2010 Integrated Regional Urban Water Management Plan for the Antelope Valley

June 2011

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Introduction & Summary

Section 1: Introduction & Summary

The 2010 Integrated Regional Urban Water Management Plan for the Antelope Valley (IRUWMP) has been prepared as an Appendix to the 2007 Antelope Valley Integrated Regional Water Management Plan (AVIRWMP) in cooperation with other retail water agencies in the Antelope Valley. It fulfills the requirements of an Urban Water Management Plan for Los Angeles County Waterworks District No. 40, Antelope Valley (District No. 40) and Quartz Hill Water District (QHWD).

The groundwater rights adjudication process is underway for the Antelope Valley Groundwater Basin (Basin); however it has not been concluded. Nothing in this IRUWMP shall be interpreted to interfere in any way with the court adjudication of groundwater rights or related settlement negotiations. All tables in Section 7 reflect projected groundwater pumping estimates provided by each water purveyor. The groundwater pumping projections are not agreed-upon values by the water purveyors, and each water purveyor understands these projections are estimates subject to change. These estimates do not necessarily reflect the maximum pumping capacity of each water purveyor.

This section presents a brief description of the provisions of the Urban Water Management Planning Act (UWMPA), provides a description of the participating water agencies and their service area characteristics, including population, climate, water demand, water supply, water conservation, water recycling, and reliability planning. The contents of this plan are provided in this section.

1.1 The Urban Water Management Plan

In 1983, the California Legislature enacted the UWMPA (Assembly Bill (AB) 797; Water Code, Division 6, Part 2.6, Section 10610-10656). This UWMPA requires water suppliers serving more than 3,000 customers or water suppliers providing more than 3,000 acre-feet (AF) of water annually to prepare an Urban Water Management Plan (UWMP) to promote water demand management and efficient water use. The UWMPA also requires water suppliers to develop, adopt, and file an UWMP (or update) every five years. A six-month extension was granted by the legislature for submittals of the 2010 UWMPs to provide additional time for the water suppliers to address Senate Bill X7-7 (SB X7-7), which requires water retailers to reduce per capita water use by 20 percent by the year 2020 with an interim target of 10 percent reduction by 2015.

Recent changes approved in 2002 and 2004 include SB 1348, SB 1384, SB 1518, AB 105, and AB 318. SB 1348 requires that the Department of Water Resources (DWR) consider the demand management activities of urban water supplier in the grant and loan application evaluation. SB 1384 requires that urban water supplier to submit a copy of their UWMP to their wholesale supplier. This bill encourages coordination between the wholesale and retail agencies. SB 1518 requires additional information regarding the use of recycled water including a comparison of previously projected use to actual use to determine the effectiveness of recycled water initiatives. AB 105 requires an urban water supplier to submit a copy of their UWMP to the California State Library. AB 318 requires urban water suppliers to provide a discussion of the desalination opportunities available to them. This includes ocean water, brackish water, and groundwater desalination for use as a long-term supply. AB 1420 passed in 2007, which addresses funding eligibility requirements of Section 10631.5 of the Water Code. In order for an urban water purveyor to be eligible for grant funding, the water purveyor must show implementation of water use efficiency demand management measures.

A copy of the current UWMPA is provided in Appendix A.

1.1.1 Purpose of the Plan

An UWMP is designed to provide an effective management and planning tool for water agencies throughout California. It allows for a succinct summary of an agency's water supplies, demands, and plans to ensure future reliability. It also encourages the efficient management of water supplies by requiring a discussion of potential water transfers and exchanges, desalination, and recycled water opportunities.

In addition to meeting the requirements of the UWMPA, this plan will also meet the requirements of an IRUWMP. Detailed discussions of current and future water supply will be provided in conjunction with water supply strategies for the Antelope Valley to ensure a reliable future water supply. Figure 1-1 provides a vicinity map of the Antelope Valley.

FIGURE 1- 1: ANTELOPE VALLEY VICINITY MAP

1.1.2 Regional Approach in Preparation of the Plan

In an effort to improve coordination and facilitate inter-agency planning to maximize resources within the Antelope Valley, District No. 40 is acting as the lead agency for this IRUWMP. All agencies located within the Antelope Valley were given the opportunity to participate in this joint effort of the UWMP preparation. As such, this IRUWMP has been prepared for District No. 40 and QHWD. These two agencies are required by the UWMPA to prepare an UWMP. This IRUWMP was also prepared in conjunction with efforts of other agencies within the Antelope Valley that have chosen to not participate in this joint effort. Table 1-1 provides a summary of the agency coordination for this IRUWMP.

TABLE 1-1: AGENCY COORDINATION

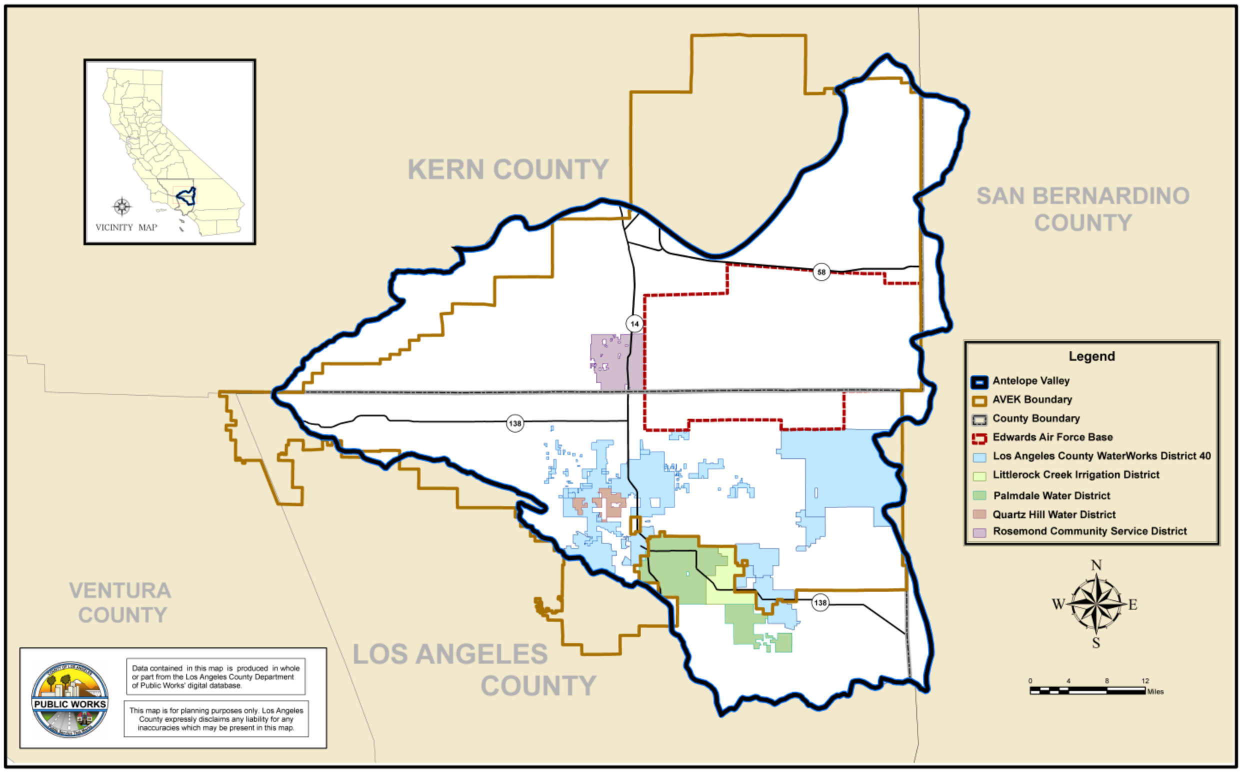
	Participated in developing the plan	Commented on the draft	Attended public meeting	Was contacted for assistance	Was sent a copy of the draft plan	Intention to adopt
District No. 40	X	X	X	X	X	X
RCSD	X	X		X	X	
QHWD	X	X		X	X	X
PWD	X	X	X	X	X	
AVEK	X	X		X	X	
City of Palmdale	X	X		X	X	
City of Lancaster	X	X	X	X	X	
Littlerock Creek Irrigation District				X	X	
Los Angeles County Regional Planning	X	X		X	X	
Los Angeles County Sanitation Districts		X		X	X	

A 60-day notification was released to Cities of Lancaster and Palmdale prior to the public hearing. Prior to adoption, the IRUWMP was made available to the public for inspection and a public hearing was held on May 31, 2011 at the City of Lancaster. The IRUWMP was adopted by the Districts' Boards, and is subject to California Government Code pertaining to legal public noticing. The IRUWMP must be submitted to DWR, State Library, and city/county that received water from supplier within 30 days after adoption. A copy of the notice for a public hearing and the resolutions of adoption are included in Appendix B**.**

1.2 The Water Purveyors of the Antelope Valley

As discussed previously, this plan has been prepared as part of a joint effort between District No. 40 and QHWD. A brief discussion of each water purveyor follows. Figure 1-2 provides a map of the water purveyors' service areas.

FIGURE 1-2: STUDY AREA BOUNDARIES



1.2.1 District No. 40

District No. 40 was formed in accordance with Division 16 Sections 55000 through 55991 of the State Water Code to supply water for urban use throughout the Antelope Valley. It is governed by the Los Angeles County Board of Supervisors with the Waterworks Division of the County Department of Public Works providing administration, operation and maintenance of District No. 40's facilities. District No. 40 is comprised of eight regions serving customers in the cities of Lancaster and Palmdale (Regions 4 and 34), Pearblossom (Region 24), Littlerock (Region 27), Sun Village (Region 33), Rock Creek (Region 39), Northeast Los Angeles County (Region 35), and Lake Los Angeles (Region 38). Regions 4 and 34 are integrated and are operated as one system. Similarly, Regions 24, 27, and 33 are also integrated and operated as one system. The various regions were consolidated into a single district on November 2, 1993. District No. 40 encompasses approximately 554 square miles.

1.2.2 QHWD

QHWD is located in the southwest end of the Antelope Valley. It is 65 miles northwest of Los Angeles on the Antelope Valley Highway 14 and west of both Palmdale and Lancaster. QHWD occupies an area of about 6 square miles located in the City of Lancaster and unincorporated portions of the County of Los Angeles. Incorporation of QHWD occurred in May 1954 and water service is provided to all residential, commercial, industrial, and agricultural customers, and for environmental and fire protection uses.

1.3 Service Area Characteristics

The Antelope Valley Study Area (Study Area), as defined for the purposes of this report, encompasses the service areas of the two water purveyors described above: District No. 40 and QHWD. The Study Area is generally in the southern portion of the Antelope Valley. The Study Area description is also addressed in the 2007 AVIRWMP (pages 2-1, 2-3, 2-22 through 2-25). The 2007 AVIRWMP can be found at http://www.avwaterplan.org.

1.3.1 Climate

Comprising the southwestern portion of the Mojave Desert, Antelope Valley ranges in elevation from approximately 2,300 feet to 3,500 feet above sea level. Vegetation native to the Antelope Valley are typical of the high desert and include Joshua trees, saltbush, mesquite, sagebrush, and creosote bush. The climate is characterized by hot summer days, cool summer nights, cool winter days and cool winter nights. Typical of a semiarid region, mean daily summer temperatures range from 63°F to 93°F, and mean daily winter temperatures range from 34°F to 57°F. The growing season is primarily from April to October. Precipitation ranges from 5 inches per year along the northern boundary to 10 inches per year along the southern boundary.

TABLE 1-2: ANTELOPE VALLEY CLIMATE

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Standard Monthly Average ET_0 (inches)	2.02	2.61	4.55	6.19	7.3	8.85	9.77	8.99	6.52	4.66	2.68	2.05	66.19
Average Rainfall (inches)	1.52	1.65	1.28	0.46	0.13	0.04	0.05	0.18	0.20	0.32	0.68	1.39	7.9
Average Max Temperature (°F)	58.3	62.1	67.2	73.9	81.7	90.1	95.5	96.9	91.3	80.3	67.1	58.7	77.1
Average Min Temperature (°F)	32.4	35.6	39.0	43.7	50.6	57.7	64.9	63.7	57.4	48.0	37.9	32.6	47.0

Source: CIMIS data for Palmdale #197 station and Western Regional Climate Center, Palmdale Station.

1.3.1.1 Effects of Global Warming

In the DWR's Water Plan, an assessment of the impacts of global warming on the State's water supply was conducted using a series of computer models that were based on decades of scientific research. Model results indicate increased temperature, reduction in Sierra snow depth, early snow melt, and a raise in sea level. These changing hydrological conditions could affect future planning efforts which are typically based on historic conditions. Difficulties that may arise include:

- hydrological conditions, variability, and extremes that are different than current water systems were designed to manage

- changes occurring too rapidly to allow sufficient time and information to permit managers to respond appropriately

- requiring special efforts or plans to protect against surprises and uncertainties

As such, DWR will continue to provide updated results from these models as further research is conducted.

1.3.2 Other Demographic Factors

Historically, land uses within the Antelope Valley have focused primarily on agriculture; however, the Valley is in transition from predominately agricultural uses to predominately residential and industrial uses. As this transition continues, water demand is expected to increase.

Current and projected population for the Study Area is shown in Table 1-3. Approximately 526,900 people will reside in the Study Area by 2035. This represents an increase of nearly 90 percent from the current population.

TABLE 1-3 POPULATION PROJECTION

	2010	2015	2020	2025	2030	2035
District No. 40	261,800	309,200	355,800	401,500	445,200	493,900
QHWD	17,500	20,800	23,900	27,000	29,900	33,000
Study Area	**279,300**	**330,000**	**379,700**	**428,500**	**475,100**	**526,900**

Source: District No. 40 and QHWD projections were based on land use maps and General Plans for the Cities of Palmdale and Lancaster.

1.4 Resources Maximization

The 2005 Integrated UWMP, 2007 AVIRWMP and this IRUWMP were developed to allow the Study Area to maximize the use of available resources and minimize the use of imported water. Sections 2 and 3 of this IRUWMP describe the water resources available to the Study Area for a 25-year period.

1.5 Contents of this Plan

The organization of this report and a brief description of the respective sections are outlined below.

Section 1: Introduction and Summary
This section provides a brief introduction and summary, describes the planning process, provides an overview of the Study Area, and summarizes the key elements of this IRUWMP.

Section 2: Current and Future Water Supply Resources
This section describes the existing and planned water supplies available to the Study Area. Supplies include groundwater, imported water, and recycled water. Projected supplies by source are presented over the next 25 years, in 5-year increments.

Section 3: Water Supply Strategy/Opportunities
This section provides a discussion and evaluation of the various alternative water management strategies and supplies available to the Study Area. Based on the evaluation, a recommended water supply strategy is presented to ensure a reliable source of supply for each water purveyor in the Study Area to meet the projected demand.

Section 4: Water Use Provisions
This section on water demand describes historic, current, and projected water usage within the Study Area. Historic water usage patterns and future water demands are determined by population and land use. In addition, the effects of weather and water conservation on historic water usage are discussed.

Section 5: Demand Management Measures
This section addresses the 14 water conservation measures called Demand Management Measures (DMMs), specified in the UWMPA, and describes current and future implementation of these water conservation measures within the agencies' service areas. The measures range from public information and education programs to physical solutions, such as residential plumbing retrofit, as well as policy/financial incentives, such as rebate programs and pricing policies.

The DMMs are the same as the 14 urban Best Management Practices (BMPs) developed by the California Urban Water Conservation Council (CUWCC).

Section 6: Recycled Water Plan
This section addresses the Antelope Valley's need for increased water supplies by offsetting existing potable demands and promoting beneficial reuse of treated wastewater. Efforts are currently underway to develop a regional recycled water distribution system in the Antelope Valley, also known as the AV Backbone.

Section 7: Water Service Reliability Planning
This section presents the water reliability assessment for the Study Area by each water purveyor. It compares the total projected water demand with the expected water supply over the next 25 years, in 5-year increments (i.e., 2015, 2020, 2025, 2030, and 2035). Assessments are also presented for a single dry year and multiple dry years (i.e., droughts). The purpose of this analysis is to determine whether there is a reasonable likelihood of meeting projected future demands with the mix of resources currently under consideration.

Section 8: Per Capita Water Use Targets
This section addresses the legislative mandate (Senate Bill X7-7) that requires the State of California to achieve a 20 percent reduction in urban per capita water use by December 31, 2020, with an interim target of 10 percent reduction by December 31, 2015.

Section 9: Water Use Projections for Low Income Housing
This section provides projected water use for single-family and multi-family residential housing needed for lower income households.

Section 10: Water Shortage Contingency Analysis
This section presents the activities to be utilized in the event of a catastrophic water supply interruption, such as an earthquake or a drought. Stages of action are described, including levels of rationing and reduction goals, priorities of use, water shortage stages and triggering mechanisms, water allotment methods, mandatory prohibitions on water use, and excessive use penalties.

1.6 List of Abbreviations and Acronyms

AF	Acre-feet
AFY	Acre-feet per year
Study Area	Antelope Valley Study Area
AVTTP	Antelope Valley Tertiary Treatment Plant
AVEK	Antelope Valley-East Kern Water Agency
ASR	Aquifer Storage and Recovery
BMPs	Best Management Practices
SWP	California State Water Project
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CII	Commercial/industrial/institutional
cfs	Cubic feet per second
DMM	Demand Management Measure
DWR	Department of Water Resources
DAWN	Domestic-Agricultural Water Network
ERPs	Emergency Response Procedures
gpcd	Gallons per capita per day
gpd	Gallons per day
gpm	Gallons per minute
GIS	Geographical Information System
hcf	Hundred cubic feet
IRUWMP	Integrated Regional Urban Water Management Plan
IRWMP	Integrated Regional Water Management Plan
LWRP	Lancaster Water Reclamation Plant
LAFCO	Los Angeles County Local Agency Formation Committee
LACSD	Los Angeles County Sanitation District
District No. 40	Los Angeles County Waterworks District No. 40
MCL	Maximum Contamination Level
MOU	Memorandum of Understanding
MWD	Metropolitan Water District
mg/L	Milligrams per liter
mgd	Million gallons per day
M&I	Municipal and Industrial
NACWA	National Association of Clean Water Agencies
PWRP	Palmdale Water Reclamation Plant
ppb	Parts per billion
PWCP	Phased Water Conservation Plan
PWD	Palmdale Water District
QHWD	Quartz Hill Water District
RCSD	Rosamond Community Services District
RWWTP	Rosamond Wastewater Treatment Plant
SCAG	Southern California Association of Governments
SIC	Standard Industrial Classification
TOC	Total Organic Carbon
THM	Trihalomethane

ULFT	Ultra low flush toilets
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
UWMPA	Urban Water Management Planning Act
WCC	Water conservation coordinator
WET	Water Education for Teachers
WEL	Water Efficiency Landscape
WSCP	Water Shortage Contingency Plan

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Section 2

Current and Future Water Supply Resources

Section 2: Current and Future Water Supply Resources

This section provides a detailed discussion of the existing and planned water supplies available to the Study Area. The Antelope Valley anticipates receiving water from local groundwater, imported water, and other sources. The projected supply by source is presented over the next 25 years, in 5-year increments.

2.1 Local Groundwater Supplies

The 2007 AVIRWMP meets the AB 3030 requirements and acts as the region's groundwater management plan. Further discussion on groundwater can be found in the 2007 AVIRWMP (pages 1-24 through 1-25 and 2-10 through 2-16). Although the Basin is not currently adjudicated, an adjudication process is underway. Since the Basin's water rights have not yet been fully adjudicated but the Basin has been found to be in overdraft by the adjudication court, there are not yet restrictions on pumping. However, water rights may be determined and limited as part of the adjudication process.

A summary of the historic pumping by each water purveyor is provided in Table 2-1.

TABLE 2-1: GROUNDWATER PUMPING HISTORY (AF)

	2005	2006	2007	2008	2009
District No. 40	19,769	12,371	19,523	24,901	18,265
Percent of Total Supply	35	21	33	46	37
QHWD	1,245	1,405	2,073	2,854	2,431
Percent of Total Supply	23	25	31	44	44
Study Area	21,014	13,776	21,596	27,755	20,696
Percent of Total Supply	34	21	33	46	38

2.1.1 Source Characteristics

The Basin is comprised of two primary aquifers: (1) the principal aquifer and (2) the deep aquifer. The principal aquifer is an unconfined aquifer. Separated from the principal aquifer by clay layers, the deep aquifer is generally considered to be confined. In general, the principal aquifer is thickest in the southern portion of the Valley near the San Gabriel Mountains, while the deep aquifer is thickest in the vicinity of the dry lakes on Edwards Air Force Base. The Basin is divided into twelve subunits. The subunits are Finger Buttes, West Antelope, Neenach, Willow Springs, Gloster, Chaffee, Oak Creek, Pearland, Buttes, Lancaster, North Muroc, and Peerless. The Basin is principally recharged by deep percolation of precipitation and runoff from the surrounding mountains and hills. In the 2007 AVIRWMP, Figure 2-10 depicts the Basin subunit boundaries.

2.1.2 Availability of Supply

Groundwater extractions between 1926 and 1972 resulted in the overdraft of the aquifer that caused groundwater levels to drop significantly. The implementation of the California State Water Project (SWP) in the 1970s resulted in stabilization of groundwater levels in some areas of the Antelope Valley, although groundwater levels in general have continued to fall to the present. From the 1990s to the present, agricultural uses have significantly increased groundwater production and exacerbated the drop in groundwater levels across the Basin. In 1999, agricultural interests filed litigation seeking to determine rights to groundwater. Subsequently, the litigation was modified into a groundwater adjudication for the Basin. Three phases of trial have been completed in the adjudication which resulted in the Court determining, inter alia, the Basin boundaries, that the safe yield of the Basin is 110,000 AFY, and that the Basin has been in a state of overdraft for over 50 years. Later phases of the trial are expected to result in rulings regarding rights to groundwater, including the prescriptive rights of the water purveyors, and a physical solution. Although District No. 40 has an entitlement claim for over 32,000 AFY of the safe yield, District No. 40's present settlement position involves sharing the native safe yield along a 15%-85% split between Municipal and Industrial (M&I), and the Overlying Landowners. District No. 40 has reached settlements consistent with this split which have been approved by District No. 40's governing body, the Los Angeles County Board of Supervisors (e.g. Willis Class, Wood Class, and Antelope Valley High School District). District No. 40 is currently in the process of negotiating settlements with other parties based on this same proposed split. This proposed split will result in less groundwater to District No. 40 than their entitlement claim. Nonetheless, to be consistent with the settlements reached and being contemplated, District No. 40 is utilizing the proposed settlement pumping amounts for purposes of projections in this IRUWMP. However this amount can be, and will be, revised upwards, up to the maximum available entitlement claim if the settlement negotiations are unsuccessful and the matter proceeds to trial with a Court finding on prescriptive rights. Table 2-3 provides the projected groundwater pumping provided by each of the water purveyors. The groundwater pumping projections do not reflect agreed-upon estimates by the water purveyors, and each water purveyor understands these projections are subject to change due to the pending adjudication process as stated above. These estimates also do not necessarily reflect the maximum pumping capacity of each water purveyor. Percentage of total supply assumes delivery of average year Table A Amounts. Nothing in this IRUWMP shall be interpreted to interfere in any way with the adjudication action, settlement process, or rulings of the Court.

TABLE 2-2: GROUNDWATER EXTRACTION CAPACITY (AF)

	2015	2020	2025	2030	2035
District No. 40	35,000	35,000	35,000	35,000	35,000
QHWD	4,000	4,000	4,000	4,500	5,000
Study Area	39,000	39,000	39,000	39,500	40,000

Note: All numbers are rounded to the nearest 100 AF.

TABLE 2-3: ADJUDICATION PREDICTION OF GROUNDWATER PUMPING (AF)

	2015	2020	2025	2030	2035
District No. 40	23,200	23,200	23,200	23,200	23,200
Percent of Total Supply	28	28	28	28	28
QHWD	2,500	2,500	2,500	2,500	2,500
Percent of Total Supply	27	27	27	27	27
Study Area	25,700	25,700	25,700	25,700	25,700
Percent of Total Supply	27	27	27	27	27

Note: All numbers are rounded to the nearest 100 AF.

2.1.2.1 District No. 40

Currently District No. 40 has 49 active wells with 5 new wells currently under construction.

2.1.2.2 QHWD

QHWD currently operates nine wells at an average water level depth of 250 to 300 feet for a total maximum pumping capacity of 4,681 gpm. Two new wells with 500 gpm capacity each are currently being designed/constructed and are expected to be on-line by the end of 2011 for a future maximum pumping capacity of 5,681 gpm.

Copies of each water purveyor's Consumer Confidence Report are provided as Appendix C.

2.2 Wholesale (Imported) Water Supplies

The only imported water supply for the Study Area is SWP water contracted through the Antelope Valley-East Kern Water Agency (AVEK). Water imported to the Study Area through the SWP first became available in 1978. The SWP is the nation's largest state-built water and power development and conveyance system. It includes pumping and power plants, reservoirs, lakes, storage tanks, canals, tunnels and pipelines that capture, store, and convey water to 29 contract water agencies.

The SWP is operated by DWR for the benefit of SWP contractors. The SWP includes 660 miles of aqueduct and conveyance facilities, from Lake Oroville in the north to Lake Perris in the south. The SWP is contracted to deliver a maximum 4.17 million AFY of Table A water to the 29 contracting agencies. Table A water is a reference to the amount of water listed in "Table A" of the contract between the SWP and the contracting agencies and represents the maximum amount of water an agency may request each year.

AVEK, the third largest SWP contractor, has a current contractual Table A Amount of 141,400 AFY. AVEK provides this water for both agricultural and M&I use. AVEK's two largest M&I customer agencies are District No. 40 and QHWD. Table 2-4 provides a summary of the historic and current imported water volumes for the Study Area.

TABLE 2-4: HISTORIC IMPORTS FROM SWP (AF)

	2005	2006	2007	2008	2009
District No. 40	35,935	46,946	40,212	29,286	30,611
Percent of Total Supply	65	79	67	54	63
QHWD	4,154	4,322	4,539	3,645	3,146
Percent of Total Supply	77	75	69	56	56
Study Area	40,089	51,268	44,751	32,931	33,757
Percent of Total Supply	66	79	67	54	62

Each year by October 1st, the SWP contractors provide DWR with a request for water delivery up to their full Table A Amount. Actual delivery from DWR may vary from the request due to variances in supply availability resulting from hydrology, storage availability, regulatory or operating constraints, etc. When supply is limited, a reduction of the requested amount is determined per the water allocation rules governing the SWP.

Besides fluctuations in the availability of SWP water, due to periods of drought-related or regulatory supply interruptions within the State, sufficient infrastructure has been constructed so that there are no restrictions on the ability of District No. 40 and QHWD to use SWP water from AVEK to meet water demands in the Study Area even during peak summer demand periods. It is estimated that approximately 76% of AVEK's available allocation each year will be available to serve District No. 40 (69%) and QHWD (7%). This percentage was taken from AVEK's 2010 UWMP and is based on the amount of property taxes paid by customers of AVEK and the historic amount of water each retailer has purchased from AVEK. The percentage is subject to change dependent on the development and usage patterns in the Antelope Valley in the future but represents the best available estimate for planning purposes.

Table 2-5 provides a summary of the SWP water available to the individual water purveyors assuming an average water year allocation.

TABLE 2-5: RETAIL DEMAND PROJECTIONS FOR IMPORTED WATER (AF)

	2015	2020	2025	2030	2035
District No. 40 (AVEK)	61,000	61,000	61,000	61,000	61,000
QHWD (AVEK)	6,800	6,800	6,800	6,800	6,800
Study Area	**67,800**	**67,800**	**67,800**	**67,800**	**67,800**
Percent of Total Supply	**73**	**73**	**73**	**73**	**73**

Note: All numbers are rounded to the nearest 100 AF.

2.2.1 Source Characteristics

The SWP's watershed encompasses the mountains and waterways around the Feather River. Rain and melting snow run off mountainsides and into waterways that lead into Lake Oroville. The lake in Butte County is the SWP's official start and a part of a complex that includes three power plants, a forebay, and an afterbay. One of the power plants, Hyatt Power Plant, is the largest and was built in the bedrock under the lake.

When water is needed, it is released from Lake Oroville into the Feather River. It travels down the river to where the river converges with the Sacramento River, the State's largest waterway. Water flows down the Sacramento River into the Sacramento-San Joaquin Delta. From the Delta, water is pumped into the California Aqueduct. The Antelope Valley is served by the East Branch of the California Aqueduct.

2.2.2 Reliability of Supply

DWR reports in their 2009 State Water Project Delivery Reliability Report (Reliability Report) that existing SWP facilities will on average receive 60 percent of their full Table A Amount for current demand conditions and 60 percent of their full Table A Amount for 2029 demand conditions.

Availability of SWP water varies from year to year, depending on precipitation, regulatory restrictions, legislative restrictions, and operational conditions, and is especially unreliable during dry years. The DWR's Reliability Report anticipates a minimum delivery of 7 percent for a single dry year for current conditions and an 11 percent for a single dry year during 2029 demand conditions. Over multiple dry year periods, average annual Table A deliveries vary from 34 percent to 36 percent of the maximum Table A Amount.

Tables 2-6 and 2-8 provide a summary of the availability of wholesale imported water for average, single dry, and multiple dry water years.

TABLE 2-6: WHOLESALER IDENTIFIED AND QUANTIFIED EXISTING AND PLANNED SOURCES OF WATER AVAILABLE TO THE STUDY AREA FOR AVERAGE/NORMAL WATER YEARS

Wholesaler (Supply Source)	2010[b]	2015	2020	2025	2030	2035
AVEK (SWP)	141,400	141,400	141,400	141,400	141,400	141,400
Table A Supply (AF)[a]	42,700	67,800	67,800	67,800	67,800	67,800
Percent of Table A Amount	30	48	48	48	48	48

Note:
(a) The percentages of Table A Amount projected to be available are from Table B.2 of DWR's Reliability Report (August 2010). Supplies are calculated by multiplying AVEK's Table A Amounts available to the Study Area (141,400 AFY x 80%) by the average water year reliability percent.

(b) 2010 Table A supply shows the actual amount of SWP received by the Study Area.

TABLE 2-7: WHOLESALER WATER RELIABILITY

AVEK (SWP Supply)		Single Dry Year	Multiple Dry Years			
			Year 1	Year 2	Year 3	Year 4
2009	Table A Supply (AF)[a]	7,900	40,700	40,700	39,600	38,500
	Percent of Table A Amount	7	36	36	35	34
2029	Table A Supply (AF)[a]	12,400	43,000	43,000	40,700	39,600
	Percent of Table A Amount	11	38	38	36	35

Note:
(a) The percentages of Table A Amount projected to be available are from Table B.2 of DWR's Reliability Report (August 2010). Supplies are calculated by multiplying AVEK's Table A Amounts available to the Study Area (141,000 x 80%) by these percentages.

TABLE 2-8: BASIS OF WATER YEAR DATA

Water Year Type	Basis of Data	Similar Historic Year
Average Water Year	Average water year is based on 60 percent of AVEK's full Table A Amount available to the Study Area. Base years for the average, single dry and multiple dry years were determined from the analyses presented in the DWR's Reliability Report (August 2010).	1922-2003
Single Dry Year		1977
Multiple Dry Years		1931-1934

The Study Area has no inconsistent sources of supply.

2.2.3 Water Quality

2.2.3.1 AVEK

SWP water is treated by four AVEK facilities prior to delivery to the water purveyors. The Quartz Hill Water Treatment Plant was the first plant built by AVEK. The treatment plant receives water by gravity from the California Aqueduct. Screening and metering are provided at the head of the plant, followed by treatment chemical addition, flash mixing, tapered energy flocculation, clarification utilizing plate settlers and sediment removal, dual media filters, and ozone/chlorine disinfection. Treated water is stored in two 9.2 million-gallon reservoirs which supply water by gravity into the distribution system. Decanted water from the solids removal process is returned to the plant influent and recycled. After the completion of the third expansion in 2010, the Quartz Hill Water Treatment Plant became capable of producing 90 mgd, enough to serve the needs of 388,000 people. AVEK is planning a conversion of their disinfection systems from chlorine to chloramines or Granular Activated Carbon (GAC). This conversion will significantly reduce the levels of Trihalomethanes (THMs) from the treated water.

Expansion of the Eastside Water Treatment Plant located between Littlerock and Pearblossom to 10 mgd was completed in late 1988. It can now serve the needs of about 44,000 consumers.

The 14 mgd Rosamond Water Treatment Plant was established to support the needs of consumers in southeastern Kern County, an area that includes Rosamond, Mojave, California City, Edwards Air Force Base and Boron. Rosamond Water Treatment Plant is capable of providing water for 60,000 people.

The 4 mgd Acton Water Treatment Plant was completed in 1989. Water is pumped from the plant site near Barrell Springs Road, on Sierra Highway, to Vincent Hill Summit. From there it is pumped into a District No. 40 pipeline for transport to the Acton area. The plant's capacity is sufficient to supply the needs of 17,000 consumers.

The treated water is generally considered to be of excellent quality. Appendix C contains the Consumer Confidence Reports for AVEK deliveries in the Los Angeles County.

2.3 Summary of Supplies

Table 2-9 provides a summary of existing and planned water supply sources from each water purveyor during an average water year over a 25-year planning period, in 5-year increments.

TABLE 2-9: CURRENT AND PLANNED WATER SUPPLIES (AF)

Water Supply Sources	2010*	2015	2020	2025	2030	2035
District No. 40						
Groundwater[a]	7,600	23,200	23,200	23,200	23,200	23,200
SWP[b]	39,200	61,000	61,000	61,000	61,000	61,000
Recycled Water[c]	0	5,400	8,200	10,900	13,600	16,300
Groundwater Banking[d]	0	0	0	0	0	0
Anticipated New Supply[d]	0	2,300	4,100	12,900	21,600	30,300
Total	**46,800**	**91,900**	**96,500**	**108,000**	**119,400**	**130,800**
QHWD						
Groundwater[a]	1,900	2,500	2,500	2,500	2,500	2,500
SWP[b]	3,500	6,800	6,800	6,800	6,800	6,800
Recycled Water[c]	0	0	0	0	0	0
Groundwater Banking[d]	0	0	0	0	0	0
Anticipated New Supply[d]	0	0	0	0	0	900
Total	**5,400**	**9,300**	**9,300**	**9,300**	**9,300**	**10,200**
Study Area						
Groundwater[a]	9,500	25,700	25,700	25,700	25,700	25,700
SWP[b]	42,700	67,800	67,800	67,800	67,800	67,800
Recycled Water[c]	0	5,400	8,200	10,900	13,600	16,300
Groundwater Banking[d]	0	0	0	0	0	0
Anticipated New Supply[d]	0	2,300	4,100	12,900	21,600	31,200
Total	**52,200**	**101,200**	**105,800**	**117,300**	**128,700**	**141,000**

Note: All numbers are rounded to the nearest 100 AF.
(a) Assumes adjudication prediction of groundwater pumping.
(b) SWP water delivery at 60 percent of Table A Amount available to the Study Area.
(c) Recycled Water is discussed in Section 6.
(d) Groundwater Banking and Anticipated New Supplies are discussed in Section 3.
*2010 shows actual water supply values.

2.4 Economic Analysis of Supplies

This subsection provides an economic evaluation of the existing supplies available to the Study Area. Further, these sources are ranked based on this analysis and consideration of source reliability. Table 2-10 provides a summary of the unit costs for each of the supplies available to the Study Area. As shown in this table, groundwater is the most cost effective source available to the Antelope Valley, however, due to the uncertainty of this supply as the adjudication process continues, there is no guarantee of its reliability.

TABLE 2-10: ECONOMIC SUMMARY OF THE EXISTING SUPPLIES FOR THE STUDY AREA

	Cost per AF	Reliability Factor[(a)]	Ranking
District No. 40			
Groundwater	$120	90	1
Imported Water	$296 ($367 Summer)	60	2
QHWD			
Groundwater	$120	90	1
Imported Water	$296 ($367 Summer)	60	2

Note:
(a) Reliability factor for imported water is based on DWR's Reliability Report; reliability factor for groundwater is based on the assumed adjudication prediction of groundwater pumping. However, water rights may be determined and limited as part of the adjudication process.

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Section 3

Water Supply Strategy/Opportunities

Section 3: Water Supply Strategy/Opportunities

3.1 Transfer and Exchange Opportunities

As will be shown in Section 7, the projected water demands for the Study Area will exceed the existing available water supply in the foreseeable future. As such the Antelope Valley water purveyors are evaluating various transfer and exchange opportunities as they arise.

The water retailers in the Study Area receive their imported water supply from AVEK. Any transfer or exchange of water rights will likely be moved into the Study Area via the SWP and will therefore have to be facilitated by AVEK.

3.2 Planned Water Supply Projects and Programs

Based on projected growth from population and land use build-out, water demands for the Study Area are expected to increase approximately 55 percent from 2010 to 2035. The main driver for these demands is presumed to be single-family residential development. However, projected future demands, particularly those in the near-term, will continue to be monitored and adjusted in response to changes in the rate of housing development as well as major new industrial customers such as solar and other power facilities. Water management strategies are also discussed in the 2007 AVIRWMP (pages 5-7 through 5-33).

The Study Area will require new projects that provide additional supply in order to meet the projected demand, but at this time, no specific projects have been selected. Future water supply project plans will focus on the following:

- Take steps to limit dependence on imported water by maximizing use of recycled water
- Expand conservation efforts
- Acquire and/or develop new imported supplies by introducing the New Water Supply (Developer Fee)
- Create a combination of local surface spreading facilities to percolate untreated SWP water and Aquifer Storage and Recovery (ASR) wells to inject potable water
- Add additional groundwater extraction capacity in order to recover stored water
- Pursue an exchange program with agriculture interests to replace their groundwater use with recycled water thereby providing additional potable groundwater for municipal use
- Construct new infrastructure to deliver recycled water for non-potable uses
- Conduct further project development to use recycled water to replenish the Basin

3.3 Acquisition of New Water Supply

Even with the demand management measures addressed in Section 5, and the increased use of recycled water to reduce existing potable water demands discussed in Section 6, the existing and committed demands and existing water supplies are approximately equal and additional water supplies will have to be acquired and imported into the Antelope Valley in order to meet the demands associated with the level of growth projected for the Study Area. In order to acquire these additional water supplies, District No. 40 and QHWD are working with AVEK to establish a New Water Supply (Developer Fee) on new developments that will be used to acquire additional imported water supplies. AVEK is currently working with its water retailers and the development community to design the fee and an operational procedure for assessing it. The proposed framework for assessing this fee is as follows:

1. Developer requests a will-serve letter from water retailer for the project
2. Water retailer informs developer of the volume of new water supply needed to serve project
3. Developer pays the New Water Supply (Developer Fee) to AVEK for the volume of new water supply
4. AVEK provides developer with a letter of commitment to water retailer for the new water supply
5. AVEK acquires new water supply
6. AVEK designates new water supply for development to the water retailer serving the development over and above the water retailer's allocation of AVEK's supplies
7. AVEK adjusts the fee annually based on the current market rate for permanent water transfers
8. Water retailer ensures reliability of the new water supply

3.4 Stormwater and Desalination

Potential water supply alternatives that are available to the Antelope Valley besides those mentioned above include stormwater reuse and desalination. Because the Antelope Valley is a closed hydrologic system, all stormwater entering the Basin either infiltrates into the groundwater basin or evaporates. The water agencies in the Study Area will continue to support onsite reuse of stormwater by customers. In addition, the Antelope Valley region was awarded grant funds from Proposition 84 to update the 2007 AVIRWMP to include a regional flood management plan. A major component of the regional flood management plan will be identifying regional areas that can be used for large scale stormwater retention and groundwater basin recharge in order to increase the amount of annual returns flows to the groundwater basin.

The UWMPA also requires water agencies to consider options for desalination. The Antelope Valley is located a considerable distance from the Pacific Ocean so constructing a transmission main to move either sea water or desalinated water directly to the Antelope Valley is cost prohibitive at this time. However, one option that AVEK can consider when acquiring new water supplies is partnering with a SWP contractor situated in close proximity to the Pacific Ocean. Under such an arrangement, AVEK could use funds collected from the New Water Supply (Developer Fee) to contribute financially to the construction of a desalination facility, and in turn, the partnering agency would transfer portion of their SWP water rights to AVEK.

3.5 Aquifer Storage and Recovery

District No. 40's ASR Program includes the use of twenty existing wells for direct injection of treated SWP water into the aquifer. The purpose of this program is to augment natural recharge of the groundwater basin through injection of treated SWP water into the Basin, when sufficient supplies are available. The injected water is then available during periods of lower SWP allocation such as in dry years to meet demand. On October 14, 2010, the Lahontan Regional Water Quality Control Board (Regional Board) approved a five-year Conditional Waiver of Waste Discharge Requirements (Waiver) for this project.

3.5.1 Aquifer Characteristics

The Antelope Valley is a closed basin in the western part of the Mojave Desert, and is divided by fault zones and other physical boundaries to water movement into twelve sub-basins (Bloyd, 1967). The majority of the District No. 40's customers, and the District No. 40's ASR Program, are located within the Lancaster subunit. The Lancaster subunit is alluvial and lacustrine in nature, and is characterized by unconfined (upper) and confined (lower) aquifers that are separated by a clay layer that is between 200 and 300 feet thick. The upper aquifer is a primary source of potable water for District No. 40 due to water quality issues contained in the lower aquifer.

3.5.2 ASR Wells

District No. 40's existing extraction wells are used for direct injection of treated drinking water into the Basin. Slight modifications of the well equipment were required, including flow control valves that regulate the rate at which the water is injected. These flow control valves are typically located at ground surface near the well head. Some of District No. 40's wells are equipped with down-hole flow control valves that regulate the flow using a nitrogen inflated bladder. As part of typical injection operations, the pumps are energized regularly to backflush the aquifer thereby maintaining injection flow rates.

As a condition of the Waiver, District No. 40 must show that the injected water remains within the radii of influence of the ASR wells, which is on the order of 1,200 feet. This requires monthly water quality monitoring of wells within a quarter mile of the injection sites, and semi-annual monitoring of select wells between a quarter mile and three quarters of a mile from injection sites to demonstrate that the injected water is effectively contained near the ASR wells. The Waiver allows for injection up to 6,843 AFY. District No. 40 plans to use a total of 17 wells for injection using available SWP water.

3.5.3 Water Quality

District No. 40's ASR Program utilizes water imported by the SWP for injection into the Basin. The water is treated prior to injection through conventional treatment, which includes free chlorine disinfection. Conventional treatment causes the formation of disinfection byproducts (DBP) such as trihalomethanes (THMs) and haloacetic acids (HAA5). These DBPs are not naturally occurring in the Basin, and are therefore considered a discharge by the Regional Board. In addition, these particular DBPs continue to form and increase in concentration as the water moves further from the treatment plant. In order to prevent the further formation of DBPs due to the availability of free chlorine, the water is de-chlorinated prior to injection. As a condition of the Waiver, weekly sampling of the injection water for DBPs is required, and District No. 40 must enact contingency plans in the event that water quality monitoring indicates that the levels of DBPs exceed limits established in the Waiver. In addition, monthly and semi-annual water quality monitoring of nearby wells is required to show that these DBPs are not moving outside the radius of influence of the ASR wells. The upcoming conversion of AVEK's treatment plant from conventional treatment to chloramines or GAC is anticipated to reduce or eliminate DBP formation within the treatment plant and distribution system.

3.6 Water Banking Opportunities

As indicated in more detail in Section 7, water banking is a crucial strategy that will be used by the water purveyors to help navigate the uncertainties in the availability of water supplies for the Study Area. Water banking involves storing water when it is available in wet years or low demand periods and subsequently recovering it in periods of drought or high demand. The three methods of banking contemplated for the Study Area are in-lieu groundwater basin recharge, groundwater basin recharge through surface percolation, and ASR. These opportunities are located inside and outside of the Antelope Valley. Generally, water banking within the Antelope Valley is preferred over those outside because risks of disruption due to conveyance interruptions are minimized. However, potential water banking opportunities within the Antelope Valley require additional development.

In evaluating water banking requirements, there are two characteristics that must be established: the required volume of water in storage and the required pumpback capacity for the most severe three-year delivery projection. The three-year drought sequence is commonly utilized for water supply planning in California and in UWMPs. The requirements are calculated by comparing projected demand to the sum of available groundwater and SWP supplies during a worst-case three-year drought scenario comprised of two 35 percent SWP allocations followed by a 7 percent SWP allocation.

In the event that the annual SWP allocation is less than demand, water that has been stored through in-lieu groundwater basin recharge will typically be used first to make up the difference between demand and SWP supply. If maximum groundwater extraction capacity is insufficient to make up the difference, additional banking methods such as storage of carry-over water in SWP reservoirs or groundwater basin recharge through surface percolation are required.

In order to meet the banked water supply targets in the future, the water retailers in the Study Area will store sufficient quantities of available supplies in years where supply conditions permit. These targets therefore dictate how the present-year's water resources are utilized. The supply targets increase with demand, and therefore must be recalculated annually. In a similar manner, present year operations must be modified annually to account for the recalculated targets. Upon adjudication of the Basin, it is anticipated that each water retailer will be able to save credits for not fully utilizing its adjudicated groundwater right in a given year, thus saving unused groundwater for use when SWP supply is limited or interrupted.

SWP reservoir storage is crucial to meeting the carry-over and banked supply targets. In the event that a water retailer does not use its full entitlement of SWP water in a given year, AVEK can store the remainder in San Luis Reservoir. Unfortunately, in the event of a high allocation the following year, that quantity of carry-over water may be lost due to limited reservoir capacity. In this case, this carry-over supply can be moved to a water bank for future use. Conversely, if the next year's SWP allocation is insufficient to meet demand, the carry-over supply can be moved into the Study Area. Banked supply will be utilized in the event that demand is greater than the sum of the current year SWP allocation, available carryover and maximum groundwater extraction capacity.

3.6.1.1 Antelope Valley Water Bank

The Antelope Valley Water Bank (AVWB) encompasses an 18-square mile area totaling roughly 13,440 acres, of which 1,482 acres would be dedicated for spreading basins. More specifically, there would be 11 spreading basins, each approximately 160 acres in size except for one 40-acre basin, and up to 40 new recovery wells. At full build-out, the AVWB will be a water banking facility capable of 100,000 AFY of recharge, 100,000 AFY of recovery, and 500,000 AF of total storage capacity within the underlying aquifer. Accordingly, the AVWB would contribute to accomplishing the goal of making more water available, through recharge and recovery, to meet existing and future water requirements in the Antelope Valley and other regions in Southern California during periods when surface water supplies are deficient.

3.6.1.2 AVEK's Water Supply Stabilization Project No. 2

AVEK has analyzed locations and methods for water storage in the Antelope Valley region. The Water Supply Stabilization Project No. 2 (WSSP2) is a groundwater basin banking project that was selected based on studies performed by the United States Geological Survey (USGS).

Based on USGS's work, it is expected that the percolation rate of raw water placed in the recharge area will average about a half a foot per day on 400 of the 1,400 acre site. Raw water will be delivered to the site through three existing turnouts that are capable of delivering up to 30,000 AF of water during a proposed recharge cycle. A total recharge of approximately 190 AF per day is expected.

3.6.1.3 Semitropic Water Storage Bank

The Semitropic Water Storage District (Semitropic) is located in the San Joaquin Valley in north-central Kern County, about 20 miles northwest of Bakersfield and immediately east of the California Aqueduct. Semitropic was originally formed in 1958 with the expectation of receiving water from the SWP and surplus water from the Kern River.

In 1995, Semitropic began implementation of the Semitropic Groundwater Banking and Exchange Program by utilizing a portion of the available immense groundwater storage capacity (approximately 1 million AF out of over 3 million AF). This long-term water storage program was designed to recharge groundwater and reduce overdraft, increase operational reliability and flexibility, and optimize the distribution and use of available water resources between Semitropic and the banking partners. The existing Semitropic water bank has a storage capacity of 1 million AF; a recharge capacity of 90,500 AFY; a firm extraction capacity of 90,000 AFY through the pumpback and physical return of groundwater to the SWP facilities; and the ability to return up to 133,000 AFY through exchange of Table A SWP entitlement. Approximately 700,000 AF are currently in storage. This program is currently fully operational and is a proven and working water bank.

Semitropic is in the process of a second phase of the groundwater banking program called the Stored Water Recovery Unit (SWRU). The SWRU will increase storage by 650,000 AF to a maximum of 1.65 million AF and increase recovery capacity by 200,000 AFY for a total guaranteed or pumpback capacity of 290,000 AFY. This means that the Semitropic Water Storage Bank, including its entitlement exchange capability of up to 133,000 AFY, will be able to deliver up to 423,000 AFY of dry year yield to the California Aqueduct.

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Section 4

Water Use Provisions

Section 4: Water Use Provisions

This section describes historic/current water usage and the methodology used to project future demands within each water purveyor's service areas. Water usage is divided into sectors such as: residential, industrial, institutional/governmental, landscape/recreational, agricultural, and other purposes.

4.1 Historic/Current Water Use

This subsection will present the historic and current water use for each water purveyor in the Study Area.

4.1.1 District No. 40

District No. 40 began keeping records of water use and number of meters by customer class in 2001. Past and current water use is based on the billing records of District No. 40 and is presented in Table 4-1.

TABLE 4-1: DISTRICT NO. 40 HISTORIC AND CURRENT WATER USE

Customer Category	2005		2006		2007		2008		2009	
	Water Use (AF)	Meters	Water Use (AF)	Meters	Water Use (AF)	Meters	Water Use (AF)	Meters	Water Use (AF)	Meters
Single-Family	34,751	46,139	38,562	49,647	40,629	49,793	36,664	49,849	33,548	50,532
Multi-Family (duplex)	269	277	256	281	255	274	223	267	198	257
Multi-Family complex	3,839	706	3,833	697	4,036	686	3,730	678	3,398	683
Commerical	4,200	1,441	4,092	1,513	4,200	1,513	3,929	1,581	3,707	1,581
Industrical/ Manufacturing	123	36	113	36	97	34	98	35	81	35
Private Fire Protection	4	381	2	426	48	463	1	501	28	509
Landscape Irrigation	2,464	638	3,039	706	3,782	770	3,560	806	3,486	818
Public / Government Agency	3,818	204	3,326	208	3,537	205	3,192	209	2,847	215
Other Districts	0	0	0	0	0	0	0	0	0	0
Outside District	96	1	0	1	0	1	0	1	1	3
Temporary Construction Meter	1,714	206	2,130	172	895	162	319	86	120	55
Domestic/ Private	284	12	311	12	299	12	279	12	260	12
Other	7	1	9	1	7	1	32	7	27	7
Firefighting, flushing, theft and leaks	3,921	n/a	3,507	n/a	1,885	n/a	2,073	n/a	1,489	n/a
Total	55,490	50,042	59,180	53,700	59,670	53,914	54,100	54,032	49,190	54,707

4.1.2 QHWD

QHWD does not have the ability to breakdown water usage by sector. However, QHWD currently serves approximately 5,500 connections. Of the 5,500 connections, approximately 98 percent are residential. Commercial connections account for approximately one percent, landscape irrigation and non-potable connections account for less than one percent, and other connections account for the remaining number of connections. Table 4-2 provides a summary of the QHWD's historic and existing service connections.

TABLE 4-2: QHWD HISTORIC AND CURRENT WATER USAGE

Customer Category	2005		2006		2007		2008		2009	
	Water Use (AF)	Meters	Water Use (AF)	Meters	Water Use (AF)	Meters	Water Use (AF)	Meters	Water Use (AF)	Meters
Single-Family	n/a	5,288	n/a	5,288	n/a	5,350	n/a	5,315	n/a	5,350
Multi-Family	n/a	24	n/a	24	n/a	28	n/a	26	n/a	25
Commerical	n/a	66	n/a	66	n/a	68	n/a	74	n/a	76
Industrical/ Manufacturing	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Landscape Irrigation	n/a	56	n/a	56	n/a	66	n/a	62	n/a	63
Other	n/a	9	n/a	9	n/a	0	n/a	3	n/a	0
Total	5,398	5,443	5,532	5,443	6,613	5,512	6,498	5,480	5,441	5,514

4.2 Other Factors Affecting Water Usage

Two major factors that affect water usage are weather and water conservation. Historically, when the weather is hot and dry, water usage increases. The amount of increase varies according to the number of consecutive years of hot dry weather and the conservation activities imposed. During cool-wet years, water usage decreases due to less irrigation demand for external landscaping. Water conservation measures employed within the Study Area have a direct long-term effect on water usage. Both of these factors are discussed below in detail.

4.2.1 Weather Effects on Historical Water Usage

Historically, both agricultural and urban water usage have increased in dry weather. However, in recent years, conservation efforts have limited increases in demand due to higher temperatures and often have resulted in reduced overall demand. Further effects due to global warming may also begin to influence future water usage and planning efforts as previously discussed in Section 1.

4.2.2 Conservation Effects on Water Usage

In recent years, water conservation has become an increasingly important factor in water supply planning in California. The California Plumbing Code has instituted requirements for new construction that mandate the installation of ultra low-flow toilets and low-flow showerheads. District No. 40 has participated in water conservation measures that include public information and education programs and the implementation of water efficient operations and maintenance practices. As a retail customer of AVEK, QHWD has also implemented DMMs as described in Section 5. In November 2009, SB X7-7 was enacted requiring all water suppliers to increase water use efficiency. The legislation set an overall goal of reducing per capita urban water use by 20 percent by December 31, 2020. The State shall make incremental progress towards this goal by reducing per capita water use by at least 10 percent by December 31, 2015.

4.3 Projected Water Use

4.3.1 Population and Water Demand Projections

The population projections for the Study Area are shown in Table 2-3 of the 2007 AVIRWMP, which projects population increases for the incorporated cities, communities and unincorporated county areas. However, jurisdictional boundaries in the Study Area are not aligned with water district boundaries, particularly in the portion of the Study Area in Los Angeles County. In order to estimate the future populations that will be served by each water district in Los Angeles County, each census tract in the Los Angeles County portion of the Study Area was projected to be served by a particular water district and included in a designated jurisdiction. Table 4-3 identifies the actual or projected water purveyor and jurisdiction for each census tract within Los Angeles County in the Study Area.

TABLE 4-3: ACTUAL/PROJECTED WATER PURVEYOR AND JURISDICTION

Census Tract	Water District	Jurisdiction
37900501	District No. 40	Lancaster
37900502	District No. 40	Lancaster
37900503	District No. 40	Lancaster
37900504	District No. 40	Lancaster
37900602	District No. 40	Lancaster
37900604	District No. 40	Lancaster
37900605	District No. 40	Lancaster
37900606	District No. 40	Lancaster
37900607	District No. 40	Lancaster
37900701	District No. 40	Lancaster
37900703	District No. 40	Lancaster
37900704	District No. 40	Lancaster
37900705	District No. 40	Lancaster
37900803	District No. 40	Lancaster
37900804	District No. 40	Lancaster
37900805	District No. 40	Lancaster

37900806	District No. 40	Lancaster
37900900	District No. 40	Lancaster
37901003	District No. 40	Lancaster
37901004	District No. 40	Lancaster
37901005	District No. 40	Lancaster
37901006	District No. 40	Lancaster
37901007	District No. 40	Lancaster
37901205	District No. 40	Lancaster
37901101	QHWD	Lancaster
37901102	QHWD	Lancaster
37910301	QHWD	Lancaster
37900200	District No. 40	Palmdale
37910201	District No. 40	Palmdale
37910203	District No. 40	Palmdale
37910204	District No. 40	Palmdale
37910206	District No. 40	Palmdale
37910302	District No. 40	Palmdale
37910401	District No. 40	Palmdale
37910706	Littlerock Creek ID	Palmdale
37910000	PWD	Palmdale
37910402	PWD	Palmdale
37910403	PWD	Palmdale
37910404	PWD	Palmdale
37910501	PWD	Palmdale
37910502	PWD	Palmdale
37910503	PWD	Palmdale
37910601	PWD	Palmdale
37910602	PWD	Palmdale
37910603	PWD	Palmdale
37910604	PWD	Palmdale
37910703	PWD	Palmdale
37910704	PWD	Palmdale
37910705	PWD	Palmdale
37910707	PWD	Palmdale
37910708	PWD	Palmdale
37910709	PWD	Palmdale
37910710	PWD	Palmdale
37910100	PWD	Unic. LA County
37901203	Tejon	Unic. LA County
37901207	Cal Water	Unic. LA County
37900101	District No. 40	Unic. LA County
37900102	District No. 40	Unic. LA County
37900300	District No. 40	Unic. LA County
37910902	District No. 40	Unic. LA County
37910202	Mutuals	Unic. LA County
37910205	PWD	Unic. LA County
37910901	PWD	Unic. LA County
37911000	PWD	Unic. LA County

Based on the breakdown of census tracts, Table 4-4 indicates the population projections for the water purveyors in the Study Area.

TABLE 4-4: POPULATION PROJECTIONS BY WATER DISTRICT

	2010	2015	2020	2025	2030	2035
District No. 40	**261,800**	**309,200**	**355,800**	**401,500**	**445,200**	**493,900**
in Lancaster	167,400	192,400	217,100	241,000	263,900	288,900
in Palmdale	53,100	68,700	84,200	100,500	116,100	134,200
in LA County	41,300	48,000	54,500	60,000	65,200	70,800
QHWD	**17,500**	**20,800**	**23,900**	**27,000**	**29,900**	**33,000**
RCSD	17,700	22,600	26,200	30,400	35,200	40,800
PWD	123,100	146,200	169,000	189,400	209,000	230,700
in Palmdale	113,800	135,500	156,900	176,100	194,500	214,900
in LA County	9,300	10,700	12,100	13,300	14,500	15,800
Mutuals	4,600	6,000	7,400	8,700	9,900	11,300
LCID	6,500	10,000	13,600	16,600	19,500	22,900
Cal Water	4,100	5,200	6,200	7,300	8,300	9,400
Tejon	2,900	3,300	3,700	1,200	4,100	4,400
Plant 42	2,600	3,400	4,100	1,300	4,900	5,700
Cal City		12,000	20,000	25,000	30,000	35,000
Mohave		9,000	10,500	12,000	13,000	14,000
Edwards		10,000	11,500	13,000	14,500	16,000
Boron		3,000	3,500	4,000	4,500	5,000
Unic Kern		29,000	52,000	70,000	85,000	103,000
Antelope Valley Area Total	**440,800**	**589,700**	**707,400**	**807,400**	**913,000**	**1,025,100**

Population projections are often used to determine future demand by utilizing an average water demand (typically based on historic water use). However, they often mask economic trends, changes in land use, and non-population based water demands. In order to more accurately predict the water demand projections for the Study Area particularly in Los Angeles County, and to distribute this demand to the water purveyors, the land use maps and General Plans of the Cities of Lancaster and Palmdale were used.

The land use and zoning maps for the Cities of Lancaster and Palmdale were divided up by census tract and water demand factors were assigned to each land use type. The water demand factors used were based on average water use by existing customers within each land use type and reflect reductions in water use necessary to meet per capita water use targets by

2015 and 2020. Table 4-5 indicates the per acre water use demand in AF for each land use type. If each land use sector continues to use water at the rate of these factors, the Study Area would meet the demand reduction targets mandated in SB X7-7. However, future demands until 2020 are projected to return to the normal levels that were observed in the Study Area prior to the recent drought due to the unusual level of water conservation that occurred in the Study Area between 2008 and 2010. Therefore, the tables in Section 7 do not project demands based on these factors until 2020 when the water purveyors are required to comply with SB X7-7. Using land use data to project demand is a more accurate method to estimate water demand both by jurisdiction and water district.

TABLE 4-5: WATER USE FACTORS IN ACRE-FEET PER ACRE BY LAND USE TYPE

Type	Single-Family Residential	Multi-Family Residential	Commercial	Heavy Industry	Light Industry	Mixed Use	Non-Urban Residential	Public Areas	Healthcare
AF/ acre	3.9	2.5	2.25	0.3	1.1	2.5	1.9	2.6	5

Tables 4-6 and 4-7 break down these projections by land use type for each water purveyor in the Study Area. Table 4-8 indicates the actual and project total water demand for each water purveyor in the Study Area and the remaining water retailers in the Antelope Valley. As shown, the water purveyors in the Study Area serve 52 percent of the 2010 retail demand in the Antelope Valley and are projected to serve 50 percent by 2035. However, it should be noted that much of the increased demand projected by 2035 will occur outside of the existing service areas of any water retailer. The new demands assumed to be served by water retailers outside of the Study Area could in fact be served by District No. 40 and QHWD.

TABLE 4-6: DISTRICT NO. 40 DEMAND PER LAND USE TYPE

	Water Demand Factor (AF/acre)	2010 Demand (AF)	2015 Demand (AF)	2020 Demand (AF)	2025 Demand (AF)	2030 Demand (AF)	2035 Demand (AF)	Total acres
Single-Family Residential	**3.9**	**30,900**	**39,900**	**48,900**	**58,000**	**68,000**	**76,700**	**19,660**
Lancaster Capital [(1)]	*N/A*	-	-	*2,100*	*2,100*	*2,100*	*2,100*	*480*
Tentative tracts 60610 & 60620 [(1)]	*N/A*	-	-	*980*	*980*	*980*	*980*	*220*
Tentative tracts 62758 & 62759 [(1)]	*N/A*	-	-	*890*	*890*	*890*	*890*	*190*
Tentative tract 62757 [(3)]	*N/A*	-	-	*780*	*780*	*780*	*780*	*160*
Will-Serve Letter Commitments [(a)(1)]	*N/A*	-	*7,450*	*7,450*	*7,450*	*7,450*	*7,450*	*N/A*
Commitment to the City of Lancaster [(a)(1)]	*N/A*	-	*1,000*	*1,000*	*1,000*	*1,000*	*1,000*	*N/A*
Commitment to the City of Palmdale [(a)(1)]	*N/A*	-	*400*	*400*	*400*	*400*	*400*	*N/A*
Commitment to the County of LA [(a)(1)]	*N/A*	-	*100*	*100*	*100*	*100*	*100*	*N/A*
Multi-Family Residential	**2.5**	**3,400**	**3,970**	**4,200**	**4,400**	**4,700**	**4,980**	**1,990**
Commercial	**2.3**	**3,707**	**5,600**	**7,600**	**9,600**	**11,000**	**13,370**	**6,020**
Amargosa Creek Specific Plan [(1)]	*N/A*	-	-	*270*	*270*	*270*	*270*	*150*
Downtown Lancaster Specific Plan [(3)]	*N/A*	-	-	*1,990*	*1,990*	*1,990*	*1,990*	*100*
Heavy Industry	**-**	**-**	**100**	**200**	**300**	**500**	**600**	**2,130**
Light Industry	**1.1**	**81**	**1,200**	**3,200**	**5,100**	**6,450**	**8,790**	**7,720**
Mixed Use	**2.5**	**2,647**	**3,000**	**3,100**	**3,400**	**3,500**	**3,600**	**1,480**
Non-Urban Residential	**1.9**	**1,641**	**2,000**	**2,500**	**2,900**	**3,300**	**3,750**	**780**
Public Areas	**2.6**	**3,124**	**3,700**	**4,000**	**4,200**	**4,500**	**4,750**	**1,830**
Healthcare	**5.0**	**-**	**230**	**300**	**500**	**600**	**700**	**140**
Open Space	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**940**
Specific Plans	**-**	**0**	**14,800**	**14,490**	**14,180**	**13,870**	**13,560**	**9,920**
City Ranch-Phase 1 Constructed	*N/A*	-	*2,480*	*2,170*	*1,860*	*1,550*	*1,240*	*380*
City Ranch Ph 1 Remaining [(2)]	*N/A*	-	*370*	*370*	*370*	*370*	*370*	*110*
City Ranch Ph 2-4	*N/A*	-	*4,390*	*4,390*	*4,390*	*4,390*	*4,390*	*1,310*
Antelope Valley Business Park	*N/A*	-	*560*	*560*	*560*	*560*	*560*	*120*
Ritter Ranch [(1)]	*N/A*	-	*7,000*	*7,000*	*7,000*	*7,000*	*7,000*	*8,000*
TOTAL	**N/A**	**45,500**	**74,500**	**88,490**	**102,580**	**116,420**	**130,800**	**52,610**
Realized Commited Demand [(4)]	N/A	-	3,200	12,590	15,180	17,620	20,600	N/A

Note:
(a)These demands are not necessarily included in a specific land use type.
(1)These demands are included in the categories they are listed under and are demands District No. 40 has committed to serve.
(2)This committed demand represents the remaining 320 homes District No. 40 has committed to serve
(3)These demands are for developments for which the requested Water Supply Assessment indicated there was inconclusive information to determine whether sufficient supplies existed to serve them.
(4)This line indicates committed demand will materialize over time.

TABLE 4-7: QHWD DEMAND PER LAND USE TYPE

	Water Demand Factor	2010 Demand	2015 Demand	2020 Demand	2025 Demand	2030 Demand	2035 Demand	Total acres
	(AF/acre)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	
Single-Family Residential	3.9	4,558	4,955	5,830	6,615	7,440	8,440	2,163
Multi-Family Residential	2.5	25	40	50	70	90	110	44
Commercial	2.25	76	100	160	200	250	330	148
Heavy Industry	0.3	-	-	-	-	-	-	-
Light Industry	1.1	-	5	10	15	20	20	16
Mixed Use	2.5	-	-	-	-	-	-	-
Non-Urban Residential	1.9	841	900	950	1,100	1,200	1,320	694
Public Areas	2.6	-	-	-	-	-	-	-
Healthcare	5	-	-	-	-	-	-	-
Open Space	-	-	-	-	-	-	-	18
Total	N/A	5,500	6,000	7,000	8,000	9,000	10,220	3,083

TABLE 4-8: LAND USE OR POPULATION BASED WATER DEMAND PROJECTIONS (AF)

	2010	2015	2020	2025	2030	2035
District No. 40	**45,500**	**74,500**	**88,490**	**102,580**	**116,420**	**130,800**
in Lancaster	35,200	45,300	53,280	62,350	70,760	79,500
in Palmdale	5,700	24,500	30,310	35,130	39,870	44,800
in LA County	4,600	4,700	4,900	5,100	5,790	6,500
QHWD	**5,500**	**6,000**	**7,000**	**8,000**	**9,000**	**10,220**
RCSD	3,010	3,390	4,090	4,730	5,490	6,360
PWD	20,000	28,000	36,000	44,000	52,000	60,000
in Palmdale	18,000	23,800	29,500	35,000	41,000	46,950
in LA County	2,000	2,300	2,600	2,900	3,300	3,700
around Plant 42	-	1,900	3,900	6,100	7,700	9,350
Mutuals*	5,000	6,000	6,800	7,600	8,200	8,660
LCID*	2,000	2,500	3,000	4,000	5,000	5,680
Cal Water*	1,000	2,000	4,000	5,000	6,000	7,570
Tejon	-	1,500	4,000	6,400	7,500	8,000
Plant 42*	2,000	2,300	2,600	2,900	3,200	3,660
Cal City	3,000	3,000	4,000	4,000	5,000	6,000
Mohave	2,000	2,000	3,000	3,000	3,000	4,000
Edwards	2,000	3,000	3,000	3,000	4,000	4,000
Boron	1,000	1,000	1,000	1,000	1,000	1,000
Unic Kern	6,000	8,000	11,000	15,000	20,000	28,000
Antelope Valley Area	**98,010**	**143,190**	**177,980**	**211,210**	**245,810**	**283,950**

*Water projections for the service areas of the various mutual water companies, Littlerock Creek Irrigation District, California Water Service Company, and Plant 42 reflect the land use projections for the census tracts assumed to be served by these entities. However, the demand could potentially be served by other water purveyors in the immediate vicinity.

The water use projections assume full development per the Cities' General Plans by 2035.

Section 5

Water Demand Management Measures

Section 5: Water Demand Management Measures

This section will discuss the existing and planned DMMs implemented by each of the water purveyors.

5.1 Water Demand Management Measures

As outlined below, the UWMPA requires water suppliers implement "demand management" in their UWMP through a five step process. "Demand management," as applied to water conservation, refers to the use of measures, practices, or incentives implemented by water utilities to permanently reduce the level or change the pattern of demand. Per California Water Code (CWC) §10631(f) and (g), UWMPs must include:

1. A description of each water demand management measure being implemented, or scheduled for implementation:

   DMM 1. Water survey programs for single-family residential and multi-family residential customers.

   DMM 2. Residential plumbing retrofit.

   DMM 3. System water audits, lead detection, and repair.

   DMM 4. Metering with commodity rates for all new connections and retrofit of existing connections.

   DMM 5. Large landscape conservation programs and incentives.

   DMM 6. High-efficiency washing machine rebate programs.

   DMM 7. Public information programs.

   DMM 8. School education programs.

   DMM 9. Conservation programs for commercial, industrial, and institutional accounts.

   DMM 10. Wholesale agency programs.

   DMM 11. Conservation pricing.

   DMM 12. Water conservation coordinator.

   DMM 13. Water waste prohibition.

   DMM 14. Residential ultra-low-flush toilet replacement programs.

2. A schedule of implementation for all water DMMs proposed or described in the water supplier's UWMP.

3. A description of the methods, if any, the water supplier will use to evaluate the effectiveness of the DMMs implemented or described under the UWMP.

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

5. An evaluation of each DMM not being implemented or scheduled for implementation, which shall include cost-benefit, funding availability, and legal authority analyses.

The UWMPA allows one of two ways for water utilities to provide DMM information so as to meet the respective requirements of CWC §10631(f) and (g):

- Signatory. A water supplier who is a member of the California Urban Water Conservation Council[1] (CUWCC) and signatory of the *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU) may submit their Best Management Practice (BMP) Activity Reports (Annual Reports). Signatories pledge to develop and implement the 14 BMPs that are intended to reduce long-term urban water demands. These BMPs are functionally-equivalent to the DMMs in CWC §10631(f)(1).

  It should be noted that exemptions are available for BMPs that cannot be implemented; certain criteria must be met regarding cost-effectiveness, budgetary constraints, or legal issues that prohibit the implementation of any BMP for a signatory.

- Non-signatory. A water supplier who is not a member of CUWCC, or who is a member of CUWCC, but chooses not to submit the Annual Reports, must discuss all 14 DMMs, along with any additional measures the supplier is implementing or has scheduled for implementation in their UWMP submittal.

5.2 Implementation Levels of DMMs/BMPs

The DMMs which were implemented, or scheduled to be implemented, by District No. 40 and QHWD are outlined in the respective sections below. Included in the discussions are the descriptive "demand management" elements as per the UWMPA.

5.2.1 District No. 40

District No. 40 has been a signatory to the CUWCC MOU since April 1996 and, as such, is a member of CUWCC. Copies of District No. 40's Best Management Practices Activity Reports for 2009 are provided in Appendix D. These reports contain all the necessary information to meet the UWMPA requirements.

District No. 40 is in the beginning stages of developing a budget based billing rate structure that assesses indoor and outdoor budgets for each customer. The indoor budget is calculated based on the number of people per household, while the outdoor budget is based on the irrigated area and historical evapotranspiration data. The development of this budget based billing structure will promote efficient use of water, promote conservation, and provide appropriate revenues for District No. 40's operations. District No. 40 has an effective

[1] CUWCC, a non-governmental agency, was formed to increase water use efficiency statewide through partnerships among urban water agencies, public interest organizations, and private entities. CUWCC's goal is to integrate urban water conservation BMPs into the planning and management of California's water resources.

conservation program and will continue the program to reduce water usage in order to comply with SB X7-7.

5.2.2 QHWD

QHWD is not a signatory to the CUWCC MOU and is not a member of CUWCC. As such, a description of all 14 DMMs is provided below with a discussion of the proposed methods to measure efficiency.

5.2.2.1 DMM 1: Water survey programs for single-family residential and multi-family residential customers

Since 1996, QHWD began offering free residential water use surveys to all QHWD customers. This service is advertised on QHWD's website and has been featured in the quarterly newsletter several times. In 2008 QHWD implemented a conservation rate structure that has helped show customers if their usage is normal or not, since the implementation of this rate structure water surveys has significantly increased.

State Certified staff conduct both interior and exterior audits at the customers home, and complete a report that is made available to the customer(s) with suggestions for water conservation and a list of the currently offered rebate program. In 2007 average annual demand was approximately 1.17 AFY per connection (6,612 AF/5,674 connections). However, in 2010 after doing these audits teamed with conservation billing for two years the average annual demand was .92 AFY per connection (5,441 AF/5,937 connections). Thus, QHWD has shown that the audits and the conservation billing have reduced the annual water consumption per connection by 21 percent.

5.2.2.2 DMM 2: Plumbing Retrofit

Since 2008, QHWD has participated in the distribution of information of suppliers for showerheads, aerators, and toilet tank leak detection tablets during Water Awareness Month and emphasizes water use surveys and ultra-low flush toilet replacement programs. In early 2008, a toilet replacement rebate was started where QHWD offers a fifty dollar rebate on all ultra low-flush toilets. This program has been funded by the overage charges from the conservation rate structure.

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

QHWD has conducted water audits and leak detection and repair checks on an "as-needed" basis since its formation in 1955. QHWD began preventative audits and leak detections in 2002, since 2008 QHWD has sent letters to high residential user (top 10 percent), and continues to perform water audits by our staff, as well as monitor high bills for possible leaks.

QHWD is located in an earthquake zone, and as such has permanently incorporated the system water audit and leak detection, and meter calibration (production and customer meters) programs into its utility operations. On average, QHWD crews spend about 20 days surveying approximately 40 miles of main and laterals per year. QHWD also participates in an annual valve exercise program to ensure that all connections operate as required. Broken or poorly operating valves are scheduled for repair or replacement.

Effectiveness of this DMM is measured through the reduction in number of leaks detected and unaccounted for water losses in comparison to past years. Typically unaccounted for water loss is less than 5 percent. QHWD utilizes an annual review of the data records to confirm that the unaccounted for water losses stay under 6 percent.

5.2.2.4 DMM 4: Metering with Commodity Rates

QHWD is fully metered for all customer sectors, including separate meters for single-family residential, commercial, large landscapes, and all institutional/governmental facilities. Since 2008 QHWD has created a conservation based rate structure. The inside water is calculated in the following fashion, 4,200 gallons a month is allotted for up to three occupants after that each additional occupant is granted an additional 1000 gallons. The outside allotment is calculated by the overall foot print of the lot, for the first 5,000 square foot a customer receives 19 gallons per square foot to be allocated throughout the year. For lots larger than 5,000 square feet the first 5,000 are still calculated at 19 gallons per square foot and area above the 5,000 is calculated at 17 gallons per a square foot till 14,000 square feet then the calculations changes again for all area over the first 14,000 square foot to that of 14 gallons per square foot. Detailed rate information for a one month billing cycle is provided in Table 5-1.

TABLE 5-1: QHWD TIERED RATE STRUCTURE

2011 **Winter rates** will apply to water used in the months of **October through May** as follows:			
Tier Name	**% of Water Budget**	**Multiply by Unit (100cf)**	**Multiply by Gallon**
Conservation	0 – 75%	$0.66	0.00088235
Base Rate	0 – 100%	$0.70	0.00093583
Inefficient	101 – 150%	$1.05	0.00140374
Excessive	151 – 200%	$1.75	0.00233957
Wasteful	Greater than 200%	$2.45	0.0032754
2011 **Summer rates** will apply to water used in the months of **June through September** as follows:			
Tier Name	**% of Water Budget**	**Multiply by Unit (100cf)**	**Multiply by Gallon**
Conservation	0 – 75%	$0.81	0.00108289
Base Rate	0 – 100%	$0.86	0.00114973
Inefficient	101 – 150%	$1.29	0.0017246
Excessive	151 – 200%	$2.15	0.00287433
Wasteful	Greater than 200%	$3.01	0.00402406

QHWD's building department coordinates the implementation of this DMM. Project designers must demonstrate the use of water saving devices in their designs. A staff member reviews the building plans to determine the water use efficiency before a permit is issued to the new customer.

This DMM will be measured for effectiveness through the measures illustrated in DMM 1. Commercial water reduction achieved is estimated at 12 to 15 percent. At this time, no additional budget has been allotted for this DMM.

5.2.2.5 DMM 5: Large Landscape Conservation Programs and Incentives

In 1992, QHWD established a landscape ordinance.

This DMM has been permanently incorporated into QHWD ordinances. It is anticipated that the survey could result in 10 percent reduction in water use and the conservation measures an additional 15 percent reduction in water use. Landscape/irrigation average daily demand in 2004 was approximately 5.4 AF per connection. Assuming budgets are created for only the landscape/irrigation meters (41 meters total) over the next five years and a combined water savings of 25 percent, an annual water savings of 58 AFY could be achieved by 2010. However, at this time no additional budget has been allotted for this DMM.

Its effectiveness will be measured through cost savings, the attendance to the Water Efficiency Landscape (WEL) demonstration garden, and the number of WEL materials distributed. An annual report on the landscape water savings associated with this DMM will be submitted to the QHWD's Board of Directors.

5.2.2.6 DMM 6: High Efficiency Washing Machine Rebate Programs

High-efficiency washing machines use about 50 percent less water than conventional machines, using only 20 to 30 gallons of water per load, compared to 40 to 45 gallons for conventional top-loading washers. The estimated annual savings for a typical household is about 5,000 gallons per year.

QHWD does not currently implement or plan on implementing this DMM because this DMM would not be economically viable due to the high cost of washing machines, high program costs (i.e., rebates), and low cumulative water savings compared to other DMMs. However, customers in the QHWD's water service area may be eligible for rebates from either the area's electric utility, or gas utility. Water and energy savings vary with the new models, however mean water savings of approximately 14 gallons per household per day would be expected. High efficiency models cost from $600 to $1,100 (compared to $300 to $700 for conventional units) which may reduce the rate of participation. Examples of customers that would derive maximum benefit from this program include multi-family residential units and laundromats with multiple washing machines per location.

5.2.2.7 DMM 7: Public Information Programs

QHWD also promotes water conservation and other resource efficiencies in coordination with NACWA and the energy utilities. It also distributes public information through bill inserts, brochures, community speakers, paid advertising, and many special events every year.

It has formed a Citizens' Advisory Committee to assist in developing new ways to communicate with the public and the media about water conservation and other resource issues. Due to arid conditions of the region, it also has become a priority to develop conservation materials focused on the short term residents and visitors though working with restaurants, hotels, and real estate offices. QHWD has established a World Wide Web Home Page, which includes information on water conservation, recycling, and other resource issues.

QHWD will continue to provide public information services and materials to remind the public about water and other resource issues. QHWD will track the commentary regarding the information provided. QHWD has a proposed budget of $5,000 for public relations purposes.

5.2.2.8 DMM 8: School Education

QHWD continues to work with the school districts to promote water conservation and other resource efficiencies at school facilities and to educate students about these issues. As part of the commercial/industrial/institutional water conservation programs, all new public school toilets, urinals, showerheads, and faucet aerators will utilize ultra-low flow models. QHWD continually works with the school districts to complete retrofits of school and facilities and playground irrigation systems and provides educational materials for several grade levels, State and County water system maps, posters, workbooks, interactive computer software, videos, tours, and sponsors WET training, science fairs, and water conservation contests. To date, QHWD has not presented to any classes.

To measure the effectiveness of this DMM, QHWD will continue to survey the institutions and educators on the number of programs, materials and attendance at water conservation activities. No additional budget has been allotted for this DMM.

5.2.2.9 DMM 9: Conservation programs for commercial, industrial, and institutional account

For the last several years, QHWD has provided water use audits to any customer who so requested. QHWD utilizes a database program to identify the top 10 percent of the commercial customers and the top 20 percent of the industrial and institutional customers. These high demand customers are contacted by letter and with follow up telephone calls to offer audits.

QHWD will continue to implement this DMM at the annual target rate for at least the next five years. At this time, additional budget has been allotted for this DMM.

5.2.2.10 DMM 10: Wholesale Agency Programs

QHWD is not a wholesale agency and thus this DMM is not applicable.

5.2.2.11 DMM 11: Conservation Pricing

In 2008 QHWD introduced conservation rate structures for all residential accounts, as detailed in DMM 4. Since implementing this system, QHWD has seen a decrease in water usage and the staff at QHWD is trying to see if the rate structure is correlated in any way.

QHWD will continue to monitor the number of violators who use water in excess of their established allotment. The incentive of this DMM is to decrease the customers' water costs for those that conserve and create a price incentive to conserve.

5.2.2.12 DMM 12: Water Conservation Coordinator

QHWD has designated one full-time WCC in 2002. One staff person (who works 30 percent on water conservation) and part time staff who coordinate the landscape programs provide additional support to the WCC.

QHWD will continue to survey the institutions and educators on the number of programs, materials and attendance at water conservation activities in order to measure the DMMs effectiveness.

5.2.2.13 DMM 13: Water Waste Prohibition

QHWD has enacted a "No Waste" ordinance. Enforcement includes the "gutter flooder" patrol to educate customers, and if necessary, issue warnings and citations for violations. See Appendix F for the "No Waste" Ordinance and information on regulations, restrictions and enforcement.

As a method to measure efficiency, QHWD will monitor the number of annual violations.

5.2.2.14 DMM 14: Ultra low-flush toilets replacement program

QHWD established a high visibility ultra-low flush toilet replacement program in 2001and plans to continue the DMM until at least 80 percent of all non-conserving and low-flush model toilets have been replaced. QHWD has continued to offer this rebate to all of their customers that adds up to $50.00 per toilet.

All public facilities in the QHWD will also eventually have ULFTs, urinals, showerheads, and self-closing faucets. Funding for replacement programs will come in part from the Demand Offset Program, where new development provides funds to improve the water use efficiency of existing customers.

QHWD will continue to offer rebates to customers, will establish a direct installation program, and will provide rebates for toilets and urinals for installation at public facilities including schools, libraries, and fire department facilities.

Projected total annual water savings from toilet retrofits at full implementation has yet to be determined, however water conserved in ULFT replacement programs have been shown to be 1.9 to 5.4 gallons of water savings per flush per toilet which equates to 12 to 45 gallons per replacement per day. Assuming 20 replacements a year, the minimum annual water savings from this DMM is approximately 0.27 AFY (20 * 12 gpd *365 days/325,075 gals per AF).

To measure effectiveness, QHWD will calculate annual ULFT replacement program water savings to confirm the savings are within 10 percent of calculated retrofit-on-resale water savings, using the CUWCC MOU Exhibit 6 methodology and water savings estimates. Exhibit 6 has become an industry standard for evaluation of ULFT replacement programs.

5.3 Summary of Conservation

Through the implementation of the existing DMMs and SB X7-7 requiring all water suppliers to reduce per capita urban water use, a reduction of 10 percent in average water use is expected by 2015 and 20 percent by 2020 for the Study Area. However, it is difficult to determine actual water savings since most conservation measures are voluntary. Typically when a shortage occurs, water customers increase their awareness of water usage and voluntarily reduce water demand even more to avoid water rationing. The 20 percent reduction target from the proposed baseline has already been achieved within the Study Area, as shown in Section 8.

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Section 6

Recycled Water Plan

Section 6: Recycled Water Plan

6.1 Recycled Water Supplies

The Antelope Valley is faced with significant challenges with respect to management of water resources in the region. Recycled water helps address the Antelope Valley's need for increased water supplies by offsetting existing potable demands and promoting beneficial reuse of treated wastewater, such as using recycled water for groundwater replenishment. Efforts are currently underway to develop a regional recycled water distribution system in the Antelope Valley, also known as the AV Backbone. Due to the size and scope of the project, it is a multi-agency, multi-jurisdictional project that will be implemented collectively to serve the Study Area. Recycled water supplies are also addressed in the 2007 AVIRWMP (pages 3-17 through 3-20).

6.1.1 Source Characteristics and Quality

Lancaster Water Reclamation Plant (LWRP), Palmdale Water Reclamation Plant (PWRP) and Rosamond Wastewater Treatment Plant (RWWTP) are the wastewater treatment plants serving the Study Area. These three plants currently provide primarily secondary[2] treated recycled water. A small percentage of wastewater is treated to a tertiary[3] level at the LWRP through two additional onsite facilities, known as the Antelope Valley Tertiary Treatment Plant (AVTTP) and the Membrane Bioreactor (MBR) Plant, which provides the only tertiary treated recycled water currently available in the Study Area. However, on-going construction at each of the three treatment plants will allow for additional tertiary treated recycled water to be produced. A description of each of the three treatment plants that may provide recycled water to the Study Area is provided below.

6.1.1.1 LWRP

The LWRP, built in 1959, is located north of the City of Lancaster and is owned and operated by the County Sanitation District No. 14 of Los Angeles County (Sanitation District No. 14). The plant's service area includes most of the City of Lancaster, parts of the neighboring City of Palmdale, and unincorporated areas of Los Angeles County. The LWRP currently has a design capacity to treat 17 mgd of wastewater to a secondary level. Approximately 0.6 mgd of secondary effluent may undergo further tertiary treatment at the Antelope Valley Tertiary Treatment Plant (AVTTP) and approximately 1 mgd of primary effluent may receive secondary and tertiary treatment at the Membrane Bioreactor (MBR) Plant. In 2010, LWRP produced an average of 10.4 mgd of secondary treated recycled water and 1.1 mgd of tertiary treated recycled water. Uses of the recycled water produced at the LWRP include: various M&I uses, agricultural irrigation, recreational impoundments at Apollo Community Regional Park, maintenance of marsh-like habitat at Piute Ponds on Edwards Air Force Base, and in-plant uses. Sanitation District No. 14 is currently upgrading the existing LWRP to have a secondary and tertiary treatment capacity of 18 mgd.

6.1.1.2 PWRP

The PWRP, built in 1953 and located on two sites adjacent to the City of Palmdale, is owned, operated, and maintained by the County Sanitation District No. 20 of Los Angeles County

[2] Secondary treatment means recycled water that meets secondary standards, including water quality, as defined in the California Code of Regulations Title 22.
[3] Tertiary treatment means recycled water that meets tertiary standards, including water quality, as defined in the California Code of Regulations Title 22.

(Sanitation District No. 20). PWRP, which has a secondary treatment capacity of 15 mgd, produced 8.3 mgd of secondary treated recycled water in 2010. Uses of the recycled water produced at the PWRP include agricultural and landscape irrigation and in-plant uses.

The Regional Board has required that Sanitation District No. 20 prevent the discharge of nitrogenous compounds to the groundwater at levels that violate the water quality objectives identified in the 1994 Water Quality Control Plan for the Lahontan Region (1994 Basin Plan). In response, Sanitation District No. 20 is currently upgrading the PWRP to include nitrification-denitrification process treatment for a tertiary treatment capacity of 12 mgd. The tertiary treated recycled water produced at the PWRP after completion of these upgrades will be used for various M&I uses, agricultural irrigation, and in-plant uses.

6.1.2 Availability of Supply

For the purpose of this study, historic recycled water flows were provided by Sanitation District Nos. 14 and 20 to predict the amount of recycled water anticipated in the Study Area. These projections are for tertiary treated water only and are determined from the applicable recycled water producer's Annual Monitoring Report. These projections take into consideration the recycled water that has been committed to users outside of the Study Area (e.g., Piute Ponds and Apollo Community Regional Park). Table 6-1 provides a summary of the projected available recycled water to the Study Area through 2035. However, the volume of recycled water produced at the LWRP and PWRP will be dependent on the level of growth that occurs in the Study Area. If the population and land use projections provided by the Cities of Lancaster and Palmdale materialize, the amount of recycled water available will be significantly greater than the numbers presented in Table 6-1.

TABLE 6-1: RECYCLED WATER AVAILABILITY TO STUDY AREA 2010 – 2035

	2010	2015	2020	2025	2030	2035
LWRP[(a)] (mgd)	1.1	11.5	12.9	14.0	15.3	16.7
PWRP[(b)] (mgd)	0.0	10.1	10.5	10.9	11.2	11.6
Study Area (mgd)	**1.1**	**21.6**	**23.4**	**24.9**	**26.5**	**28.3**
Study Area (AFY)	**1,200**	**24,200**	**26,200**	**27,900**	**29,700**	**31,700**

Note:
(a) Extrapolated using historical flows from 2000 to 2010 listed in LWRP Annual Monitoring Reports and excludes estimated demand at the Piute Ponds and Apollo Regional Community Park.
(b) Extrapolated using historical flows from 2000 to 2010 listed in PWRP Annual Monitoring Reports.

Note that the total recycled water projected to be produced in the Antelope Valley area in 2035 is 31,700 AF. Table 4-8 projects that the water demand in the Study Area in 2035 could be 141,000 AF. Given this demand, it is conservative to assume approximately 20 percent of the potable supply could potentially be treated and reused as recycled water. This is a conservative estimate since most likely a larger percentage of new development will connect to a regional sewer system.

Although Table 6-1 provides the projected volumes of recycled water available, actual delivery of recycled water by the purveyors to reuse sites will be limited to demand and implementation of the AV Backbone. Table 6-2 provides the projections of recycled water demand for an average water year. The projections are based on a recycled water market assessment and are generally for M&I recycled water uses. District No. 40 recycled water demands were determined with the inclusion of the Cities of Lancaster and Palmdale demands, as detailed in the 2006 report, "Final Facilities Planning Report, Antelope Valley Recycled Water Project" (2006 Recycled Water Facilities Plan) prepared for District No. 40. Although no specific users have been identified for QHWD, the agency plans on connecting to the AV Backbone system in the future and using recycled water in-lieu of groundwater pumping. Use of recycled water would be encouraged through the use of financial incentives (i.e., recycled water would be available at a lower cost than the existing potable water supply). Table 6-3 indicates the 2005 Integrated UWMP projected recycled water use for 2010 and compares it to what was actually utilized in 2010.

TABLE 6-2: PROJECTED FUTURE USE OF RECYCLED WATER IN THE STUDY AREA BASED ON THE 2006 RECYCLED WATER FACILTIES PLAN (AF)

	2015	2020	2025	2030	2035
District No. 40	5,400	8,200	10,900	13,600	16,300
QHWD	-	-	-	-	-
Study Area Total Recycled Water Demand	**5,400**	**8,200**	**10,900**	**13,600**	**16,300**

Note:
These projections are based on the 2006 Recycled Water Facilities Plan and do not include the new projected demand associated with the proposed lands uses for the Study Area as shown in Table 6-4.

TABLE 6-3: 2005 INTEGRATED UWMP RECYCLED WATER USE COMPARED TO 2010 ACTUAL IN THE STUDY AREA (AF)

Water Purveyor	2010 Actual Use	2005 Projection for 2010
District No. 40	0	2,700
QHWD	-	-
Study Area Total Recycled Water Demand	0	**2,700**

In addition to the demands identified in the 2006 Recycled Water Facilities Plan, a significant portion of the projected demands for the Study Area based on the land use projections and General Plans of the Cities of Lancaster and Palmdale could potentially be served by recycled water. As the potable water demand increases in the Antelope Valley, the amount of wastewater produced is also anticipated to increase. When this occurs, a significant portion of the industrial development within both cities is projected to occur near the alignment of the AV Backbone. Table 6-4 identifies the amount of new demand associated with industrial development and beyond what is projected in Section 4 of the IRUWMP and what is identified in the 2006 Recycled Water Facilities Plan that could be served by recycled water if it is available. However, if sufficient recycled water is not available to serve these industrial developments, additional potable supplies would have to be acquired in order for these developments to occur.

TABLE 6-4: RECYCLED WATER – POTENTIAL FUTURE USES

	2015	2020	2025	2030	2035
Agricultural Irrigation	-	-	-	-	-
Landscape Irrigation	-	-	-	-	-
Commercial Irrigation	-	-	-	-	-
Golf Course Irrigation	-	-	-	-	-
Industrial Reuse*	19,300	22,300	25,300	27,800	31,000
Groundwater Recharge	-	-	-	-	-
Indirect Potable Reuse	-	-	-	-	-
Wildlife Habitat	-	-	-	-	-
Total	**19,300**	**22,300**	**25,300**	**27,800**	**31,000**

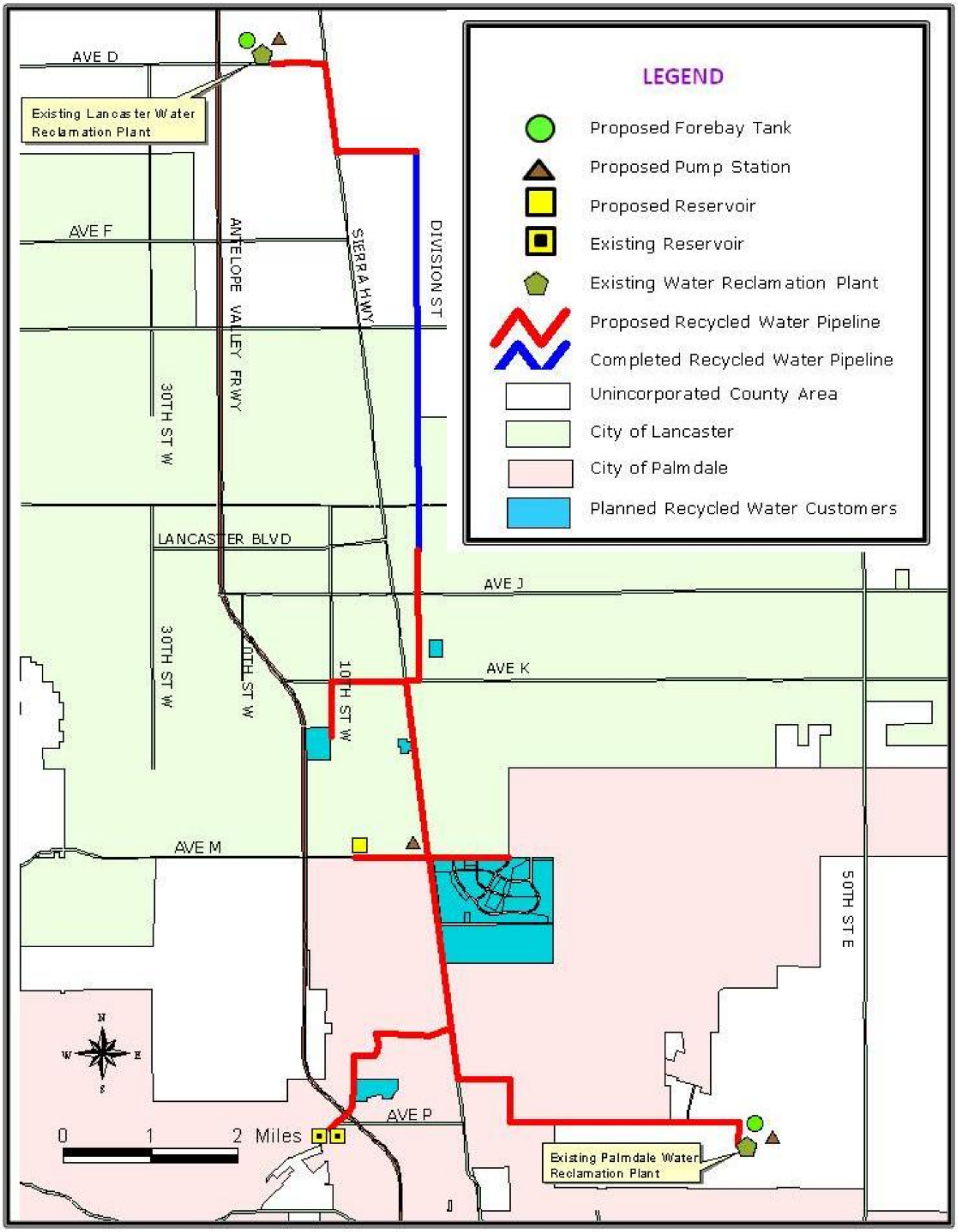
Note:

*Based on the new projected demand (beyond the identified uses in the 2006 Recycled Water Facilities Plan) associated with the proposed land uses for the Antelope Valley area for recycled water, if the AV Backbone is available to deliver recycled water to all reuse sites.

6.1.3 AV Backbone Recycled Water Facilities

The AV Backbone will provide the necessary distribution infrastructure to convey recycled water to users and thereby offset potable water demands in the Antelope Valley. The AV Backbone will be constructed in phases to serve the Cities of Lancaster and Palmdale and the surrounding unincorporated communities of Los Angeles County, as shown in Figure 6-1. Future phases of the AV Backbone are subject to modification and will be developed in accordance with regional goals as demand and funding are identified. In 2009, the City of Lancaster completed the first phase of the AV Backbone, constructing a recycled water pipeline along Division Street, from Avenue E to Lancaster Boulevard, with funding assistance from District No. 40. The City of Lancaster is currently working with the Army Corps of Engineers to extend the pipeline of AV Backbone further south along Division Street to Avenue K; along Avenue K from Division Street to 10th Street West; and along Sierra Highway from Avenue K to Avenue M. In addition, District No. 40 is working with the City of Palmdale to design and construct a portion of the pipeline, including storage and pumping facilities, to connect the PWRP with Lancaster's pipeline at Sierra Highway and Avenue M. Once these AV Backbone phases and recycled water deliveries are implemented, monies from a settlement agreement between Sanitation District Nos. 14 and 20 and the Regional Board will be available to partly reimburse these efforts. As future funding sources are identified, the AV Backbone will be connected to the LWRP. Once the northern and southern portions of the AV Backbone are linked and the LWRP and the PWRP are both connected to the system, the AV Backbone will have the redundancy necessary to ensure a reliable source of supply, so that the recycled water service area can expand to serve additional recycled water demands.

FIGURE 6-1: PROPOSED RECYCLED WATER BACKBONE SYSTEM



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Section 7

Water Service Reliability Planning

Section 7: Water Service Reliability Planning

This section provides a discussion of the reliability of the water supply within the Antelope Valley. A comparison between the water supply and demand for an average water year, single dry water year, and multiple dry water years is also provided. Water supply reliability is also discussed in the 2007 AVIRWMP (Chapter 3). The groundwater rights adjudication process is underway for the Basin; however it has not been concluded. Nothing in this IRUWMP shall be interpreted to interfere in any way with the court adjudication of groundwater rights or related settlement negotiations. All tables in Section 7 reflect projected groundwater pumping estimates provided by each water purveyor. The groundwater pumping projections are not agreed-upon values by the water purveyors, and each water purveyor understands these projections are estimates subject to change. These estimates do not necessarily reflect the maximum pumping capacity of each water purveyor.

7.1 Reliability

Reliability is "how much one can count on a certain amount of water being delivered to a specific place at a specific time" and depends on the availability of water from the source, availability of the means of conveyance and level and pattern of water demand at the place of delivery.

7.2 Water Quality Impacts on Availability of Supply

Groundwater quality and imported water quality has been addressed in the 2007 AVIRWMP (pages 2-15, 3-42 through 3-45). Any change in water supply is not dependent on water quality, but on the SWP deliveries and local drought conditions. Therefore, there is no water quality impacts projected.

7.3 Reliability Comparison

As required by the UWMPA, a comparison of water supply and demand for an average water year, single dry water year, and multiple dry water years should be present from 2015 to 2035 in five-year increments.

7.3.1 Average Water Year Assessment

Table 7-1 provides a summary of the average water year reliability for each of the water purveyors in the Study Area as a whole. As discussed in Section 2, the overall delivery of SWP water was estimated to be 48 percent of AVEK's Table A Amount available to the Study Area. Assuming the availability of groundwater remains the same as indicated in the tables, Table 7-1 indicates District No. 40 requires new water supplies in order to meet any of its new projected demand. These supplies are anticipated to be acquired using the New Water Supply Fee (Developer Fee) described in Section 3.3. Although the existing supplies for District No. 40 are shown to be slightly higher than the existing and committed demand, District No. 40 has already received requests to serve proposed developments that require more than the small surplus of supply. QHWD will need to implement new water supplies by 2030 in order to meet demand during an average water year.

Demand estimates are based on the land use or population projection developed in Section 4. The sufficiency of each water purveyor's supplies to meet demand is dependent on the final results of the adjudication process.

7.3.2 Single Dry Year Water Assessment

Table 7-2 provides a summary of the single dry water year reliability for each of the water purveyors and the Study Area as a whole. Overall SWP water delivery was estimated to be available at 7 to 11 percent (as determined by DWR's Reliability Report) of AVEK's Table A Amount available to the Study Area. Demand estimates are based on the land use or population projection developed in Section 4.

As shown by the comparison, each water purveyor will have sufficient supply to meet the increasing demand through 2035 with implementation of the new planned water supplies and assuming the availability of groundwater remains the same as indicated in the tables. Tables 7-1 through 7-7 reflects projected groundwater pumping as well as the new planned water supplies as identified and discussed in Sections 2 and 3, respectively. Upon adjudication of the Basin, it is anticipated that each water retailer will be able to save credits for not fully utilizing its adjudicated groundwater right in a given year, thus saving unused groundwater for use when SWP supply is limited or interrupted.

7.3.3 Multiple Dry Year Assessment

Tables 7-3 through 7-7 provide a summary of the multiple dry water year reliability for each of the water purveyors and the Study Area as a whole. Each table presents a five year period of supply and demand (e.g., Table 7-3 presents data for years 2011 to 2015, Table 7-4 presents data for years 2016 to 2020, etc.). For all cases, overall delivery of SWP water was estimated to be available at 34 to 36 percent (as determined by DWR's Reliability Report) of AVEK's Table A Amount available to the Study Area. Demand estimates are based on the land use or population projection developed in Section 4.

As shown by the comparison, each water purveyor will have sufficient supply to the increasing demand through 2035 with the implementation of the new planned water supplies, assuming the availability of groundwater remains the same as indicated in the tables.

TABLE 7-1: AVERAGE WATER YEAR ASSESSMENT

District No. 40	**2015**	**2020(1)**	**2025**	**2030**	**2035**
Demand					
Existing Demand	59,800	53,000	53,000	53,000	53,000
Committed Demand	20,600	20,600	20,600	20,600	20,600
Projected Demand	11,500	22,900	34,400	45,800	57,200
Total Demand	91,900	96,500	108,000	119,400	130,800
Existing Water Supplies					
Groundwater	23,200	23,200	23,200	23,200	23,200
Imported water	61,000	61,000	61,000	61,000	61,000
Total Existing Supply	84,200	84,200	84,200	84,200	84,200
Difference (supply minus demand)	(7,700)	(12,300)	(23,800)	(35,200)	(46,600)
Difference as Percent of Supply	(9)	(15)	(28)	(42)	(55)
Difference as Percent of Demand	(8)	(13)	(22)	(29)	(36)
Planned Water Supplies					
Groundwater Banking	-	-	-	-	-
Anticipated New Supplies (Developer Fee)	2,300	4,100	12,900	21,600	30,300
Recycled Water	5,400	8,200	10,900	13,600	16,300
Total Planned Supply	7,700	12,300	23,800	35,200	46,600
Total Existing and Planned Supplies	91,900	96,500	108,000	119,400	130,800
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

Note:
(1) Demand projections beginning in 2020 reflect the SB X7-7 mandates

QHWD	2015	2020(1)	2025	2030	2035
Demand	6,500	7,400	8,300	9,300	10,200
Existing Water Supplies					
Groundwater	2,500	2,500	2,500	2,500	2,500
Imported water	6,800	6,800	6,800	6,800	6,800
Total Existing Supply	9,300	9,300	9,300	9,300	9,300
Difference (supply minus demand)	2,800	1,900	1,000	0	(900)
Difference as Percent of Supply	30	20	11	0	(10)
Difference as Percent of Demand	43	26	12	0	(9)
Planned Water Supplies					
Groundwater Banking	-	-	-	-	-
Anticipated New Supplies (Developer Fee)	-	-	-	-	900
Recycled Water	-	-	-	-	-
Total Planned Supply	-	-	-	-	900
Total Existing and Planned Supplies	9,300	9,300	9,300	9,300	10,200
Difference (supply minus demand)	2,800	1,900	1,000	0	0
Difference as Percent of Supply	30	20	11	0	0
Difference as Percent of Demand	43	26	12	0	0

Study Area	2015	2020(1)	2025	2030	2035
Demand	98,400	103,900	116,300	128,700	141,000
Existing Water Supplies					
Groundwater	25,700	25,700	25,700	25,700	25,700
Imported water	67,800	67,800	67,800	67,800	67,800
Total Existing Supply	93,500	93,500	93,500	93,500	93,500
Difference (supply minus demand)	(4,900)	(10,400)	(22,800)	(35,200)	(47,500)
Difference as Percent of Supply	(5)	(11)	(24)	(38)	(51)
Difference as Percent of Demand	(5)	(10)	(20)	(27)	(34)
Planned Water Supplies					
Groundwater Banking	-	-	-	-	-
Anticipated New Supplies (Developer Fee)	2,300	4,100	12,900	21,600	31,200
Recycled Water	5,400	8,200	10,900	13,600	16,300
Total Planned Supply	7,700	12,300	23,800	35,200	47,500
Total Existing and Planned Supplies	101,200	105,800	117,300	128,700	141,000
Difference (supply minus demand)	2,800	1,900	1,000	0	0
Difference as Percent of Supply	3	2	1	0	0
Difference as Percent of Demand	3	2	1	0	0

TABLE 7-2: SINGLE DRY WATER YEAR ASSESSMENT

District No. 40	**2015**	**2020 (1)**	**2025**	**2030**	**2035**
Demand					
Existing Demand	59,800	53,000	53,000	53,000	53,000
Committed Demand	20,600	20,600	20,600	20,600	20,600
Projected Demand	11,500	22,900	34,400	45,800	57,200
Total Demand	91,900	96,500	108,000	119,400	130,800
Existing Water Supplies					
Groundwater	23,200	23,200	23,200	23,200	23,200
Imported water	8,200	9,200	10,200	11,200	11,200
Total Existing Supply	31,400	32,400	33,400	34,400	34,400
Difference (supply minus demand)	(60,500)	(64,100)	(74,600)	(85,000)	(96,400)
Difference as Percent of Supply	(193)	(198)	(223)	(247)	(280)
Difference as Percent of Demand	(66)	(66)	(69)	(71)	(74)
Planned Water Supplies					
Groundwater Banking	54,800	55,300	61,500	67,400	74,500
Anticipated New Supplies (Developer Fee)	300	600	2,200	4,000	5,600
Recycled Water	5,400	8,200	10,900	13,600	16,300
Total Planned Supply	60,500	64,100	74,600	85,000	96,400
Total Existing and Planned Supplies	91,900	96,500	108,000	119,400	130,800
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

Note:
(1) Demand projections beginning in 2020 reflect the SB X7-7 mandates

QHWD	**2015**	**2020(1)**	**2025**	**2030**	**2035**
Demand	6,500	7,400	8,000	9,300	10,000
Existing Water Supplies					
Groundwater	2,500	2,500	2,500	2,500	2,500
Imported water	900	1,000	1,100	1,300	1,300
Total Existing Supply	3,400	3,500	3,600	3,800	3,800
Difference (supply minus demand)	(3,100)	(3,900)	(4,400)	(5,500)	(6,200)
Difference as Percent of Supply	(91)	(111)	(122)	(145)	(163)
Difference as Percent of Demand	(48)	(53)	(55)	(59)	(62)
Planned Water Supplies					
Groundwater Banking	3,100	3,900	4,400	5,200	5,400
Anticipated New Supplies (Developer Fee)	-	-	-	-	200
Recycled Water	-	-	-	300	600
Total Planned Supply	3,100	3,900	4,400	5,500	6,200
Total Existing and Planned Supplies	6,500	7,400	8,000	9,300	10,000
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

Study Area	**2015**	**2020(1)**	**2025**	**2030**	**2035**
Demand	98,400	103,900	116,000	128,700	140,800
Existing Water Supplies					
Groundwater	25,700	25,700	25,700	25,700	25,700
Imported water	9,100	10,200	11,300	12,500	12,500
Total Existing Supply	34,800	35,900	37,000	38,200	38,200
Difference (supply minus demand)	(63,600)	(68,000)	(79,000)	(90,500)	(102,600)
Difference as Percent of Supply	(183)	(189)	(214)	(237)	(269)
Difference as Percent of Demand	(65)	(65)	(68)	(70)	(73)
Planned Water Supplies					
Groundwater Banking	57,900	59,200	65,900	72,600	79,900
Anticipated New Supplies (Developer Fee)	300	600	2,200	4,000	5,800
Recycled Water	5,400	8,200	10,900	13,900	16,900
Total Planned Supply	63,600	68,000	79,000	90,500	102,600
Total Existing and Planned Supplies	98,400	103,900	116,000	128,700	140,800
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

TABLE 7-3: MULTI-DRY WATER YEAR ASSESSMENT 2011-2015

District No. 40	2011	2012	2013	2014	2015
Demand					
Existing Demand	59,800	59,800	59,800	59,800	59,800
Committed Demand	20,600	20,600	20,600	20,600	20,600
Projected Demand	2,300	4,600	6,900	9,200	11,500
Total Demand	82,700	85,000	87,300	89,600	91,900
Existing Water Supplies					
Groundwater	23,200	23,200	23,200	23,200	23,200
Imported water	34,600	34,600	34,600	34,600	35,600
Total Existing Supply	57,800	57,800	57,800	57,800	58,800
Difference (supply minus demand)	(24,900)	(27,200)	(29,500)	(31,800)	(33,100)
Difference as Percent of Supply	(43)	(47)	(51)	(55)	(56)
Difference as Percent of Demand	(30)	(32)	(34)	(35)	(36)
Planned Water Supplies					
Groundwater Banking	23,600	25,900	28,200	30,500	26,400
Anticipated New Supplies (Developer Fee)	1,300	1,300	1,300	1,300	1,300
Recycled Water	-	-	-	-	5,400
Total Planned Supply	24,900	27,200	29,500	31,800	33,100
Total Existing and Planned Supplies	82,700	85,000	87,300	89,600	91,900
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

.

QHWD	**2011**	**2012**	**2013**	**2014**	**2015**
Demand	5,700	5,900	6,000	6,300	6,500
Existing Water Supplies					
Groundwater	2,500	2,500	2,500	2,500	2,500
Imported water	3,900	3,900	3,900	3,900	3,900
Total Existing Supply	6,400	6,400	6,400	6,400	6,400
Difference (supply minus demand)	700	500	400	100	(100)
Difference as Percent of Supply	11	8	6	2	(2)
Difference as Percent of Demand	12	8	7	2	(2)
Planned Water Supplies					
Groundwater Banking	-	-	-	-	100
Anticipated New Supplies (Developer Fee)	-	-	-	-	-
Recycled Water	-	-	-	-	-
Total Planned Supply	-	-	-	-	100
Total Existing and Planned Supplies	6,400	6,400	6,400	6,400	6,500
Difference (supply minus demand)	700	500	400	100	0
Difference as Percent of Supply	11	8	6	2	0
Difference as Percent of Demand	12	8	7	2	0

Study Area	**2011**	**2012**	**2013**	**2014**	**2015**
Demand	88,400	90,900	93,300	95,900	98,400
Existing Water Supplies					
Groundwater	25,700	25,700	25,700	25,700	25,700
Imported water	38,500	38,500	38,500	38,500	39,500
Total Existing Supply	64,200	64,200	64,200	64,200	65,200
Difference (supply minus demand)	(24,200)	(26,700)	(29,100)	(31,700)	(33,200)
Difference as Percent of Supply	(38)	(42)	(45)	(49)	(51)
Difference as Percent of Demand	(27)	(29)	(31)	(33)	(34)
Planned Water Supplies					
Groundwater Banking	23,600	25,900	28,200	30,500	26,400
Anticipated New Supplies (Developer Fee)	1,300	1,300	1,300	1,300	1,800
Recycled Water	-	-	-	-	5,400
Total Planned Supply	24,900	27,200	29,500	31,800	33,600
Total Existing and Planned Supplies	89,100	91,400	93,700	96,000	98,800
Difference (supply minus demand)	700	500	400	100	400
Difference as Percent of Supply	1	1	0	0	0
Difference as Percent of Demand	1	1	0	0	0

TABLE 7-4: MULTI-DRY WATER YEAR ASSESSMENT 2016-2020

District No. 40	**2016**	**2017**	**2018**	**2019**	**2020(1)**
Demand					
Existing Demand	59,800	59,800	59,800	59,800	53,000
Committed Demand	20,600	20,600	20,600	20,600	20,600
Projected Demand	13,800	16,000	18,300	20,600	22,900
Total Demand	94,200	96,400	98,700	101,000	96,500
Existing Water Supplies					
Groundwater	23,200	23,200	23,200	23,200	23,200
Imported water	35,600	35,600	35,600	35,600	35,600
Total Existing Supply	58,800	58,800	58,800	58,800	58,800
Difference (supply minus demand)	(35,400)	(37,600)	(39,900)	(42,200)	(37,700)
Difference as Percent of Supply	(60)	(64)	(68)	(72)	(64)
Difference as Percent of Demand	(38)	(39)	(40)	(42)	(39)
Planned Water Supplies					
Groundwater Banking	27,800	29,300	30,800	32,400	27,100
Anticipated New Supplies (Developer Fee)	1,600	1,800	2,000	2,200	2,400
Recycled Water	6,000	6,500	7,100	7,600	8,200
Total Planned Supply	35,400	37,600	39,900	42,200	37,700
Total Existing and Planned Supplies	94,200	96,400	98,700	101,000	96,500
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

Note:
(1) Demand projections beginning in 2020 reflect the SB X7-7 mandates

QHWD	**2016**	**2017**	**2018**	**2019**	**2020(1)**
Demand	6,600	6,800	7,000	7,200	7,400
Existing Water Supplies					
Groundwater	2,500	2,500	2,500	2,500	2,500
Imported water	3,900	3,900	3,900	4,000	4,000
Total Existing Supply	6,400	6,400	6,400	6,500	6,500
Difference (supply minus demand)	(200)	(400)	(600)	(700)	(900)
Difference as Percent of Supply	(3)	(6)	(9)	(11)	(14)
Difference as Percent of Demand	(3)	(6)	(9)	(10)	(12)
Planned Water Supplies					
Groundwater Banking	200	400	600	700	900
Anticipated New Supplies (Developer Fee)	-	-	-	-	-
Recycled Water	-	-	-	-	-
Total Planned Supply	200	400	600	700	900
Total Existing and Planned Supplies	6,600	6,800	7,000	7,200	7,400
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

Study Area	**2016**	**2017**	**2018**	**2019**	**2020(1)**
Demand	100,800	103,200	105,700	108,200	103,900
Existing Water Supplies					
Groundwater	25,700	25,700	25,700	25,700	25,700
Imported water	39,500	39,500	39,500	39,600	39,600
Total Existing Supply	65,200	65,200	65,200	65,300	65,300
Difference (supply minus demand)	(35,600)	(38,000)	(40,500)	(42,900)	(38,600)
Difference as Percent of Supply	(55)	(58)	(62)	(66)	(59)
Difference as Percent of Demand	(35)	(37)	(38)	(40)	(37)
Planned Water Supplies					
Groundwater Banking	28,000	29,700	31,400	33,100	28,000
Anticipated New Supplies (Developer Fee)	1,600	1,800	2,000	2,200	2,400
Recycled Water	6,000	6,500	7,100	7,600	8,200
Total Planned Supply	35,600	38,000	40,500	42,900	38,600
Total Existing and Planned Supplies	100,800	103,200	105,700	108,200	103,900
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

TABLE 7-5: MULTI-DRY WATER YEAR ASSESSMENT 2021-2025

District No. 40	**2021**	**2022**	**2023**	**2024**	**2025**
Demand					
Existing Demand	53,000	53,000	53,000	53,000	53,000
Committed Demand	20,600	20,600	20,600	20,600	20,600
Projected Demand	25,200	27,500	29,800	32,100	34,400
Total Demand	98,800	101,100	103,400	105,700	108,000
Existing Water Supplies					
Groundwater	23,200	23,200	23,200	23,200	23,200
Imported water	35,600	35,600	35,600	36,700	36,700
Total Existing Supply	58,800	58,800	58,800	59,900	59,900
Difference (supply minus demand)	(40,000)	(42,300)	(44,600)	(45,800)	(48,100)
Difference as Percent of Supply	(68)	(72)	(76)	(76)	(80)
Difference as Percent of Demand	(40)	(42)	(43)	(43)	(45)
Planned Water Supplies					
Groundwater Banking	27,900	28,600	29,300	28,800	29,500
Anticipated New Supplies (Developer Fee)	3,400	4,500	5,500	6,700	7,700
Recycled Water	8,700	9,200	9,800	10,300	10,900
Total Planned Supply	40,000	42,300	44,600	45,800	48,100
Total Existing and Planned Supplies	98,800	101,100	103,400	105,700	108,000
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

QHWD	**2021**	**2022**	**2023**	**2024**	**2025**
Demand	7,600	7,800	8,000	8,100	8,300
Existing Water Supplies					
Groundwater	2,500	2,500	2,500	2,500	2,500
Imported water	4,000	4,000	4,000	4,000	4,000
Total Existing Supply	6,500	6,500	6,500	6,500	6,500
Difference (supply minus demand)	(1,100)	(1,300)	(1,500)	(1,600)	(1,800)
Difference as Percent of Supply	(17)	(20)	(23)	(25)	(28)
Difference as Percent of Demand	(14)	(17)	(19)	(20)	(22)
Planned Water Supplies					
Groundwater Banking	1,100	1,300	1,500	1,600	1,800
Anticipated New Supplies (Developer Fee)	-	-	-	-	-
Recycled Water	-	-	-	-	-
Total Planned Supply	1,100	1,300	1,500	1,600	1,800
Total Existing and Planned Supplies	7,600	7,800	8,000	8,100	8,300
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

Study Area	**2021**	**2022**	**2023**	**2024**	**2025**
Demand	106,400	108,900	111,400	113,800	116,300
Existing Water Supplies					
Groundwater	25,700	25,700	25,700	25,700	25,700
Imported water	39,600	39,600	39,600	40,700	40,700
Total Existing Supply	65,300	65,300	65,300	66,400	66,400
Difference (supply minus demand)	(41,100)	(43,600)	(46,100)	(47,400)	(49,900)
Difference as Percent of Supply	(63)	(67)	(71)	(71)	(75)
Difference as Percent of Demand	(39)	(40)	(41)	(42)	(43)
Planned Water Supplies					
Groundwater Banking	29,000	29,900	30,800	30,400	31,300
Anticipated New Supplies (Developer Fee)	3,400	4,500	5,500	6,700	7,700
Recycled Water	8,700	9,200	9,800	10,300	10,900
Total Planned Supply	41,100	43,600	46,100	47,400	49,900
Total Existing and Planned Supplies	106,400	108,900	111,400	113,800	116,300
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

TABLE 7-6: MULTI-DRY WATER YEAR ASSESSMENT 2026-2030

District No. 40	**2026**	**2027**	**2028**	**2029**	**2030**
Demand					
Existing Demand	53,000	53,000	53,000	53,000	53,000
Committed Demand	20,600	20,600	20,600	20,600	20,600
Projected Demand	36,600	38,900	41,200	43,500	45,800
Total Demand	110,200	112,500	114,800	117,100	119,400
Existing Water Supplies					
Groundwater	23,200	23,200	23,200	23,200	23,200
Imported water	36,700	36,700	36,700	36,700	36,700
Total Existing Supply	59,900	59,900	59,900	59,900	59,900
Difference (supply minus demand)	(50,300)	(52,600)	(54,900)	(57,200)	(59,500)
Difference as Percent of Supply	(84)	(88)	(92)	(95)	(99)
Difference as Percent of Demand	(46)	(47)	(48)	(49)	(50)
Planned Water Supplies					
Groundwater Banking	30,100	30,800	31,500	32,200	32,900
Anticipated New Supplies (Developer Fee)	8,800	9,800	10,900	11,900	13,000
Recycled Water	11,400	12,000	12,500	13,100	13,600
Total Planned Supply	50,300	52,600	54,900	57,200	59,500
Total Existing and Planned Supplies	110,200	112,500	114,800	117,100	119,400
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

QHWD	**2026**	**2027**	**2028**	**2029**	**2030**
Demand	8,500	8,700	8,900	9,000	9,300
Existing Water Supplies					
Groundwater	2,500	2,500	2,500	2,500	2,500
Imported water	4,000	4,100	4,100	4,100	4,100
Total Existing Supply	6,500	6,600	6,600	6,600	6,600
Difference (supply minus demand)	(2,000)	(2,100)	(2,300)	(2,400)	(2,700)
Difference as Percent of Supply	(31)	(32)	(35)	(36)	(41)
Difference as Percent of Demand	(24)	(24)	(26)	(27)	(29)
Planned Water Supplies					
Groundwater Banking	2,000	2,100	2,300	2,400	2,400
Anticipated New Supplies (Developer Fee)			-	-	-
Recycled Water	-	-	-	-	300
Total Planned Supply	2,000	2,100	2,300	2,400	2,700
Total Existing and Planned Supplies	8,500	8,700	8,900	9,000	9,300
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

Study Area	**2026**	**2027**	**2028**	**2029**	**2030**
Demand	118,700	121,200	123,700	126,100	128,700
Existing Water Supplies					
Groundwater	25,700	25,700	25,700	25,700	25,700
Imported water	40,700	40,800	40,800	40,800	40,800
Total Existing Supply	66,400	66,500	66,500	66,500	66,500
Difference (supply minus demand)	(52,300)	(54,700)	(57,200)	(59,600)	(62,200)
Difference as Percent of Supply	(79)	(82)	(86)	(90)	(94)
Difference as Percent of Demand	(44)	(45)	(46)	(47)	(48)
Planned Water Supplies					
Groundwater Banking	32,100	32,900	33,800	34,600	35,300
Anticipated New Supplies (Developer Fee)	8,800	9,800	10,900	11,900	13,000
Recycled Water	11,400	12,000	12,500	13,100	13,900
Total Planned Supply	52,300	54,700	57,200	59,600	62,200
Total Existing and Planned Supplies	118,700	121,200	123,700	126,100	128,700
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

TABLE 7-7: MULTI-DRY WATER YEAR ASSESSMENT 2031-2035

District No. 40	**2031**	**2032**	**2033**	**2034**	**2035**
Demand					
Existing Demand	53,000	53,000	53,000	53,000	53,000
Committed Demand	20,600	20,600	20,600	20,600	20,600
Projected Demand	48,100	50,400	52,700	55,000	57,200
Total Demand	121,700	124,000	126,300	128,600	130,800
Existing Water Supplies					
Groundwater	23,200	23,200	23,200	23,200	23,200
Imported water	36,700	36,700	36,700	36,700	36,700
Total Existing Supply	59,900	59,900	59,900	59,900	59,900
Difference (supply minus demand)	(61,800)	(64,100)	(66,400)	(68,700)	(70,900)
Difference as Percent of Supply	(103)	(107)	(111)	(115)	(118)
Difference as Percent of Demand	(51)	(52)	(53)	(53)	(54)
Planned Water Supplies					
Groundwater Banking	33,600	34,400	35,000	35,800	36,300
Anticipated New Supplies (Developer Fee)	14,000	15,000	16,100	17,100	18,200
Recycled Water	14,200	14,700	15,300	15,800	16,400
Total Planned Supply	61,800	64,100	66,400	68,700	70,900
Total Existing and Planned Supplies	121,700	124,000	126,300	128,600	130,800
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

QHWD	**2031**	**2032**	**2033**	**2034**	**2035**
Demand	9,500	9,700	9,800	10,000	10,300
Existing Water Supplies					
Groundwater	2,500	2,500	2,500	2,500	2,500
Imported water	4,100	4,100	4,100	4,100	4,100
Total Existing Supply	6,600	6,600	6,600	6,600	6,600
Difference (supply minus demand)	(2,900)	(3,100)	(3,200)	(3,400)	(3,700)
Difference as Percent of Supply	(44)	(47)	(48)	(52)	(56)
Difference as Percent of Demand	(31)	(32)	(33)	(34)	(36)
Planned Water Supplies					
Groundwater Banking	2,500	2,300	2,300	2,400	2,600
Anticipated New Supplies (Developer Fee)	100	200	300	400	500
Recycled Water	300	600	600	600	600
Total Planned Supply	2,900	3,100	3,200	3,400	3,700
Total Existing and Planned Supplies	9,500	9,700	9,800	10,000	10,300
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

Study Area	**2031**	**2032**	**2033**	**2034**	**2035**
Demand	131,200	133,700	136,100	138,600	141,100
Existing Water Supplies					
Groundwater	25,700	25,700	25,700	25,700	25,700
Imported water	40,800	40,800	40,800	40,800	40,800
Total Existing Supply	66,500	66,500	66,500	66,500	66,500
Difference (supply minus demand)	(64,700)	(67,200)	(69,600)	(72,100)	(74,600)
Difference as Percent of Supply	(97)	(101)	(105)	(108)	(112)
Difference as Percent of Demand	(49)	(50)	(51)	(52)	(53)
Planned Water Supplies					
Groundwater Banking	36,100	36,700	37,300	38,200	38,900
Anticipated New Supplies (Developer Fee)	14,100	15,200	16,400	17,500	18,700
Recycled Water	14,500	15,300	15,900	16,400	17,000
Total Planned Supply	64,700	67,200	69,600	72,100	74,600
Total Existing and Planned Supplies	131,200	133,700	136,100	138,600	141,100
Difference (supply minus demand)	0	0	0	0	0
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

Section 8

Per Capita Water Use Targets

Section 8: Per Capita Water Use Targets

8.1 Per Capita Water Use Target for SB X7-7 Reduction

The SB X7-7 is a legislative mandate that requires the State to achieve a 20 percent reduction in urban per capita water use in California by December 31, 2020, with an interim target of 10 percent reduction by December 31, 2015. The legislation requires every urban water purveyor to develop: 1) baseline daily per capita water use; 2) urban water use target; 3) interim urban water use target; and 4) compliance daily per capita water use.

8.1.1 Base Period Ranges

Tables 8-1 and 8-2 provide the base period ranges used to calculate base daily capita water use for each of the water purveyors. Each water purveyor identified their demand reduction targets for years 2015 and 2020 by utilizing DWR's Methodology 1. Methodology 1 is based on calculating 80 percent of the water purveyor's baseline per capita water use (i.e., a 20 percent reduction).

8.1.1.1 District No. 40

TABLE 8-1: DISTRICT NO. 40 BASE PERIOD RANGES (AF)

Base	Parameter	Value	Units
10 to 15-year base period	2008 total water deliveries	52,000	AF
	2008 total volume of delivered recycled water	0	AF
	2008 recycled water as a percent of total deliveries	0	percent
	Number of years in base period[1]	10	years
	Year beginning base period range	1995	
	Year ending base period range[2]	2004	

Note:

[1] If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first year base period is a continuous 10- to 15-year period.

[2] The ending year must be between December 31, 2004 and December 31, 2010.

8.1.1.2 QHWD

TABLE 8-2: QHWD BASE PERIOD RANGES (AF)

Base	Parameter	Value	Units
10 to 15-year base period	2008 total water deliveries	6,498	AF
	2008 total volume of delivered recycled water	0	AF
	2008 recycled water as a percent of total deliveries	0	percent
	Number of years in base period[1]	10	years
	Year beginning base period range	1995	
	Year ending base period range[2]	2004	

Note:

[1] If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first year base period is a continuous 10- to 15-year period.

[2] The ending year must be between December 31, 2004 and December 31, 2010.

8.1.2 Base Daily Per Capita Water Use

Tables 8-3 through 8-6 provide the base daily capita water use for a 10-year range and 5-year range for each of the water purveyors. The calculation is used to determine whether the water supplier's 2015 and 2020 per capita water use targets meet the legislation's minimum water use reductions. The target has to be either 80 percent of the 10-year baseline (ending no earlier than December 31, 2004, and no later than December 31, 2010) or 95 percent of the 5-year baseline (ending no earlier than December 31, 2007, and no later than December 31, 2010), whichever is more conservative. Each water purveyor already meets the proposed 20 percent reduction by 2020 based on their selected baseline periods. Water conservation methods will still be practiced as discussed in Section 5.

8.1.2.1 District No. 40

District No. 40 used Methodology 1 (10-year base period) to determine the urban water use target baseline of 353 gpcd. The urban water use 2020 target (20 percent reduction) is 282 gpcd. The interim (10 percent reduction) urban water use for the 2015 target is 318 gpcd. The annual average water use in 2009 was 262 gpcd, thus currently meeting the 2015 and 2020 target.

TABLE 8-3: DISTRICT NO. 40 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	Calendar Year			
1	1995	117,947	37	314
2	1996	118,633	41	349
3	1997	119,109	43	358
4	1998	120,188	38	314
5	1999	123,735	44	355
6	2000	126,566	47	372
7	2001	129,372	49	377
8	2002	132,830	49	367
9	2003	137,003	51	375
10	2004	141,775	49	347
			Base Daily Capita Water Use[1]	**353**
			80% of Baseline	**282**

Note:
[1]Add values in the column and divide by the number of rows.
*Most recent year in base period must end no earlier than December 31, 2004, and no later than December 31, 2010.

TABLE 8-4: DISTRICT NO. 40 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	Calendar Year			
1	2003	137,003	48.46	354
2	2004	141,775	51.39	363
3	2005	148,634	49.17	331
4	2006	163,665	52.85	323
5	2007	168,518	53.25	316
			Base Daily Capita Water Use[1]	337
			95% of Baseline	320

Note:
[1]Add values in the column and divide by the number of rows.
*Most recent year in base period must end no earlier than December 31, 2007, and no later than December 31, 2010.

8.1.2.2 QHWD

QHWD used Methodology 1 (10-year base period) to determine the urban water use target baseline of 373 gpcd. The urban water use 2020 target (20 percent reduction) is 298 gpcd. The interim (10 percent reduction) urban water use for the 2015 target is 336 gpcd.

TABLE 8-5: QHWD 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	Calendar Year			
1	1995	10,250	4	391
2	1996	10,250	4	394
3	1997	10,500	4.3	413
4	1998	10,600	4.4	417
5	1999	10,600	4.4	412
6	2000	11,000	4.3	387
7	2001	12,000	4.3	362
8	2002	15,000	4.8	323
9	2003	15,000	4.7	313
10	2004	15,500	4.9	314
Base Daily Capita Water Use[1]				**373**
80% of Baseline				**298**

Note:

[1]Add values in the column and divide by the number of rows.

*Most recent year in base period must end no earlier than December 31, 2004, and no later than December 31, 2010.

TABLE 8-6: QHWD 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	Calendar year			
1	2003	15,000	4.7	313
2	2004	15,000	4.9	324
3	2005	15,500	4.8	311
4	2006	15,500	5.1	319
5	2007	16,000	5.9	369
Base Daily Capita Water Use[1]				327
95% of Baseline				311

Note:

[1]Add values in the column and divide by the number of rows.

*Most recent year in base period must end no earlier than December 31, 2007, and no later than December 31, 2010.

Section 9

Water Use Projections for Low Income Housing

Section 9: Water Use Projections for Low Income Housing

9.1 Low Income Housing

Section 10631.1 of the California Water Code requires 2010 UWMPs to include the projected water use for lower income single-family and multi-family residential households as identified in the housing element of any city, county, or city and county in the service area of the water purveyor. Lower income is established by the State as 80 percent of the area median income.

The projections are meant to assist water purveyors in complying with the requirements of the Government Code Section 65589.7, which requires water purveyors to "grant a priority for the provision of water and sewer services to proposed developments that include housing units affordable to lower income households".

Table 9-1 shows the estimated low income projected water demands for the Study Area. The low income water demand projections were based on 36 percent of demand for the Study Area. Housing Needs Assessment Populations and Household Income Maps from both the Cities of Lancaster and Palmdale were utilized to identify the projected low income housing units for the Study Area.

TABLE 9-1: LOW INCOME PROJECTED WATER DEMANDS (AF)

Low Income Water Demands	2015	2020	2025	2030	2035
District No. 40 service area	26,800	31,900	36,900	41,900	47,100
QHWD service area	2,200	2,500	2,900	3,200	3,700
Study Area Total	29,000	34,400	39,800	45,100	50,800

Note: All numbers are rounded to the nearest 100 AF.

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Section 10

Water Shortage Contingency Analysis

Section 10: Water Shortage Contingency Analysis

This water shortage contingency analysis is based on water shortages that arise not only from drought, but shortages resulting from earthquakes, fires, system failures, and water quality contamination as well. Recent drought-related water management experiences for water agencies in California have revealed the complexity of coping with a water supply shortage. These experiences are well-documented and ready for implementation in the future by most agencies. Various water shortage scenarios may require similar drought-related actions, but may involve different complications that must be taken into account to address the shortage.

10.1 Minimum Water Supply

As such, each water purveyor's three-year minimum water supply is provided in Table 10-1. The average normal water year was set as 2010. Three-year minimum supply was determined to occur for the base years 2011, 2012 and 2013. As shown, each water purveyor currently has a sufficient water supply portfolio to meet their current demands over the next 3 years given a worst case water supply scenario. Because the SWP allocation has already been set at 80 percent of Table A amounts for 2011, the water purveyors will be able to use their respective surplus supplies to help meet the demands in 2012 and 2013 even if the SWP allocations were 35 percent and 7 percent, respectively, of Table A amounts.

TABLE 10-1: THREE-YEAR MINIMUM WATER SUPPLY (AF)

Area	Source	2011	2012	2013	Normal(c)
District No. 40	Groundwater	23,200	23,200	23,200	7,600
	Imported Water(a)	*35,600	35,600	7,100	39,200
	Carry Over/ Banked Water (b)	0	0	29,900	0
	Recycled Water	0	0	0	0
	Total	**58,800**	**58,800**	**60,200**	**46,800**
QHWD	Groundwater	2,500	2,500	2,500	1,900
	Imported Water(a)	*4000	4,000	800	3,500
	Carry Over/ Banked Water (b)	0	0	5,000	0
	Recycled Water	0	0	0	0
	Total	**6,500**	**6,500**	**8,300**	**5,400**
Study Area	Groundwater	25,700	25,700	25,700	9,500
	Imported Water(a)	39,600	39,600	7,900	42,700
	Carry Over/ Banked Water (b)	0	0	34,900	0
	Recycled Water	0	0	0	0
	Total	**65,300**	**65,300**	**68,500**	**52,200**

Notes: All numbers are rounded to the nearest 100 AF.
(a) A 35-35-7 percent delivery reliability was assumed for the SWP as determined for a three-year dry period (worst case water supply scenario).
(b) Carryover/banked water supply available as a result of unused allocation of 2011 imported water supply and banking efforts.
(c) 2010 actuals were used for the normal base year.
* Due to an 80 percent allocation of Table A imported supplies in 2011, excess available water will either be banked or stored as carryover in San Luis Reservoir.

10.2 Coordinated Planning

Coordination among the Antelope Valley water purveyors is essential when planning for a loss of supply. This is especially true since the Antelope Valley water purveyors share the same water sources and will be equally affected when a loss occurs. It is also essential for planning to be coordinated with AVEK, the wholesale water supplier, since AVEK will need to take similar actions for each water purveyor in the time of need.

10.3 Drought Conditions

Being located within an arid region of Southern California, the Antelope Valley is highly susceptible to drought conditions. Thus it is important for the water purveyors to have a plan in place to ease the impacts to the water supply during times of drought. The DMMs discussed in Section 5 will play an essential role in limiting water use during drought times, but further measures are often incorporated in a Water Shortage Contingency Plan (WSCP).

10.4 Earthquakes or Other Natural Disaster

The Antelope Valley is located in an earthquake zone. In the event of an earthquake or natural disaster, the Antelope Valley has the potential of losing its SWP supply. According to the California Division of Mines and Geology, a displacement along the San Andreas Fault could rupture the two aqueduct systems importing water to Southern California, resulting in a potential delay of three to six weeks in SWP water delivery. Additional delays may occur due to damage to pumping facilities. DWR estimates a four month delay if a major break should occur.

If such a delay occurs, each water purveyor could maximize its groundwater production and utilize its emergency storage to meet water demands until the aqueduct was repaired. In the event of a prolonged absence of SWP water, the water purveyors could implement their established “No Waste” Ordinances and WSCP Stages to substantially reduce demands until SWP supply is restored.

10.4.1 SWP Emergency Outage Scenarios

Following is a discussion of three possible scenarios for an outage of SWP water due to earthquake, power outage, or other event. In past years, slippage of side panels, flood events, and subsidence repairs were handled by DWR without interruption in delivery. This is mainly due to a key design feature of the aqueduct which allows isolation of various sections. Thus DWR can repair the damaged section without interrupting operation of another. However, three potential scenarios that would result in a loss of delivery to the Study Area are described below. They include a levee breach near the Sacramento-San Joaquin Delta, loss of the San Joaquin Valley transverse due to flood or earthquake, and loss of the East Branch due to earthquake. The water purveyors’ ability to meet demands during the worst of these scenarios is also presented.

10.4.1.1 Levee Breach near Banks Pumping Plant

The Delta plays an essential role in the SWP operation. Water from the Delta is diverted to the SWP’s main pumping facility, the Banks Pumping Plant located in the southern Delta, into the California Aqueduct. If a major levee breach were to occur near this facility, the freshwater in the Delta may become displaced with saltwater rushing in from the San Francisco Bay. Pumping from the Delta would cease until the water quality was restored. Depending on the time of the breach, the necessary fresh water inflows required to restore the Delta may not be available.

Historically levee breaks, such as the Jones Tract break, may take several months to completely restore. Assuming that the Banks Pumping Plant was down for six months, DWR could utilize water stored in the San Luis Reservoir to continue delivery of some SWP water to

Southern California. However, availability of supply will vary depending on the time of the breach. An occurrence in late summer early fall, would result in minimal delivery due to the typically low levels in San Luis Reservoir during this period. In addition to supply from San Luis Reservoir, the water purveyors could utilize storage from their facilities and maximize groundwater until the Delta is restored. The water purveyors could also utilize any water previously stored in groundwater banks.

10.4.1.2 Complete Disruption of the California Aqueduct in the San Joaquin Valley

As demonstrated by the past flood event at Arroyo Pasajero, which resulted in the temporary loss of the Edmund G Pat Brown portion of the California Aqueduct, the SWP facilities are vulnerable to flood. If a similar incident were to occur due to flood or earthquake, loss of deliveries from the San Luis Reservoir could result. DWR anticipates an outage of up to four months should a loss in this portion of the California Aqueduct occur. If delivery were prevented from the San Luis Reservoir, the water purveyors could receive water through the Domestic-Agricultural Water Network (DAWN) Project facilities and maximize groundwater until the supply is restored. The bulk of the water imported by AVEK is treated and distributed to customers throughout its service area through DAWN Project facilities. Additionally, the water purveyors could utilize any water previously banked.

10.4.1.3 Complete Disruption of the East Branch of the California Aqueduct

The East Branch of the California Aqueduct begins at a bifurcation of the aqueduct south of the Edmonston Pumping Plant. The East Branch conveys water through the Alamo Power Plant to the Pearblossom Pumping Plant, which pumps the water 540 feet uphill. The water is then conveyed in an open channel into the Mojave Siphon Power Plant and into Lake Silverwood. When needed, water is discharged to the Devil's Canyon Power Plant and its two afterbays. The Santa Ana Pipeline then conveys the water 28 miles underground to the California Aqueduct's terminus at Lake Perris.

If a portion of the East Branch were damaged due to a major earthquake, deliveries to the water purveyors could be interrupted depending on the location of the break. It is assumed that a single-location break occurred north of the Pearblossom Pumping Plant and prevented delivery of water stored in the DAWN Project facilities. The water purveyors could maximize groundwater and utilize water stored in groundwater banks until SWP delivery resumed.

Of the three scenarios, the disruption of the East Branch of the California Aqueduct would result in the worst-case scenario for the water purveyors of the Antelope Valley since it would prevent any delivery of SWP. In this case, the water purveyors would rely on local groundwater and water stored in groundwater banks. An assessment of water supply and demand for a six-month SWP interruption are presented in Table 10-2. Water supplies are assumed to be one half of the volumes available in a single dry year with the exception of recycled water.

Table 10-2 shows that with predicted adjudication groundwater pumping and utilization of banked water within the Antelope Valley, an additional 45 percent water conservation is estimated to meet projected demands in the Study Area. According to Table 10-2, District No. 40 would have to implement Phase 8 of their Phased Water Conservation Plan (PWCP) described in Section 10.7.1. QHWD would have to implement Phase 4 of their WSCP described in Section 10.7.2.

TABLE 10-2: PROJECTED SUPPLIES AND DEMAND DURING A SIX-MONTH DISRUPTION IN IMPORTED SUPPLY

	2015	2020	2025	2030	2035
Study Area Existing Supply					
Groundwater	12,900	12,900	12,900	12,900	12,900
Imported Water	4,600	5,100	5,700	6,300	6,300
Total Existing Supply	17,500	18,000	18,600	19,200	19,200
Study Area Planned Supply					
Groundwater Banking/New Supply	29,100	29,900	34,100	38,300	42,900
Recycled Water	5,400	8,200	10,900	13,900	16,900
Total Planned Supply	34,500	38,100	45,000	52,200	59,800
Total Existing and Planned Supply	**52,000**	**56,100**	**63,600**	**71,400**	**79,000**
Study Area Demand	**97,900**	**103,500**	**116,000**	**128,400**	**141,000**
Additional Conservation Required	45,900	47,400	52,400	57,000	62,000
Additional Conservation as a Percent of Demand	0.47	0.46	0.45	0.44	0.44

10.5 Power Outages

In the event of a power outage, the water purveyors would follow their established Emergency Response Procedures (ERPs). ERPs for a power outage include ensuring back-up power supply for all water supply facilities to continue supplying water to customers, communicating with the power company, activating emergency connections with adjacent water systems, continuing water quality monitoring, and issuing boil water advisories as necessary.

10.6 Contamination

Contamination of water supply can result from a number of different events including, a reduction in water supply, water main break, cross-connection condition, water source pollution or covert action. Water supplies for the Study Area are generally of good quality and no foreseeable permanent contamination issues are anticipated. In the event of a toxic spill or major contamination, the water purveyors would follow their ERPs to isolate the problem and reduce the impact to the water supply. Once the problem has been isolated, the contamination would be cleaned up using the outlined chlorination or other necessary procedures and the water supply returned to service as soon as possible. In the meantime, emergency storage or alternative supply would be used to meet demand. Implementation of additional DMMs could also be utilized if the outage is anticipated to be of longer consequence.

10.7 Stages of Action

Each water purveyor has adopted individual WSCPs for their service area. The stages of action for each water purveyor are described in more detail below and copies are provided in Appendix F.

10.7.1 District No. 40

District No. 40 has implemented a PWCP comprised of nine stages or "Phases" that call for the reduction in water use in order to meet a conservation target. Table 10-3 summarizes the shortage stages and conditions. Implementation of a Phase requires determination of a shortage from the County of Los Angeles Board of Supervisors (Board of Supervisors). Water shortages could result from reduced availability of AVEK water, main breaks, natural disasters, or earthquakes. Once a shortage is determined, a public hearing is held to determine which Phase should be implemented.

TABLE 10-3: DISTRICT NO. 40 STAGES OF ACTION

Phase	1	2	3	4	5	6	7	8	9
Anticipated Shortage that Triggers Phase	10%	15%	20%	25%	30%	35%	40%	45%	50%
Conservation Target	90%	85%	80%	75%	70%	65%	60%	55%	50%
Type of Rationing	Voluntary	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory

In addition to the PWCP, District No. 40 has recently developed an internal WSCP. The WSCP, in contrast to the PWCP, does not specifically state the measures that will take effect in a given stage. Instead, it will assist District No. 40 in the decision making process and identify the necessary actions to be taken prior to a recommendation to the Board of Supervisors.

10.7.1.1 Prohibitions, Consumption Reduction Methods and Penalties

An urgency ordinance amending Title 11 – Health and Safety of the Los Angeles County Code, relating to water conservation requirements for the Unincorporated Los Angeles Area took effect on October 7, 2008. The ordinance prohibits hose watering paved area, landscape watering between 10 am to 5 pm or causing runoff, usage of decorative fountains, washing vehicles at a non-commercial carwash and providing drinking water without customers' request, etc. The entire ordinance can be found at the following link:

http://dpw.lacounty.gov/wwd/web/docs/Water%20Wasting%20Ordinance%20final.pdf.

However, District No. 40's PWCP and WSCP incorporate prohibitions similar to those normally outlined in such an ordinance. Table 10-4 through 10-6 provides a summary of the mandatory prohibitions, consumption reduction methods and the stages in which they would take effect.

TABLE 10-4: MANDATORY PROHIBITIONS

Prohibition	Stage When Prohibition Becomes Mandatory
Repair all leaks	Always required
No runoff from lawns	Always required
Restaurants serve water to customers upon request only	Always required
Landscape watering between 10 a.m. and 5 p.m.	Always required
No construction meters will be issued	3
No new permanent meters will be installed	7

TABLE 10-5: DISTRICT NO. 40 CONSUMPTION REDUCTION METHODS

Consumption Reduction Methods	Stages Method Takes Effect
Demand reduction program	All stages
Restrict building permits	3,4,5,6,7,8,9
Use prohibitions	All stages
Water shortage pricing	All stages
Voluntary rationing	1
Mandatory rationing	2,3,4,5,6,7,8,9
Education program	All stages
Percentage reduction by customer type	All stages

TABLE 10-6: CONSUMPTION REDUCTION METHODS

Consumption Reduction Methods	Stage When Method Takes Effect	Projected Reduction (%)
Voluntary rationing	1	2.5%
Demand reduction program	All stages	2.5%
Restrict building permits	3	5%-10%
Use prohibitions	All stages	5%-10%
Water shortage pricing	All stages	2.5%
Mandatory rationing	2	5%-10%
Percentage reduction by customer type	All stages	2.5%

Penalties imposed for the various stages are as described in the PWCP. The conservation target is a percentage of the quantity used during a “base” billing period set by the Board of Supervisors. Water use up to the target quantities shall be billed at the established quantity charge or normal charge. Water use in excess of aforementioned target quantities shall be subject to the following conservation surcharges in addition to the established quantity charge or normal charge:

1. For all customers within Los Angeles County Waterworks Districts, an additional conservation surcharge of 1.0 times the established quantity charge or normal charge will be assessed for water use in excess of the target quantity, up to 115 percent of the target quantity.

2. For all customers within Los Angeles County Waterworks Districts, an additional conservation surcharge of 2.0 times the established quantity charge or normal charge will be assessed for water use in excess of 115 percent of the target quantity.

3. If the cost of purchased water obtained from the water wholesalers that sell water to the Los Angeles County Waterworks Districts increases beyond the amounts that can be offset and collected through the rates set in 1 and 2 of the provision, then the District Engineer is hereby authorized to revise the rates set in 1 and 2 of this provision in amounts necessary to offset the cost to purchase water.

10.7.1.2 Revenue and Expenditure Impacts

The implementation of the PWCP could potentially result in revenue losses ranging between 10 and 50 percent. There are four sources of funding availability to District No. 40 to cover these losses: service charge, facility surcharge, water quantity charge, and standby charges. The service charge is a fixed connection charge based on the size of the meter. The facility surcharge and water quantity charge are based on the actual quantity of water used each month. Standby charges are assessed on all properties. Thus a reduction in water use will only affect the facility surcharge and water quantity charges. In order to reduce the impact of these losses, District No. 40 can utilize the following measures: use extra revenues contributed by the conservation surcharge, delay capital improvement projects, and increase water rates.

10.7.1.3 Reduction Measuring Mechanism

In order to monitor the reduction in water use during a water shortage stage, supply and demand data is reported on a monthly basis with excess use violations reported to the County of Los Angeles Waterworks Districts and to the customer. Bi-monthly water meter readings are collected and compiled to determine if the water usage meets the target goal.

10.7.2 QHWD

QHWD adopted a four stage WSCP which is summarized in Table 10-7. The stages were designed to provide a minimum of 50 percent of normal supply during a water shortage event. Table 10-8 provides a description of the triggers for the rationing stages.

TABLE 10-7: QHWD STAGES OF ACTION

Phase	1	2	3	4
Anticipated Shortage that Triggers Phase	Up to 15%	15 to 25%	25 to 35%	35 to 50%
Conservation Target	85%	75%	65%	50%
Type of Rationing	Voluntary	Mandatory	Mandatory	Mandatory

TABLE 10-8: QHWD TRIGGERING MECHANISMS

Phase	1	2	3	4
Current Supply	85 to 90% of normal supply	75 to 85% of normal supply	65 to 75% of normal supply	Less than 65% of normal supply
Future Supply	Insufficient supply to provide 80% for next two years	Insufficient supply to provide 75% for next two years	Insufficient supply to provide 65% for next two years	Insufficient supply to provide 50% for next two years
Groundwater	No excess groundwater pumped	First year excess groundwater pumped	Second year excess groundwater pumped	No excess groundwater available
Water Quality	Loss of 10% from contamination	Loss of 20% from contamination	Loss of 30% from contamination	
Disaster Loss				Disaster Loss

10.7.2.1 Prohibitions, Consumption Reduction Methods and Penalties

The "No Waste" Ordinance adopted by QHWD outlines the mandatory prohibition on water wasting and describes the excessive use penalties enforced by QHWD. A copy of the ordinance is provided in Appendix F. Table 10-9 provides a summary of the consumption methods and the stages in which they take effect.

TABLE 10-9: QHWD CONSUMPTION REDUCTION METHODS

Consumption Reduction Methods	Stages Method Takes Effect
Demand reduction program	All stages
Flow restriction	4
Restrict building permits	2, 3, 4
Use prohibitions	All stages
Water shortage pricing	All stages
Voluntary rationing	1
Mandatory rationing	2, 3, 4
Education program	All stages
Percentage reduction by customer type	2, 3, 4

10.7.2.2 Revenue and Expenditure Impacts

QHWD uses all surplus revenues collected during the stages to fund a Rate Stabilization Fund, conservation, recycling, and capital improvements. The fund will be maintained at 75 percent of the normal water revenue and will be used to stabilize rates during periods of water shortage or disaster to minimize the need to adjust rates during the shortage. However, during prolonged shortages, rates may need to be increased. QHWD estimates the following percent increases for the given phases:

Stage 1: No increase
Stage 2: 25 percent increase
Stage 3: 50 percent increase
Stage 4: 100 percent increase

After a shortage ends, rates will be increased by 15 percent of the pre-shortage rate for one year.

10.7.2.3 Reduction Measuring Mechanism

In order to monitor the reduction in water use during a water shortage stage, daily production figures are recorded. During Stage 1 and 2, weekly production will be compared to the target weekly production. These weekly reports will be forwarded to the General Manager and Water Shortage Response Team. If goals are not met, QHWD Board of Directors is notified so corrective action can be taken. During Stage 3 and 4, the procedures are the same with the General Manager receiving the daily reports as well as the weekly reports.

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