, Mr. Cash also teaches students about the amount of water used during everyday tasks and how they can conserve water by just making some simple behavioral changes.

This exciting environmental education assembly program is offered **FREE** to all Central Basin elementary schools (K-5) that have an extended daycare/after school program.

From September 2008 through June 2010, over 6,000 students have participated in Think Water! It's Magic.

"Water Is Life" Poster Contest (Grades 4 – 8)
As part of an annual recognition of Water Awareness Month, the "Water Is Life" Poster Contest is a collaborative arts program between Central Basin and the MWD. Celebrated every May, Water Awareness Month encourages wise water use, conservation, recycling, and water education. Students in grades 4 – 8, are encouraged to depict on posters various water uses and/or wise water use at home or school, in industry or business, in the environment, in agriculture, or in recreation. Central Basin then selects a grand-prize winner who is awarded a fully-loaded laptop computer and receives a special recognition at Central Basin's headquarters. The grand-prize winner's poster is then submitted to MWD to be included in calendars, and featured on water bottles, screen savers, mouse pads, etc.

From September 2005 through June 2010, over 80,000 students have had an opportunity to participate in the "Water Is Life" Poster Contest.

Waterlogged (Grades 9 – 12)

Waterlogged is a collaborative high school visitation program between Central Basin and the Roundhouse Marine Studies Lab and Aquarium, an oceanographic teaching station. Through specimen dissections, examples of current aquatic/marine science research, and practical hands-on activities, students will learn more about the scientific method, habitats and inhabitants of the Pacific Ocean, and the overall effect of unintended human impacts on the aquatic/marine environment.

Waterlogged offers five exciting classroom visitation topics, which are each aligned to the California State Science Content Standards.

This exciting aquatic/marine science education program is offered FREE to all Central Basin Waterlogged High Schools.

From September 2007 through June 2010, 15,925 students have participated in Waterlogged.

Sewer Science (Grades 9-12)
Sewer Science is an award-winning, hands-on laboratory program that teaches high school students in Central Basin's service area about wastewater treatment.

During a week-long lab course, students create fake wastewater and employ physical, biological and chemical treatment methods and procedures to test its quality. The lab is facilitated by biologists and chemists from the County Sanitation Districts of Los Angeles County, allowing students the opportunity to learn first-hand from experienced science professionals.

From September 2005 through June 2010, 8,875 students have participated in Sewer Science.

6.5. 2 FUTURE PROGRAMS

Conservation Connection: Water & Energy in Southern California
(Grades 5 – 8)

We turn the tap and water flows out. We turn on a lamp and light fills the room. We depend on water and energy. We need the water and energy to live in Southern California and elsewhere in the world too. But where do we get the water and energy that we use? Will we always have enough to meet our needs?

Conservation Connection answers those questions, showing the connections between California, our water and energy supply, and us. But providing information is only part of Conservation Connection. The goal of the curriculum is to get students actively involved – in their homes and at school – in conserving water and energy. Within the program, students have the opportunity to survey their family's water and energy use and survey water and energy use at their school.

After gathering data, analyzing their findings and reviewing recommendations, students make, implement, and monitor plans to decrease water and energy use. By participating in this action-based curriculum, students will learn to look critically at important environmental issues and take responsibility for finding solutions.

Water for the City: Southern California's Urban Water Cycle (Grades 4 – 8)
Water for the City: Southern California's Urban Water Cycle is a partnership between Central Basin, Los Angeles County Sanitation District, Water Replenishment District, MWD, Los Angeles County Office of Education, and the Center for Global Environmental Education at Hamline University. This interactive, multi-media water education curriculum has lessons for upper elementary through middle school students, as well as a teacher's guide. Lessons and animation elements will cover the following topics: Watershed Awareness, Where Southern California gets its water from, Surface and Ground Water, Water Storage and Delivery, A Raindrop's Journey, Water Recycling, Water Conservation, Water Planning, Dams and Reservoirs, Point and Non-Point Pollution, and an interactive Urban Water Cycle game that will address water supply and management issues.

Table 6-1
School Education Program
(Number of Participating Students)

Grade Level	FY 05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	Total
K - 3rd	3,360	3,100	6,460	8,828	6,140	27,888
4th - 6th	6,040	9,520	11,163	14,499	13,825	55,047
7th - 8th	500	0	105	105	0	710
9th - 12th	905	1,925	4,900	9,265	8,015	25,010
Total	10,805	14,545	22,628	32,697	27,980	108,655