Since 1918

PALMDALE WATER DISTRICT

2029 East Avenue Q • Palmdale, California 93550 • Telephone (661) 947-4111
Fax (661) 947-8604
www.palmdalewater.org
Facebook: palmdalewaterdistrict
Twitter: @palmdaleH20

May 26, 2016

Agenda for a Special Meeting of the Board of Directors of the Palmdale Water District to be held at the District's office at 2029 East Avenue Q, Palmdale

Wednesday, June 1, 2016

7:00 p.m.

NOTES: To comply with the Americans with Disabilities Act, to participate in any Board meeting please contact Dawn Deans at 661-947-4111 x1003 at least 48 hours prior to a Board meeting to inform us of your needs and to determine if accommodation is feasible.

Additionally, a Spanish interpreter will be made available to assist the public in making comments during the meeting if requested at least 48 hours before the meeting. This was authorized by Board action on May 11, 2016 as a temporary measure while a long-term policy is developed.

Adicionalmente, un intérprete en español estará disponible para ayudar al público a hacer comentarios durante la reunión, siempre y cuando se solicite con 48 horas de anticipación de la junta directiva. Esto fué autorizado por la mesa directiva en la junta del 11 de mayo del 2016 como una medida temporal mientras se desarrolla una poliza a largo plazo.

Agenda item materials, as well as materials related to agenda items submitted after distribution of the agenda packets, are available for public review at the District's office located at 2029 East Avenue Q, Palmdale (Government Code Section 54957.5). Please call Dawn Deans at 661-947-4111 x1003 for public review of materials.

PUBLIC COMMENT GUIDELINES: **The prescribed time limit per speaker is three-minutes. Please refrain from public displays or outbursts such as unsolicited applause, comments, or cheering. Any disruptive activities that substantially interfere with the ability of the District to carry out its meeting will not be permitted and offenders will be requested to leave the meeting. (PWD Rules and Regulations, Appendix DD, Sec. IV.A.)**

Each item on the agenda shall be deemed to include any appropriate motion, resolution, or ordinance to take action on any item.

1) Roll Call.
2) Adoption of Agenda.
3) Public comments for non-agenda items.

4) Action Items - Action Calendar (The public shall have an opportunity to comment on any action item as each item is considered by the Board of Directors prior to action being taken.)

   4.1) Public Hearing regarding 2015 Urban Water Management Plan and Water Shortage Contingency Plan. (Deputy Water & Energy Resources Director Thompson II/Kennedy/Jenks Consultants)

   4.2) Consideration and possible action on Resolution No. 16-7 Adopting, Directing Filing of, and Implementing the Palmdale Water District 2015 Urban Water Management Plan and Incorporated Water Shortage Contingency Plan. (Deputy Water & Energy Resources Director Thompson II/Kennedy/Jenks Consultants)

5) Adjournment.

Dennis D. LaMoreaux

_____

DENNIS D. LaMOREAUX,
General Manager

DDL/dd

PALMDALE WATER DISTRICT

BOARD MEMORANDUM

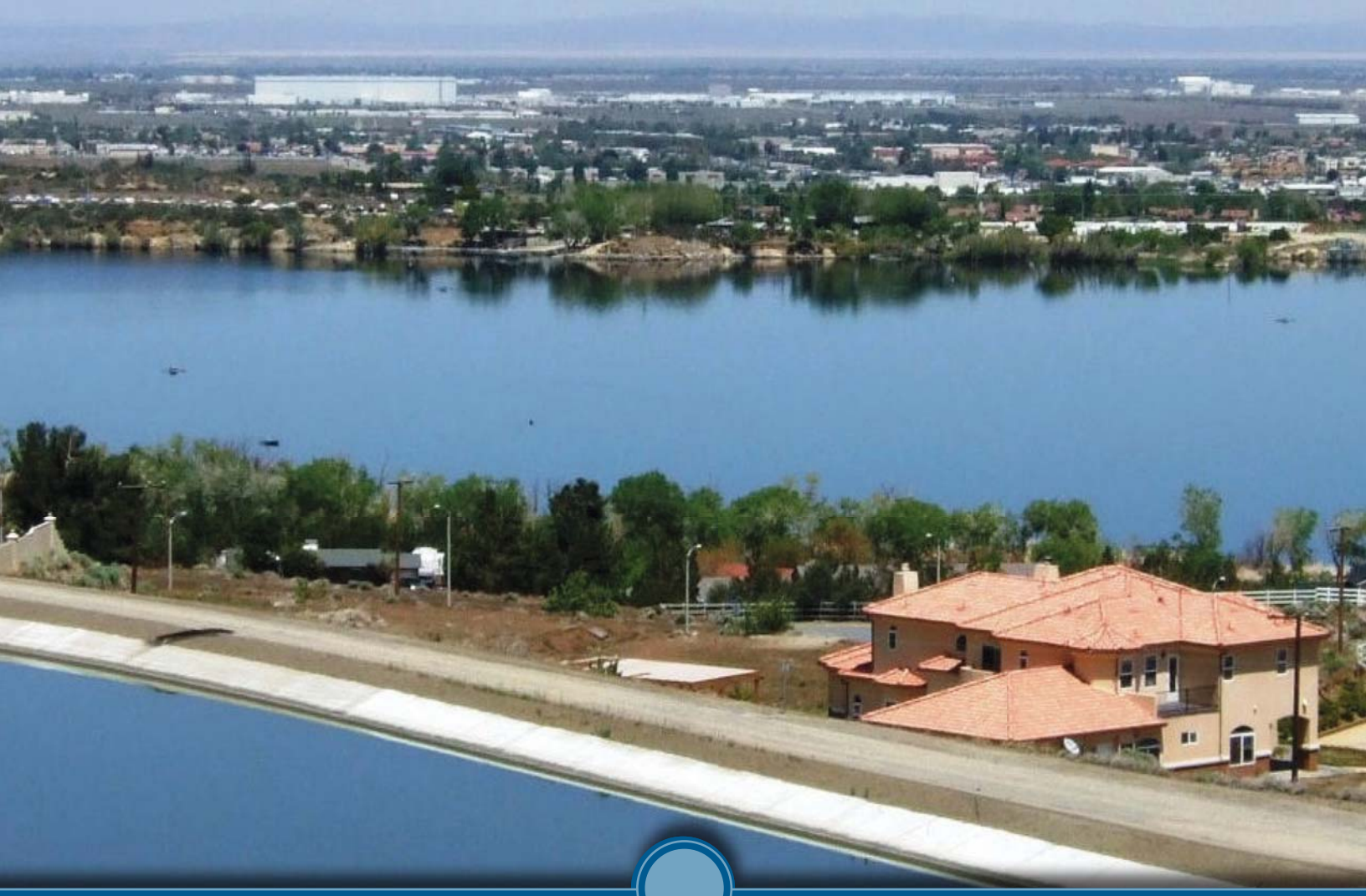
DATE:	May 26, 2016	**June 1, 2016**
TO:	BOARD OF DIRECTORS	**Board Meeting**
FROM:	Mr. Dennis LaMoreaux, General Manager	
RE:	***AGENDA ITEM NO. 4.1 – PUBLIC HEARING REGARDING 2015 URBAN WATER MANGEMENT PLAN AND WATER SHORTAGE CONTINGENCY PLAN***	

Attached is a copy of the body of the 2015 Urban Water Management Plan and Water Shortage Contingency Plan. The entire document is available in the Board office or on the District's website at the following link:

http://www.palmdalewater.org/wpcontent/uploads/2016/05/PWD_2015UWMPUpdate_PUBLIC DRAFT.pdf

Supporting Documents:

- 2015 Urban Water Management Plan and Water Shortage Contingency Plan (Pages 1 – 84 of 502 pages)



A PUBLIC DRAFT

2015 Urban Water Management Plan *for* **Palmdale Water District**

May 2016

Prepared by

Kennedy/Jenks Consultants

Kennedy/Jenks Consultants

2775 North Ventura Road, Suite 100
Oxnard, California 93036
805-973-5700
FAX: 805-973-1440

Palmdale Water District 2015 Urban Water Management Plan

Public Review Draft

25 May 2016

Prepared for

Palmdale Water District
2029 East Avenue Q
Palmdale, CA 93550

K/J Project No. 1544255*00

Table of Contents

List of Tables ..... *v*

List of Figures ..... *vi*

List of Appendices ..... *vi*

List of Acronyms ..... **vi**

Section 1: Introduction 1-1

1.1 Overview 1-1
1.2 Purpose 1-1
1.3 Basis for Preparing a Plan 1-3
1.4 Implementation of the Plan 1-3
1.4.1 Public Water Systems 1-4
1.4.2 Fiscal or Calendar Year 1-4
1.5 Cooperative Preparation of the Plan and Public Outreach 1-4
1.5.1 Plan Adoption 1-5
1.5.2 Resources Maximization 1-5
1.6 Water Management within PWD's Service Area 1-6
1.6.1 Palmdale Water District 1-6
1.7 Climate 1-8
1.8 Potential Effects of Climate Change 1-8
1.9 Climate Change Vulnerability Analysis 1-9

Section 2: Water Use 2-1

2.1 Overview 2-1
2.2 Demographics 2-1
2.3 Population 2-2
2.4 Historical Water Use 2-2
2.4.1 Historical Water Deliveries 2-2
2.4.2 Historic Sales and Deliveries 2-3
2.4.3 Historical Other Water Uses 2-3
2.5 Existing and Targeted Per Capita Water Use 2-4
2.5.1 Base Daily Per Capita Water Use 2-7
2.5.2 Compliance Water Use Targets 2-8
2.6 Projected Water Use 2-9
2.6.1 Water Delivery Projections 2-9
2.6.2 Projected Sales and Other Water Uses 2-10
2.6.3 Lower Income Projected Water Demands 2-11
2.7 Weather Effects on Water Usage 2-12
2.7.1 Conservation Effects on Water Usage 2-12

Table of Contents (cont'd)

Section 3: Water Supply....3-1

3.1 Overview....3-1
3.2 Local Water Supplies....3-3
3.2.1 Groundwater....3-3
3.2.1.1 Groundwater Subbasins....3-3
3.2.1.2 Historical Groundwater Pumping....3-5
3.2.1.3 Adjudication and Projected Groundwater Pumping....3-6
3.2.1.4 Groundwater Management Plan....3-7
3.2.1.5 Groundwater Reliability....3-7
3.2.2 Local Surface Water....3-8
3.2.2.1 Local Surface Water Entitlements....3-8
3.2.2.2 Historical and Projected Local Surface Water Production....3-9
3.2.3 Imported Water....3-9
3.2.3.1 Historical Imported Water Deliveries....3-10
3.2.3.2 Imported Water Reliability....3-11
3.2.4 Potential Supply Inconsistency....3-13
3.3 Transfers, Exchanges, and Groundwater Banking Programs....3-14
3.3.1 Existing Transfer Agreement....3-14
3.3.2 Transfer and Exchange Opportunities....3-14
3.3.3 Groundwater Banking Programs....3-15
3.3.3.1 Palmdale Groundwater Replenishment and Recovery Project....3-15
3.3.3.2 Additional Groundwater Banking Opportunities....3-16
3.3.4 Development of Desalination....3-16
3.3.4.1 Brackish Water and/or Groundwater Desalination....3-16
3.3.4.2 Seawater Desalination....3-17
3.3.5 Recycled Water....3-17
3.4 Anticipated Water Supply Sources in a Normal, Single Dry, and Multiple Dry Years....3-17

Section 4: Recycled Water....4-1

4.1 Overview....4-1
4.2 Recycled Water Planning....4-1
4.3 Existing Wastewater Treatment Facilities....4-1
4.3.1 Proposed Recycled Water System....4-2
4.4 Recycled Water Supply....4-3
4.5 Recycled Water Demand – Current and Projected....4-3
4.5.1 Recycled Water Use Comparisons....4-5
4.5.2 Encouraging Recycled Water Use....4-5

Table of Contents (cont'd)

Section 5: Water Quality 5-1

5.1 Overview 5-1
5.2 Groundwater Protection and Quality 5-1
5.2.1 Water Quality Monitoring 5-2
5.2.2 Wellhead Protection 5-3
5.2.3 Participation in the Antelope Valley Salt and Nutrient Management Plan 5-3
5.3 Imported Water Quality 5-3
5.4 Local Surface Water Quality 5-4
5.5 Water Quality Impacts on Reliability 5-4

Section 6: Water Supply Reliability 6-1

6.1 Overview 6-1
6.1.1 Groundwater Reliability 6-1
6.1.2 Imported Water Reliability 6-2
6.1.3 Local Surface Water Reliability 6-2
6.2 Projected Water Supply Reliability 6-3
6.3 Normal Water Year 6-4
6.4 Single-Dry Year 6-4
6.5 Multiple-Dry Year 6-5
6.6 Summary of Comparisons 6-6

Section 7: Water Demand Management Measures 7-1

7.1 Demand Management 7-1
7.2 Plan to Reduce Water Use 7-2
7.2.1 Foundational DMMs 7-2
7.2.1.1 Water Waste Prevention Ordinances and Prohibition 7-2
7.2.1.2 Metering 7-2
7.2.1.3 Conservation Pricing 7-2
7.2.1.4 Public Education and Outreach 7-3
7.2.1.5 Programs to assess and mange distribution system real loss 7-3
7.2.1.6 Water conservation program coordination and staffing support 7-3
7.2.2 Other DMMs 7-3
7.2.2.1 Rebate Programs 7-3
7.2.3 Planned Implementation of DMMs to Achieve Water Use Targets 7-4

Section 8: Water Shortage Contingency Planning 8-1

8.1 Stages of Action to Respond to Water Shortages 8-1

Table of Contents (cont'd)

8.2 Procedures for Water Shortage Level Determination 8-2
8.3 Prohibition of End Uses and Consumption Reduction Methods..... 8-3
8.4 Penalties, Charges, Other Enforcement of Prohibitions..... 8-5
8.5 Determining Water Shortage Reductions 8-6
8.6 Revenue and Expenditure Impacts..... 8-6
8.7 WSCP Resolution or Ordinance 8-7
8.8 Actions to Prepare For Catastrophic Supply Interruption 8-7
8.8.1 SWP Emergency Outage Scenarios..... 8-7
8.8.1.1 Scenario 1: Emergency Freshwater Pathway Description (Sacramento-San Joaquin Delta)..... 8-9
8.8.1.2 Scenario 2: Complete Disruption of the California Aqueduct in the San Joaquin Valley 8-10
8.8.1.3 Scenario 3: Complete Disruption of the East Branch of the California Aqueduct 8-10
8.8.2 Regional Power Outage Scenarios..... 8-12
8.9 Minimum Supply Next Three Years 8-12

References.....*i*

Table of Contents (cont'd)

List of Tables

TABLE 1-1: RETAIL PUBLIC WATER SYSTEM 1-4
TABLE 1-2: AGENCY COORDINATION SUMMARY 1-5
TABLE 1-3: PUBLIC PARTICIPATION TIMELINE 1-5
TABLE 1-4: CLIMATE DATA 1-8
TABLE 2-1: POPULATION – CURRENT AND PROJECTED 2-2
TABLE 2-2: HISTORICAL WATER DELIVERIES 2-3
TABLE 2-3: DELIVERIES TO OTHER AGENCIES 2-3
TABLE 2-4: DISTRIBUTION SYSTEM WATER LOSS 2-4
TABLE 2-5: HISTORICAL "OTHER" WATER USES 2-4
TABLE 2-6: SBX7-7 CALCULATIONS 2-5
TABLE 2-7: BASELINE PERIOD RANGES 2-7
TABLE 2-8: BASELINE DAILY PER CAPITA WATER USE 2-8
TABLE 2-9: COMPONENTS OF TARGET DAILY PER CAPITA WATER USE 2-9
TABLE 2-10: PROJECTED WATER DELIVERIES 2-10
TABLE 2-11: FUTURE SALES AND "OTHER" WATER USES 2-11
TABLE 2-12: PROJECTIONS OF FUTURE LOW-INCOME HOUSEHOLD WATER USE 2-11
TABLE 3-1: SUMMARY OF CURRENT AND PROJECTED WATER SUPPLIES 3-2
TABLE 3-2: HISTORICAL PUMPING BY PWD FROM THE ANTELOPE VALLEY GROUNDWATER BASIN 3-6
TABLE 3-3: PROJECTED PUMPING BY PWD FROM THE ANTELOPE VALLEY GROUNDWATER BASIN 3-7
TABLE 3-4: PROJECTED GROUNDWATER RETURN FLOW CREDITS 3-7
TABLE 3-5: HISTORICAL SURFACE WATER SUPPLIES 3-9
TABLE 3-6: PROJECTED SURFACE WATER SUPPLIES 3-9
TABLE 3-7: HISTORICAL IMPORTED WATER SUPPLIES 3-11
TABLE 3-8: PWD IMPORTED WATER SUPPLY RELIABILITY AVERAGE, SINGLE-DRY YEAR AND MULTIPLE-DRY YEAR CONDITIONS 3-13
TABLE 3-9: PROJECTED IMPORTED WATER SUPPLIES 3-13
TABLE 3-10: FACTORS RESULTING IN INCONSISTENCY OF WATER SUPPLY 3-14
TABLE 3-11: TRANSFER AND EXCHANGE OPPORTUNITIES 3-15
TABLE 3-12: WATER SUPPLY ESTIMATES – NORMAL YEAR 3-18
TABLE 3-13: WATER SUPPLY ESTIMATES – SINGLE-DRY YEAR 3-18
TABLE 3-14: WATER SUPPLY ESTIMATES – MULTIPLE-DRY YEARS 3-18
TABLE 4-1: 2015 WASTEWATER FLOWS AT PALMDALE WRP 4-2
TABLE 4-2: EFFLUENT FLOW PROJECTIONS FOR PALMDALE WRP 4-3
TABLE 4-3: ACTUAL RECYCLED WATER USE IN 2015 4-3
TABLE 4-4: PROJECTED RECYCLED WATER DEMANDS 4-4
TABLE 4-5: RECYCLED WATER USE PROJECTIONS COMPARED TO ACTUAL USE 4-5
TABLE 5-1: PROJECTED WATER SUPPLY CHANGES DUE TO WATER QUALITY 5-5

Table of Contents (cont'd)

TABLE 6-1: COMPARISON OF SUPPLIES AND DEMANDS – NORMAL YEAR 6-4
TABLE 6-2: COMPARISON OF SUPPLIES AND DEMANDS – SINGLE-DRY YEAR 6-5
TABLE 6-3: COMPARISON OF SUPPLIES AND DEMANDS – MULTIPLE-DRY YEAR 6-6
TABLE 8-1: RATIONING AND REDUCTION GOALS 8-1
TABLE 8-2: STAGES OF PWD WATER SHORTAGE CONTINGENCY PLAN 8-2
TABLE 8-3: PROHIBITIONS DURING DIFFERENT SHORTAGE STAGES 8-3
TABLE 8-4: CUSTOMER AND PWD WATER SHORTAGE ACTIONS 8-4
TABLE 8-5: ENFORCEMENT ACTIONS 8-6
TABLE 8-6: PROJECTED SUPPLIES AND DEMANDS DURING SIX-MONTH DISRUPTION OF IMPORTED SUPPLY SYSTEM 8-12
TABLE 8-7: ESTIMATE OF MINIMUM SUPPLY FOR THE NEXT THREE YEARS 8-13

List of Figures

FIGURE 1-1: PWD SERVICE AREA BOUNDARY 1-7
FIGURE 3-1: GROUNDWATER SUBBASINS 3-3
FIGURE 3-2: ANTELOPE VALLEY HYDROLOGIC FEATURES 3-5
FIGURE 8-1: PRINCIPAL SWP FACILITIES 8-8

List of Appendices

A DWR Checklist
B DWR Standardized Tables and SBX7-7 Tables
C Public Outreach Materials
D DWR Population Tool
E AWWA Water Loss Reporting Worksheets
F Water Conservation Resolutions
G CUWCC BMP Reports
H Climate Change Vulnerability Checklist
I Draft WSCP Resolution
J Groundwater Adjudication Court Order

Acronym List

°F	Fahrenheit
Act	Urban Water Management Planning Act
AF	Acre Feet
AFY	Acre Feet per Year
ARDWP	Annual Reports to the Drinking Water Program
AVEK	Antelope Valley East Kern Water Agency
AVSWCA	Antelope Valley State Water Contractors Association
AWWA	American Water Works Association
Cal OES	California Office of Emergency Services
CCR	Consumer Confidence Report
cfs	Cubic Feet per Second
CII	Commercial, Industrial, Institutional
cm	Centimeter
CUWCC	California Urban Water Conservation Council
CWC	California Water Code
DAC	Disadvantaged Community
DCR	Delivery Capability Report
DDW	Division of Drinking Water
District	Palmdale Water District
DMM	Demand Management Measure
DWR	California Department of Water Resources
ETo	Evapotranspiration
GAMA	Groundwater Ambient Monitoring and Assessment
GIS	Geographic Information System
GPCD	Gallons Per Capita per Day
gpm	Gallons per Minute
GSA	Groundwater Sustainability Agency
HET	High Efficiency Toilet
LACSD	Sanitation Districts of Los Angeles County
LCID	Littlerock Creek Irrigation District
MCL	Maximum Contaminant Level
mg	Milligrams
mgd	Million Gallons per Day
PBP	Priority Basin Project
PRGRRP	Palmdale Regional Groundwater Recharge and Recovery Project
PRWA	Palmdale Recycled Water Authority
PWD	Palmdale Water District
PWS	Public Water System
SBX7-7	Senate Bill 7 of Special Extended Session 7
SCAG	Southern California Association of Governments
SGMA	Sustainable Groundwater Management Act
SNMP	Salt and Nutrient Management Plan
SWP	State Water Project
SWRCB	State Water Resources Control Board
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
ULFT	Ultra-Low-Flush Toilet
USEPA	United States Environmental Protection Agency

UWMP	Urban Water Management Plan
WRP	Water Reclamation Plant
WSCP	Water Shortage Contingency Plan
WTP	Water Treatment Plant

Section 1: Introduction

1.1 Overview

This document presents the 2015 Urban Water Management Plan (UWMP, Plan) for the Palmdale Water District (PWD) service area. This section describes the general purpose of the Plan, discusses Plan implementation and provides general information about the PWD and its service area characteristics.

The State of California mandates that all urban water suppliers within the state prepare an UWMP. Detailed information on what must be included in these plans as well as who must complete them can be found in California Water Code Sections 10610 through 10657. According to the Urban Water Management Planning Act (UWMP Act) of 1983, an urban water supplier is defined as a supplier, either public or private, that provides water for municipal purposes either directly or indirectly to more than 3,000 customers or supplies more than 3,000 acre-feet (AF) annually.

1.2 Purpose

An UWMP is a planning tool that generally guides the actions of urban water suppliers. It provides managers and the public with a broad perspective on a number of water supply issues. It is not a substitute for project-specific planning documents, nor was it intended to be when mandated by the State Legislature. For example, the Legislature mandated that a plan include a section which "…describes the opportunities for exchanges or water transfers on a short-term or long-term basis." (Wat. Code, § 10631, subd. [d]). The identification of such opportunities and the inclusion of those opportunities in a plan's general water service reliability analysis neither commits an urban water supplier to pursue a particular water exchange/transfer opportunity, nor precludes it from exploring exchange/transfer opportunities never identified in its plan. Before an urban water supplier is able to implement any potential future sources of water supply identified in a plan, detailed project plans are prepared and approved, financial and operational plans are developed and all required environmental analysis is completed.

"A plan is intended to function as a planning tool to guide broad-perspective decision making by the management of water suppliers." (*Sonoma County Water Coalition v. Sonoma County Water Agency* (2010) 189 Cal. App. 4th 33, 39.) It should not be viewed as an exact blueprint for supply and demand management. Water management in California must address uncertainty. Planning projections may change in response to a number of factors that are associated with uncertainty such as climate change, population growth and water demand. The California Supreme Court has recognized the uncertainties inherent in long-term land use and water planning and observed that the generalized information required . . . in the early stages of the planning process are replaced by firm assurances of water supplies at later stages." (*Id.*,at 41.) From this perspective, it is appropriate to look at the UWMP as a general planning framework, not a specific action plan. It is an effort to generally answer a series of planning questions such as:

- What are the potential sources of supply and what amounts are estimated to be available from them?

- What is the projected demand, given a reasonable set of assumptions about growth and implementation of good water management practices?

- How do the projected supply and demand figures compare and relate to each other?

Using these "framework" questions and resulting answers, the implementing agency or agencies will pursue feasible and cost-effective options and opportunities to develop supplies and meet demands.

As further detailed in this Plan, the PWD will continue to explore enhancing and managing supplies from existing sources such as imported water as well as other options. These may include groundwater extraction, water exchanges and transfers, water conservation, water recycling, brackish water desalination, and water banking/conjunctive use. Additional specific planning efforts may be undertaken in regard to each option, involving detailed evaluations of how each option would fit into the overall supply/demand framework, potential environmental impacts, and how each option would affect customers.

The UWMP Act requires preparation of a plan that, among other things:

- Accomplishes water supply planning over a 20-year period in five year increments (PWD is going beyond the requirements of the Act by developing a plan which spans twenty-five years to 2040).

- Identifies and quantifies existing and projected water supplies and water supply opportunities, including recycled water, for existing and future demands, in normal, single-dry and multiple-dry years.

- Implements conservation and efficient use of urban water supplies.

Additionally, Senate Bill 7 of Special Extended Session 7 (SBX7-7) was signed into law in November 2009, which calls for progress towards a 20 percent reduction in per capita water use statewide by 2020. SBX7-7, otherwise referred to as the Water Conservation Act of 2009, requires each urban retail water supplier to develop and report a water use target in its 2010 UWMP, and to develop and report an interim 2015 water use target, baseline daily per capita use, and 2020 compliance daily per capita use, along with the basis for determining those estimates. Beginning in 2016, retail water suppliers are required to comply with the water conservation requirements in SBX7-7 in order to be eligible for State water grants or loans. Water suppliers have the ability to revisit the SBX7-7 baseline and water use targets determined in the 2010 UWMPs and update them in the 2015 UWMP updates.

SBX7-7 provides four possible methods for a retail water supplier to use to calculate its water use target. The California Department of Water Resources (DWR) has also developed methodologies for calculating base daily per capita water use; baseline commercial, industrial and institutional (CII) water use; compliance daily per capita water use; gross water use; service area population; indoor residential water use and landscape area water use. In addition, if the 2010 census was not utilized for the SBX7-7 calculations in the 2010 UWMP, that data must be used to update the calculations in the 2015 Plan.

In addition to the relatively new requirements of SBX7-7, a number of other changes to the Water Code have been enacted since 2010 which apply to the preparation of the 2015 Plan updates. These changes include:

- Demand Management Measures California Water Code (CWC) Section 10631(f)(1) and (2). (Assembly Bill 2067, 2014)
- Submittal Date CWC Section 10621(d). (Assembly Bill 2067, 2014)
- Electronic Submittal CWC Section 10644(a)(2). (Senate Bill 1420, 2014)
- Standardized Forms CWC Section 10644(1a)(2). (Senate Bill 1420, 2014)
- Water Loss CWC Section 10631(e)(1)(J) and (e)(3)(A) and (B). (Senate Bill 1420, 2014)
- Estimating Future Water Savings CWC Section 10631(e)(4). (Senate Bill 1420, 2014)
- Voluntary Reporting of Energy Intensity CWC Section 10631.2(a) and (b). (Senate Bill 1036, 2014)
- Defining Water Features CWC Section 10632(b). (Assembly Bill 2409, 2014)

A checklist to ensure compliance of this Plan with the UWMP Act requirements is provided in Appendix A.

It is the stated goal of the PWD to deliver a reliable and high quality water supply to its customers, even during dry periods. Based on conservative water supply and demand assumptions over the next twenty-five years in combination with conservation of non-essential demands during normal and dry water years, the 2015 UWMP successfully achieves this goal.

1.3 Basis for Preparing a Plan

In accordance with the CWC, urban water suppliers with 3,000 or more service connections, or supplying 3,000 or more acre-feet of water per year, are required to prepare a UWMP every five years. The 2015 UWMP shall be updated and submitted to DWR by July 1, 2016.

Revisions to the CWC directed DWR to develop standardized tables for the reporting and submittal of UWMP data. Water agencies are required to submit UWMP data electronically to DWR using the standardized tables. The standardized tables were prepared for this Plan and are included as Appendix B.

1.4 Implementation of the Plan

PWD has a contract with the State of California, through DWR, to acquire and distribute State Water Project (SWP) water to customers within the City of Palmdale and adjacent unincorporated areas of Los Angeles County. The entire service area encompasses an area of approximately 140 square miles overlying more than thirty non-contiguous areas scattered throughout the southern Antelope Valley. In addition to the primary service area, there is a federal land area of approximately 65 square miles upstream of Littlerock Dam in the Angeles National Forest. This subsection provides the cooperative framework within which the Plan will be implemented including agency coordination, public outreach and resources maximization.

1.4.1 Public Water Systems

Public water systems (PWSs) provide drinking water for human consumption and are regulated by the State Water Resources Control Board Division of Drinking Water (SWRCB DDW). PWSs are required to electronically file Annual Reports to the Drinking Water Program with the SWRCB DDW, which include water usage and other information.

Table 1-1 provides the name and number of the PWS (drinking water only) that is covered by this UWMP.

TABLE 1-1: RETAIL PUBLIC WATER SYSTEM

Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015 (AF)
CA1910102	Palmdale Water District	26,508	17,015

1.4.2 Fiscal or Calendar Year

A water supplier may report on a fiscal year or calendar year basis, but must clearly state in its UWMP the type of year that is used for reporting. The type of year should remain consistent throughout the Plan.

DWR prefers that agencies report on a calendar year basis in order to ensure UWMP data is consistent with data submitted in other reports to the State. This plan provides data consistent with a calendar year, in acre-feet per year (AFY).

1.5 Cooperative Preparation of the Plan and Public Outreach

The UWMP Act requires that the water agency identify its coordination with appropriate nearby agencies. The PWD's 2015 UWMP is intended to address those aspects of the UWMP Act which are under the control of the PWD, specifically water supply and water use. While preparing the 2015 UWMP, the PWD coordinated its efforts with relevant agencies to ensure data and issues are presented accurately.

The PWD has encouraged community participation in water planning. Interested groups were informed about the development of the Plan along with the schedule of public activities. Notices of public meetings were published in the local press and on the PWD's website. Copies of the draft UWMP were sent to the City of Palmdale, the City of Lancaster, and Los Angeles County for review and comment, in addition to other local water agencies as noted in Table 1-2. Water resource specialists with expertise in water resource management were retained to assist the PWD in preparing the details of its Plan.

Table 1-3 presents a timeline for public participation during the development of the Plan. A copy of the public outreach materials are provided in Appendix C.

TABLE 1-2: AGENCY COORDINATION SUMMARY

	Participated in UWMP Development	Received Copy of Draft	Commented on Draft	Attended Public Meetings	Contacted for Assistance	Sent Notice of Intent to Adopt	Not Involved
City of Palmdale	✓	✓					
City of Lancaster	✓	✓					
Los Angeles County Department of Regional Planning	✓	✓					
Littlerock Creek Irrigation District	✓	✓					
Los Angeles County Sanitation District	✓	✓					
Antelope Valley-East Kern Water Agency	✓	✓					
Quartz Hill Water District	✓	✓					
Rosamond Community Services District	✓	✓					
Los Angeles County Farm Bureau	✓	✓					
Los Angeles World Airports	✓	✓					
Los Angeles County Waterworks District No. 40	✓	✓					

1.5.1 Plan Adoption

The PWD began preparation of this UWMP in November 2015. The final version of the UWMP was adopted by the PWD Board on June 1, 2016 and submitted to DWR, the California State Library, the City of Palmdale, the City of Lancaster, and to Los Angeles County within thirty days of Board approval. This Plan includes all information necessary to meet the requirements of Water Conservation Act of 2009 (Wat. Code, §§ 10608.12-10608.64) and the Urban Water Management Planning Act (Wat. Code, §§ 10610-10656).

TABLE 1-3: PUBLIC PARTICIPATION TIMELINE

Date	Event	Details
Nov. 30, 2015	Kick-off Meeting	Describe UWMP requirements and process
May 18, 2016	Public Draft UWMP	Public Draft released to solicit input
June 1, 2016	Public Hearing	Review contents of Public Draft UWMP and take comments
June 1, 2016	Board Approval	UWMP and WSCP considered for approval by the Board

1.5.2 Resources Maximization

Several documents were developed to enable the PWD to maximize the use of available resources and minimize, including the PWD's 2010 UWMP (RMC 2011), the PWD's Recycled

Water Facilities Plan (RMC 2010), the Palmdale Recycled Water Authority Recycled Water Facilities Master Plan (Carollo 2015), the Antelope Valley Integrated Regional Water Management Plan (2013), DWR's 2015 State Water Project Delivery Capability Report (DWR 2015), PWD's 2015 Draft Water System Master Plan (MWH 2016), Consumer Confidence Reports, the Antelope Valley Salt and Nutrient Management Plan, and personal communication with PWD staff. Section 3 of this Plan describes in detail the water resources available to the PWD for the twenty-five-year period covered by the Plan. A complete reference list is provided in Section 9 of this Plan.

1.6 Water Management within PWD's Service Area

1.6.1 Palmdale Water District

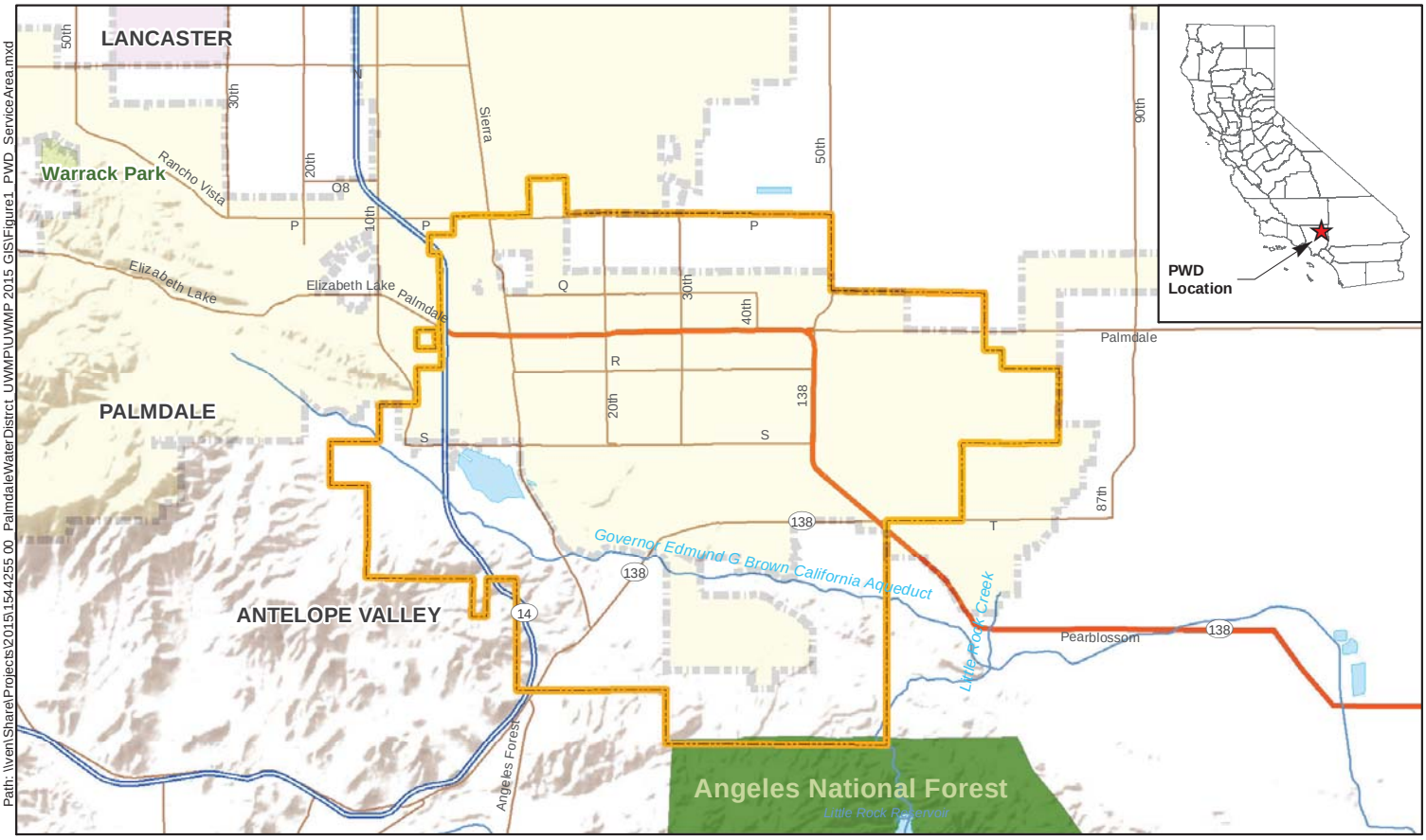
The PWD is located within the Antelope Valley in Los Angeles County, approximately 60 miles north of the City of Los Angeles and includes the central and southern portions of the City of Palmdale and adjacent unincorporated areas of Los Angeles County, as shown in Figure 1-1. The City of Palmdale's nearest neighbor, Lancaster, is approximately 10 miles to the north. The Antelope Valley Freeway (State Highway 14) runs north-south and Pearblossom Highway (State Highway 138) meanders in an east-west direction through the PWD.

The PWD was established in 1918 as the Palmdale Irrigation District. The primary function of the PWD is to provide retail water service within its service area. Under the provisions of the CWC relating to the establishment of irrigation districts, the PWD has the power to carry out any act to provide sufficient water for present and future beneficial uses, including construction and operation of facilities to store, regulate, divert and distribute water for use within its boundaries.

Until the 1950s, the area within Palmdale Irrigation District's boundaries was primarily agricultural. However, with the activation of Air Force Plant 42 and the increased use of Edwards Air Force Base, agricultural water use diminished. As populations grew within the Antelope Valley, the shift to domestic water began. In 1963, the Palmdale Irrigation District entered into an agreement to purchase water from the newly planned State Water Project (SWP). This agreement guarantees the Palmdale Irrigation District will have sufficient imported source water to supply projected population growth well into its future.

To contain the anticipated increased water supply, bonds were sold to rebuild and expand Palmdale Lake (formerly known as Harold Reservoir) to an increased capacity of over 4,100 AF. This bond financing also allowed the construction of a new treatment facility adjacent to the Lake allowing Palmdale Irrigation District to serve a broader area of Palmdale. In 1973 the Palmdale Irrigation District name was changed to the more appropriate PWD. Founded as an irrigation district supplying water mainly to farms for agricultural use, the PWD's boundaries had expanded with Palmdale's rapid population growth and the PWD shifted to providing predominantly municipal and industrial water supply. The PWD now acts as a retailer of water supplies for municipal, residential, irrigation, commercial, industrial, and institutional users.

PWD has continued to improve and add to its water distribution and storage facilities. The PWD's primary service area now covers approximately 29,440 acres (46 square miles). The distribution system encompasses approximately 400 miles of pipeline, multiple well sites, booster pumping stations, and water storage tanks maintaining a total storage capacity of over 50 million gallons.



Path: \\ven\Share\Projects\2015\1544255 00_PalmdaleWaterDistrict_UWMP\UWMP 2015 GIS\Figure1_PWD_ServiceArea.mxd

Legend

- Palmdale Water District (PWD) Boundary
- City of Lancaster Boundary
- City of Palmdale Boundary

N

0 1 2
Miles

Kennedy/Jenks Consultants

Palmdale Water District
2015 Urban Water Management Plan
Palmdale, California

Palmdale Water District Service Area Boundary

KJ 1544255*00
May 2016

Figure 1

1.7 Climate

The climate in PWD's service area is characterized by wide temperature fluctuations, hot summers, cold winters, strong winds, low humidity and scant rainfall. Temperatures in the summer months vary between 54 degrees Fahrenheit (°F) and 94 °F. In the winter months, the average temperature extremes vary from 28 to 67 °F, respectively. Most of the precipitation occurs during the winter and spring months. Over the last five years precipitation has averaged less than 1 inch. Table 1-4 shows the average, monthly evapotranspiration (ETo), rainfall, and temperature data for the PWD.

TABLE 1-4: CLIMATE DATA

Monthly Average Climate Data Summary

Month	Standard Monthly Average ETo (inches)	Average Total Rainfall (inches)	Average Temperature (°F)	
			Max	Min
January	2.31	1.07	59.38	28.15
February	3.06	0.89	62.86	31.44
March	4.98	1.00	67.24	35.01
April	6.35	0.37	71.83	39.40
May	8.25	0.20	79.42	46.84
June	9.14	0.01	88.28	53.92
July	9.58	0.10	94.25	61.31
August	8.80	0.32	93.95	59.14
September	6.37	0.23	89.08	52.57
October	4.50	0.33	77.23	42.24
November	2.89	0.36	67.20	33.28
December	1.98	0.82	57.23	28.26

Source: California Irrigation Management System (CIMIS) data provided from Station No. 197, Los Angeles Region, April 2005 – April 2016 http://wwwcimis.water.ca.gov/cimis/welcome.jsp.

1.8 Potential Effects of Climate Change

A topic of growing interest and research for water planners and managers is climate change and the potential impacts it could have on California's future water supplies. DWR's California Water Plan Update 2013 considers how climate change may affect water availability, water use, water quality, and the ecosystem (DWR 2014b).

Volume 1, Chapter 5 of the California Water Plan, "Managing an Uncertain Future," evaluated three different scenarios of future water demand based on alternative but plausible assumptions on population growth, land use changes, water conservation and future climate change. Future updates will test different response packages, or combinations of resource management strategies, for each future scenario. These response packages help decision-makers, water managers, and planners develop integrated water management plans that provide for resource

sustainability and investments in actions with more sustainable outcomes. Further detailed guidance is currently being developed by the State of California and the United States Environmental Protection Agency (USEPA) for use in integrated regional water management planning.

California faces the prospect of additional water management challenges due to a variety of issues including population growth, regulatory restrictions and climate change. Climate change is of particular interest because of the range of possibilities and their potential impacts on essential operations, including operations of the SWP. The most likely scenarios involve increased temperatures, which will reduce the Sierra Nevada snowpack and shift more runoff to winter months, and accelerated sea level rise. These changes can cause major challenges for the maintenance of the present water export system since water supplies are conveyed through the fragile levee system of the Sacramento-San Joaquin Delta. The other much-discussed climate change scenario is an increase in precipitation variability, with more extreme drought and flood events posing additional challenges to water managers (DWR 2014b).

In its 2015 State Water Project Delivery Capability Report (2015 DCR), DWR included the potential effects of climate change in its analysis of SWP delivery capability under future conditions, specifically, the changes to hydrology expected to occur from a 2025 emission level and a 15 centimeter (cm) sea level rise (DWR 2015). The current and projected availability and reliability of SWP supplies, including the potential effects of climate change, are further discussed in Section 3 of this Plan.

Even without population changes, water demand could increase. Precipitation and temperature influence water demand for outdoor landscaping and irrigated agriculture. Outdoor water use is a large component of water demands in the Antelope Valley. Lower spring rainfall increases the need to apply irrigation water. Further, warmer temperatures increase crop evapotranspiration, which increases water demand. These effects and their potential to impact demands are considered in Section 2 of this Plan.

1.9 Climate Change Vulnerability Analysis

Identification of watershed characteristics that could potentially be vulnerable to future climate change is the first step in assessing the climate change vulnerabilities in the Region. In the context of this analysis, vulnerability is defined as the degree to which a system is exposed to, susceptible to, and able to cope with and adapt to, the adverse effects of climate change, consistent with the definition in the recently issued Climate Change Handbook for Regional Water Planning (USEPA and DWR, 2011).

Water-related resources that are considered important in the Region and potentially sensitive to future climate change include water demands, water supplies, water quality, flooding, and ecosystem and habitat. A qualitative assessment of each of these resources with respect to anticipated climate change impacts has been prepared in the 2014 Integrated Regional Water Management Plan for the Antelope Valley Region. The assessment follows the climate change vulnerability checklist assessment as defined in the Climate Change Handbook for Regional Water Planning and highlights those water-related resources that are important to the Region and are sensitive to climate change. That assessment is incorporated herein and the checklist is provided as Appendix H.

Section 2: Water Use

2.1 Overview

This section describes historical and current water usage and the methodology used to project future demands within the PWD's service area. Water usage is divided into sectors such as residential, industrial, commercial, landscape, and other. To undertake this evaluation, existing land use data and population projections were evaluated. This information was then compared to historical trends for new water service connections and customer water usage information. In addition, weather and water conservation effects on historical water usage were considered in the evaluation. Several factors can affect demand projections, including:

- Land use revisions
- New regulations
- Consumer choice
- Economic conditions
- Transportation needs
- Environmental factors
- Conservation programs
- Building and plumbing codes

The foregoing factors affect the amount of water needed, as well as the timing of when it is needed and available. During an economic recession, there is a major downturn in development and a subsequent slowing of the projected demand for water. The projections in this UWMP do not attempt to forecast recessions or droughts. Likewise, no speculation is made about future building and plumbing codes or other regulatory changes. However, the projections do include water conservation consistent with new legislative requirements calling for a 20 percent reduction in per capita demand by 2020 (SBX7-7).

An analysis was performed that combined growth projections with water use data to forecast total water demand in future years. Water uses were broken out into specific categories and assumptions made about each to more accurately project future use. Three separate data sets were collected and included in the assessment; historical water use by land-use type, current population and projected population.

2.2 Demographics

Water service is provided to residential, commercial, industrial, and institutional customers, and for environmental and other uses, such as fire protection and landscaping. The total demand trend on water supplies is expected to continue to rise within the Antelope Valley area (along with most of California) because of population growth, planned development, economic activity, environmental and water quality needs and regulatory requirements.

2.3 Population

The PWD currently serves approximately 26,500 active connections, the majority of which (96 percent) are residential. Commercial connections account for approximately 3 percent, landscape irrigation connections account for about 1 percent.

The PWD has experienced steady population growth, with over 20 percent population increase since 2000. Table 2-1 shows the current and projected service area population in five-year increments to Year 2040. Population projections presented here are based on the PWD Water Master Plan Draft Report (MWH 2016). Projections were determined by using Southern California Association of Governments (SCAG) growth percentages for the City of Palmdale and applying them to the population recorded in the 2010 census within the PWD boundary. The current population (2015) shown below was calculated with the DWR population tool and is only slightly higher than the 2015 value of the Water Master Plan Draft Report.

TABLE 2-1: POPULATION – CURRENT AND PROJECTED

Population Served[(a)]	2015	2020	2025	2030	2035	2040
	118,227[(b)]	131,200	137,700	144,300	150,800	157,300

Notes:
(a) Source of 2020-2040 projections: PWD Draft Water Master Plan, September 2014, Table 2-5, "Adjusted SCAG Population Projections".
(b) 2015 population number is based on the DWR population tool (printout provided in Appendix D).

2.4 Historical Water Use

2.4.1 Historical Water Deliveries

Predicting future water use requires accurate historical water use patterns and water usage records. The PWD has meters on all residential, commercial and landscape service connections in the service area and requires meters on all new connections. The PWD provides potable water service to customers within its service area, and serves supplemental water to several customers outside its primary service area in accordance with agreements made with the Antelope Valley-East Kern Water Agency (AVEK).

The historical use of all water supplies used to meet the PWD's municipal water requirements by water use sector are summarized in Table 2-2 for the year 2010 and 2015.

TABLE 2-2: HISTORICAL WATER DELIVERIES (AF)

Water Use Sector	2010	2015[(a)]
Single family	12,944	10,251
Multi-family	1,831	1,276
Commercial	1,542	863
Industrial	1,697	1,548
Institutional/Governmental	0	0
Landscape	752	744
Other[(b)]	112	41
Total	**18,878**	**14,723**

Note:
(a) Data provided by PWD Staff. 2010 and 2015 values from District "Water Analysis" Database; 2015 values represent consumption. 2015 production was 17,015 AF as shown in Table 1-1.
(b) Other uses include water for street sweeping and other various limited use meters at City and school facilities.

2.4.2 Historical Sales and Deliveries to Other Water Agencies

The PWD currently has arrangements with AVEK and Littlerock Creek Irrigation District (LCID) to provide treatment and delivery of raw water received from those agencies. Specifically, AVEK and LCID provide raw water to the PWD, which is then treated and passed on to AVEK and LCID customers. These deliveries are described in Table 2-3.

As no additional PWD supplies are provided to AVEK or LCID with these treatment and delivery arrangements, those deliveries have no effect on PWD demands or supplies. Therefore, these deliveries are not accounted for in total PWD demands or supplies. No other arrangements for delivery or sales to other agencies currently exist with the PWD.

TABLE 2-3: DELIVERIES TO OTHER AGENCIES (AF)[(a)]

Agency	2010	2011	2012	2013	2014	2015
LCID	2	2	2	2	8	1
AVEK	0	0	168	638	690	431
Total	**2**	**2**	**170**	**640**	**698**	**432**

Notes:
(a) Data provided by PWD staff. As described above, these deliveries do not constitute sales to other agencies and due to the pass through nature of these supplies are not being accounted for in total district demands.

2.4.3 Historical Other Water Uses

In addition to the traditional demand sources, there is another component that impacts the PWD's water resources known as system water losses. This component is typically defined as the difference between water production and water sales. These water losses can come from authorized, but unmetered sources, such as firefighting and main flushing, or unauthorized sources such as leakage, illegal connections, and inaccurate flow meters.

For the 2015 UWMPs, water retailers must use the 'distribution system loss' methodology provided by DWR to calculate these losses. The method is based on American Water Works Association's (AWWA) M36 Manual. The assessment is provided in Appendix E for the year 2014. In 2014, real losses (actual leaks) were calculated to be three percent of water supplied while apparent losses (loss due to meter reading inaccuracies, data handling errors and

unauthorized consumption) were found to be five percent of water supplied. Other non-revenue consumption, which consists of unbilled authorized consumption such as water for firefighting and main and sewer flushing, was found to make up about 1.25 percent of water supplied. The results of the 2014 audit are presented in Table 2-4.

TABLE 2-4: DISTRIBUTION SYSTEM WATER LOSS[(a)]

Water Audit Reporting Year	Real Loss (AF)	% of Supplies	Apparent Loss (AF)	% of Supplies	Other Unbilled Use (AF)	% of Supplies
2014	601	3%	1,045	5%	249	1%

Note:
(a) Based on the most recent 12-month period available (beginning January 2014).

Table 2-5 provides a summary of historical "other" water uses besides metered deliveries and sales to other agencies.

TABLE 2-5: HISTORICAL "OTHER" WATER USES (AF)

Water Use	2010	2015
Groundwater Recharge/Storage/Banking	0	0
Long Term System Storage	0	0
Saline Water Intrusion Barrier	0	0
Agricultural Irrigation	0	0
Other (unbilled authorized)[(a)(b)]	240	180
System Losses (real and apparent losses)[(b)]	1,510	1,180
Total	**1,750**	**1,360**

Notes: Values are rounded
(a) Unbilled authorized consumption is water that is used by customers known to the water system but is not billed (ex., firefighting, street cleaning, etc.).
(b) Unbilled authorized and system losses for 2010 and 2015 are estimated based on average losses from 2013 and 2014 audit reports compared to total deliveries in 2010 and 2015 (Table 2-2). Based on this approach, it is assumed that water deliveries presented in Table 2-2 already capture these non-revenue uses.

2.5 Existing and Targeted Per Capita Water Use

The Water Conservation Act of 2009 (SBX7-7) is one of four policy bills enacted as part of the November 2009 Comprehensive Water Package (Special Session Policy Bills and Bond Summary). The Water Conservation Act of 2009 provides the regulatory framework to support the goal of achieving a statewide reduction in urban per capita water use described in the 20x2020 Water Conservation Plan (DWR, 2010). Consistent with SBX7-7, each water supplier must determine and report its existing baseline water consumption and establish water use targets in gallons per capita per day (GPCD), and compare actual water use against the target. The primary calculations required by SBX7-7 are summarized in Table 2-6.

TABLE 2-6: SBX7-7 CALCULATIONS

	2010 UWMP	2015 UWMP	2020 UWMP
Base Daily Water Use calculation (average GPCD used in past years)	First calculated and reported in 2010 plan	May be revised in 2015 Plan; must be revised if 2010 Census data not used in original calculation	NA
Interim Water Use Target (target GPCD in 2015)	First calculated and reported in 2010 plan	May be revised in 2015 Plan; must be revised if 2010 Census data not used in original calculation	NA
Compliance Water Use Target (target GPCD in 2020)	First calculated and reported in 2010 plan	May be revised in 2015 Plan; must be revised if 2010 Census data not used in original calculation	NA
Actual 2015 Water Use (in GPCD)	NA	In 2015 Plan must compare actual 2015 GPCD against 2015 target	NA
Actual 2020 Water Use (in GPCD)	NA	NA	In 2020 Plan must compare actual 2020 GPCD against 2020 target

In the 2015 UWMP water agencies must demonstrate compliance with the target established for 2015 and demonstrate that the agency is on track to achieve its 2020 target. Compliance is done through review of the SBX7-7 Verification Tables submitted with the 2015 Plan (included as Appendix B).

The PWD first reported its Base Daily Water Use in its 2010 UWMP. At the time the 2010 UWMP was prepared full Census data was not available. The PWD was therefore required to redo the Base Daily Water Use calculation in this UWMP.

The Base Daily Water Use calculation is based on gross water use by an agency in each year and can be based on a ten-year average ending no earlier than 2004 and no later than 2010 or a 15-year average if ten percent of 2008 demand was met by recycled water. Base Daily Water Use must account for all water sent to retail customers, excluding:

- Recycled water
- Water sent to another water agency
- Water that went into storage

It is at an agency's discretion whether or not to exclude agricultural water use from the Base Daily Water Use calculation. If agricultural water use is excluded from the Base Daily Water Use calculation it must also be excluded from the calculation of actual water use in later urban water management plans. The PWD did not supply water to agriculture during the period 1995 to 2010 and so agricultural water does not factor into the revised SBX7-7 calculations.

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). There are four methods for calculating the Compliance Water Use Target:

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

2. Per capita daily water use estimated using the sum of the following:
    a. For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of DWR's 2016 report to the Legislature reviewing progress toward achieving the statewide 20 percent reduction target, this standard may be adjusted by the Legislature by statute.
    b. For landscape irrigated through dedicated or residential meters or connections, water use efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in section 490 et seq. of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992.
    c. For CII uses, a ten percent reduction in water use from the baseline CII water use by 2020.
3. Ninety-five percent of the applicable state hydrologic region target as stated in the 2010 DWR "20x2020 Water Conservation Plan" (February, 2010) (20x2020 Plan). The PWD falls within the South Lahontan Hydrologic Region (95 percent target for this region is 162).

4. Reduce the 10 or 15-year Base Daily Per Capita Water Use a specific amount for different water sectors:
    a. Indoor residential water use to be reduced by 15 GPCD or an amount determined by use of DWR's "BMP Calculator".
    b. A 20 percent savings on all unmetered uses.
    c. A 10 percent savings on baseline CII use.
    d. A 21.6 percent savings on current landscape and water loss uses.

The Interim Water Use Target is set as a halfway point between the Base Daily Water Use GPCD and the 2020 Compliance Water Use Target GPCD.

Finally, the selected Compliance Water Use Target must be compared against what DWR calls the "Maximum Allowable GPCD". The Maximum Allowable GPCD is based on 95 percent of a 5-year average base gross water use ending no earlier than 2007 and no later than 2010. The Maximum Allowable GPCD is used to determine whether a supplier's 2015 and 2020 per capita water use targets meet the minimum water use reduction requirements of SBX7-7. If an agency's Compliance Water Use Target is higher than the Maximum Allowable GPCD, the agency must instead use the Maximum Allowable GPCD as its target. As shown below, the Maximum Allowable GPCD does not apply to the PWD.

2.5.1 Base Daily Per Capita Water Use

Figure 1-1 illustrates the PWD's service area used to estimate the Base Daily Per Capita Water Use. Tables 2-7 and 2-8 summarize the Base Daily Water Use calculation for the PWD. As is shown in these tables, the PWD is not eligible to use a 15-year base period. Years 1995 to 2004 have been selected for calculation of the 10-year base period while years 2004 to 2008 have been selected for calculation of the 5-year base period.

TABLE 2-7: BASELINE PERIOD RANGES

Baseline	Parameter	Value	Units
10 to 15 year baseline period	2008 total water deliveries	25,339	AFY
	2008 total volume of delivered recycled water	0	AFY
	2008 recycled water as a percent of total deliveries	0	Percent
	Number of years in baseline period[(a)]	10	Years
	Year beginning baseline period range	1995	-
	Year ending baseline period range[(b)]	2004	-
5 year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2003	-
	Year ending baseline period range[(c)]	2007	-

Notes:
(a) If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a contiguous 10-year period. If the amount of recycled water delivered in 2007 is 10 percent or greater, the first baseline period is a contiguous 10 to 15 year period.
(b) The ending year must be between December 31, 2004 and December 31, 2010.
(c) The ending year must be between December 31, 2007 and December 31, 2010.

In order to calculate Base Daily Per Capita Water Use for past years, it was necessary to develop population estimates for past years. The population for the PWD service area was calculated for 1990, 2000, 2010 and 2015 using the DWR online population tool (printout provided in Appendix D).

This was accomplished using a Geographic Information System (GIS) interface to derive population. By adding shape files for the entity service area boundaries or public water system boundary in 1990, 2000, and 2010, population is derived using U.S. Census Bureau census tract data from census years. Then, along with PWD production and service connections, the DWR population tool derives a person's-per-connection number, which is used to determine population in the intervening years between 1990 and 2010.

As shown in the top portion of Table 2-8, the PWD's 10-year Baseline GPCD is estimated to be 231. As shown in the second tier of Table 2-8, the PWD's 5-year Baseline GPCD is 229.

TABLE 2-8: BASELINE DAILY PER CAPITA WATER USE

Year		Service Area Population	Gross Water Use (AFY)	Daily Per Capita Water Use
10 to 15 Year Baseline GPCD				
1	1995	79,578	22,233	249
2	1996	88,785	23,514	236
3	1997	89,675	23,152	230
4	1998	90,540	20,626	203
5	1999	91,375	23,398	229
6	2000	92,172	25,901	251
7	2001	98,516	25,220	229
8	2002	99,649	25,670	230
9	2003	100,788	24,909	221
10	2004	104,237	26,684	229
10 to 15 Year Average Baseline GPCD				**231**
5 Year Baseline GPCD				
Year		**Service Area Population**	**Gross Water Use (AFY)**	**Daily Per Capita Water Use**
1	2003	100,788	24,909	221
2	2004	104,237	26,684	229
3	2005	104,120	26,128	224
4	2006	105,754	27,934	236
5	2007	107,396	28,152	234
5 Year Average Baseline GPCD				**229**
2015 Compliance Year GPCD				
2015		118,227	17,015	**128**

2.5.2 Compliance Water Use Targets

As explained above, SBX7-7 requires that the PWD identify its demand reduction targets for years 2015 and 2020 by utilizing one of four options.

- Option 1: 80% of baseline GPCD water use (i.e., a 20% reduction).
- Option 2: The sum of the following performance standards: indoor residential use (provisional standard set at 55 GPCD); plus landscape use, including dedicated and residential meters or connections equivalent to the State Model Landscape Ordinance (80% ETo existing landscapes, 70% of ETo for future landscapes); plus 10% reduction in baseline commercial, industrial institutional use by 2020.
- Option 3: 95% of the applicable state hydrologic region target as set in the 2010 DWR 20x2020 Plan.
- Option 4: Savings by Water Sector: this provisional method developed by DWR, identifies water savings obtained through identified practices and subtracts

them from the base daily per capita water use value identified for the water supplier.

Options 2 and 4 were considered and not selected because they required data not currently being collected within the PWD's service area.

The PWD service area is located within the South Lahontan Hydrologic Region as defined by DWR and this hydrologic region has been assigned a 2020 water use target of 162 GPCD per the DWR 20x2020 Water Conservation Plan. Therefore, in order to use Option 3, the PWD's daily per capita water use for the 5-year base period would have to be close to 95 percent of the 162 GPCD target, or 154 GPCD. Since the PWDs' 5-year base period is greater than this limit, this option was not chosen as the target method.

The PWD has selected Option 1, a 20 percent reduction of ten-year baseline per capita use. The ten-year baseline per capita use was 231 GPCD, requiring a reduction to 185 GPCD (231 x .80=185) with a 208 GPCD 2015 Interim Target. These calculations are summarized in Table 2-9.

As shown in Table 2-8, the PWD had a 2015 GPCD of 128, which means the PWD has met the 2015 Interim Target, as well as the 2020 Compliance Target.

TABLE 2-9: COMPONENTS OF TARGET DAILY PER CAPITA WATER USE

Period	Value		Unit	
10-year period selected for baseline GPCD	*First Year*	*1995*	*Last Year*	*2004*
5-year period selected for maximum allowable GPCD	*First Year*	*2003*	*Last Year*	*2007*
Highest 10-year Average	231		GPCD	
Highest 5-year Average	229		GPCD	
Compliance Water Use Target (20% Reduction on 10yr)	185		GPCD	
Max Allowable Water Use Target (5% Reduction 5yr)	218		GPCD	
2020 Target	**185**		GPCD	
2015 Interim Target	**208**		GPCD	
Methodology Used	Option #1			

The PWD plans to maintain progress on meeting the 20x2020 water use targets through the continuation of existing methods of conservation that have been proven successful to date, and other methods discussed in Section 7 Demand Management Measures.

2.6 Projected Water Use

2.6.1 Water Delivery Projections

The PWD's projected water deliveries were estimated considering various factors, including historical and current demands, anticipated water conservation bounce-back, and population projections.

Projected water deliveries assume that there will be an increase by 10 percent above current demands (starting in 2020) resulting from a conservation "bounce-back". This bounce-back effect is based on the assumption that drought conditions resulted in greater than usual water

demand reductions, particularly in 2015, which will diminish slightly once water conditions normalize again.

Projections through 2040 assume that water demands will grow at a similar rate to the population projections that are presented in Section 2.3 (approximately 2% over the 20-year planning horizon). Population projections are based on the PWD Water Master Plan Draft Report (MWH 2015). Water delivery projections are presented in Table 2-10.

In addition, recent legislation provides that "if available and applicable" to the PWD, demand projections "may" display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area. If such information is reported, the assessment will provide citations of the various codes, standards, ordinances, or transportation and land use plans utilized in making the projections. This UWMP does not include such savings in the demand projections.

TABLE 2-10: PROJECTED WATER DELIVERIES (AF)

Water Use Sector	2020	2025	2030	2035	2040
Single family	14,500	15,200	15,900	16,600	17,300
Multi-family	1,800	1,900	2,000	2,100	2,200
Commercial	1,200	1,300	1,300	1,400	1,500
Industrial	2,200	2,300	2,400	2,500	2,600
Institutional/Governmental	-	-	-	-	-
Landscape	1,000	1,100	1,200	1,200	1,300
Other	100	100	100	100	100
Total	**20,800**	**21,900**	**22,900**	**23,900**	**25,000**

Note: Values are rounded.

2.6.2 Projected Sales and Other Water Uses

Currently no water sales to other agencies are anticipated for the future. Based on recent water loss analyses, system losses (real and apparent) are assumed to be approximately eight percent of supplied water and other non-revenue water is assumed to account for approximately one percent. These estimated water uses are shown in Table 2-11 and are accounted for in total deliveries shown in Table 2-10.

TABLE 2-11: FUTURE SALES AND "OTHER" WATER USES (AF)

Water Use Type	2020	2025	2030	2035	2040
Sales to Other Agencies	0	0	0	0	0
Groundwater Recharge/Storage/Banking	0	0	0	0	0
Long Term System Storage	0	0	0	0	0
Saline Water Intrusion Barrier	0	0	0	0	0
Agricultural Irrigation	0	0	0	0	0
Other (unbilled authorized)[(a)(b)]	260	270	290	300	310
System Losses (real and apparent losses)[(c)]	1,660	1,740	1,830	1,910	1,990
Total	**1,920**	**2,010**	**2,120**	**2,210**	**2,300**

Notes: Values are rounded.
(a) Unbilled authorized consumption is water that is used by customers known to the water system but is not billed (ex., firefighting, street cleaning, etc.).
(b) Calculated as 1.25% of total deliveries from Table 2-10. It is assumed that these uses are already captured in water delivery projections.
(c) Calculated as 8% of total deliveries from Table 2-10. It is assumed that these uses are already captured in water delivery projections.

2.6.3 Lower Income Projected Water Demands

The UWMP Act requires that water use projections of a UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county general plan in the service area of the supplier.

Based on a GIS analysis using census data, disadvantaged communities (DACs) made up approximately 50 percent of the PWD service area population in 2010. For purposes of estimating water use projections for the PWD's lower income households, the proportion of lower income households within the PWD's service area is assumed to be 50 percent through 2040. Related demands are presented in Table 2-12 and are accounted for in total water demands described in Section 2.5.

TABLE 2-12: PROJECTIONS OF FUTURE LOW-INCOME HOUSEHOLD WATER USE (AF)

Water Use	2020	2025	2030	2035	2040
Estimated Lower Income Water Use[(a)]	8,100	8,500	8,900	9,300	9,700

Notes: Values are rounded.
(a) Calculated as 50 percent of the single-family and multi-family residential demands presented in Table 2-10.

In addition, the PWD will not deny or condition approval of water services, or reduce the amount of services applied for by a proposed development that includes housing units affordable to lower income households unless one of the following occurs:

- The PWD specifically finds that it does not have sufficient water supply;
- The PWD is subject to a compliance order issued by the SWRCB DDW that prohibits new water connections; or

- The applicant has failed to agree to reasonable terms and conditions relating to the provision of services.

2.7 Weather Effects on Water Usage

A major factor that affects water usage is weather. 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, historical water usage has decreased, reflecting less water usage for exterior landscaping. Even without population changes, water demand could increase. Precipitation and temperature influence water demand for outdoor landscaping; outdoor water use is a large component of water demands in the Antelope Valley. Lower spring rainfall increases the need to apply irrigation water. Further, warmer temperatures increase crop evapotranspiration, which increases water demand.

2.7.1 Conservation Effects on Water Usage

In recent years, water conservation has become an increasingly important factor in water supply planning and management in California. Over the past ten years there have been a number of regulatory changes related to conservation including new standards for plumbing fixtures, a new landscape ordinance, a state universal retrofit ordinance, new Green Building standards, demand reduction goals and more. The California plumbing code has also instituted requirements for new construction that mandate the installation of ultra-low-flow toilets and low-flow showerheads.

During the current drought, Governor Brown issued a January 2014 drought proclamation and April 2014 emergency declaration, calling on urban water suppliers to implement their local water shortage contingency plans. In April 2015, following the lowest snowpack ever recorded, Governor Brown directed the SWRCB to implement mandatory water reductions to reduce water usage by 25 percent. In May 2015, the SWRCB adopted an emergency regulation requiring an immediate 25 percent reduction in overall potable urban water use and began tracking water conservation for each of the state's larger urban retail water suppliers. This statewide reduction target translated into a 32 percent local reduction requirement, which has resulted in PWD -issued emergency restrictions. In February 2016 and again in April 2016, the SWRCB approved updated and extended emergency regulations that continue mandatory reductions through January 2017, unless revised before then. The extended regulation provides more flexibility to urban water suppliers in meeting their conservation requirements and provides credits for certain factors that affect water use such as hotter-than-average climates, population growth, and significant investments in new local drought resilient water sources such as recycled water.

Residential, commercial, and industrial usage can be expected to decrease as a result of the implementation of more aggressive water conservation practices. In Southern California, the greatest opportunity for conservation is in developing greater efficiency and reduction in landscape irrigation. The irrigation demand can typically represent as much as seventy percent of the water demand for residential customers depending on lot size and amount of irrigated turf and plants. Conservation efforts will increasingly target this component of water demand. Details on demand management measures and the PWD's conservation program are provided in Section 7.

Section 3: Water Supply

3.1 Overview

This section describes the water resources available to the PWD for the 25-year period covered by this UWMP. The PWD currently receives water from three sources: groundwater, surface water from Littlerock Dam Reservoir, and imported water from the SWP. Groundwater is obtained from the Antelope Valley Groundwater Basin. This water is treated, pumped into the Littlerock Dam Reservoir and transferred from the reservoir to Lake Palmdale for distribution. The PWD's imported water is provided by the SWP and is conveyed through the East Branch of the California Aqueduct to Lake Palmdale, which acts as a forebay for the PWD's 35 million gallon per day (MGD) water treatment plant. Lake Palmdale can store approximately 4,129 AF of SWP and Littlerock Dam Reservoir water.

The PWD currently does not have recycled water supplies but is in the process of developing the use of non-potable water to offset potable water demand and to diversify its water supply options. Future recycled water use is discussed in detail in Section 4. Additionally the PWD is developing new sources of supply via groundwater banking and anticipated new supplies from transfer and exchange opportunities, which are discussed in this section. The PWD does not currently nor does it have plans to use stormwater.

These supplies are summarized in Table 3-1 and discussed in more detail below. Both currently available and planned supplies are discussed.

This section also assesses supplies available to the PWD in an average year, a single dry year, and during multiple dry years.

- An average year (also called a normal year) is the average supply over a range of years and represents the median water supply available.
- The single-dry year is the year that represents the lowest water supply available.
- The multiple-dry year period is the lowest average water supply available for three or more consecutive dry years.

The term "dry" is used throughout this section and in subsequent sections concerning water resources and reliability as a measure of supply availability. As used in this Plan, dry years are those years when supplies are the lowest and demands are the highest, which occurs primarily when precipitation is lower than the long-term average precipitation. The impact of low precipitation in a given year on a particular source of supply may differ based on how low the precipitation is, or whether the year follows a high-precipitation year or another low-precipitation year. For the SWP, a low-precipitation year may or may not affect supplies, depending on how much water is in SWP storage at the beginning of the year. Also, dry conditions can differ geographically. For example, a dry year can be local to the Antelope Valley area (thereby affecting local groundwater replenishment and production, and yield from Littlerock Dam Reservoir), local to northern California (thereby affecting SWP water deliveries), or statewide (thereby affecting both local groundwater and the SWP). When the term "dry" is used in this Plan, statewide drought conditions are assumed, affecting both local groundwater and SWP supplies at the same time.

TABLE 3-1: SUMMARY OF CURRENT AND PROJECTED WATER SUPPLIES (AF)

		2015		2020	2025	2030	2035	2040
	Detail	Actual Volume	Level of Treatment	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume
Existing Supplies								
Groundwater[(a)]	Antelope Valley Groundwater Basin	11,200	Drinking Water	6,280	4,140	2,770	2,770	2,770
Groundwater[(a)]	Return Flow Credit	0	Drinking Water	5,000	5,000	5,000	5,000	5,000
Surface Water[(b)]	Littlerock Reservoir	500	Raw Water	4,000	4,000	4,000	4,000	4,000
Imported Water[(c)]	SWP Table A	5,800	Raw Water	13,200	13,000	13,000	13,000	13,000
Imported Water	Butte Transfer Agreement[(d)]	0	Raw Water	6,200	6,100	6,100	6,100	6,100
Recycled Water	LACSD[(e)]	100	Recycled Water	2,500	5,000	5,500	6,000	6,000
	Total Supplies	**17,600**	**-**	**37,180**	**37,240**	**36,370**	**36,870**	**36,870**

Notes: Values are rounded.
(a) See Section 3.2.1.3 for details.
(b) Projections based on estimated 50 percent of average historical yield (50 percent of 8,000 AFY). See Section 3.2.2.2.
(c) Projections assume Table A availability of 62% for 2020 and 61% thereafter, based on 2015 DCR. See Section 3.2.3.2.
(d) Projections assume Table A availability of 62% for 2020 and 61% thereafter, based on 2015 DCR. See Section 3.3.1.
(e) For details see Section 4.

3.2 Local Water Supplies

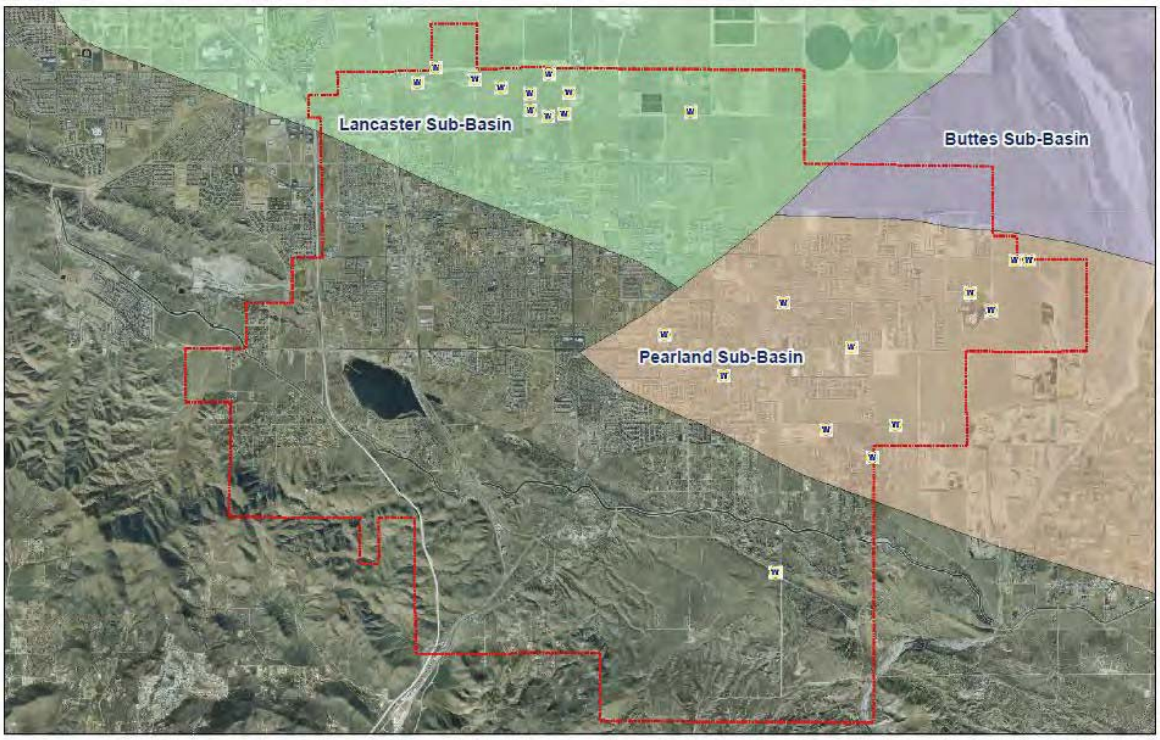
3.2.1 Groundwater

Groundwater pumping currently makes up a significant proportion of the PWD's water supply portfolio, accounting for about 50 percent of supplies over the last five years. The District's groundwater supply is the Antelope Valley Groundwater Basin (DWR Basin No. 6-44, Bulletin 118), where there are 22 active wells currently drawing from the aquifer. This water is treated with chlorine disinfection and pumped directly into the District's potable distribution system. Since 1995, the District has produced on average 9,759 AF of groundwater per year. The availability of groundwater supply for the PWD does not vary throughout the course of a year.

3.2.1.1 Groundwater Subbasins

The U.S. Geological Survey has identified a series of subbasins in the Antelope Valley Groundwater Basin. The PWD service area overlies the Lancaster, Buttes, and Pearland groundwater subbasins as shown in Figure 3-1. The boundaries between the three subbasins are determined by discontinuity or by steepening of the groundwater surface as measured in wells, rather than by surface evidence of faults. Movement of groundwater from the Pearland and Buttes subbasins to the Lancaster subbasin is slowed across these boundaries. The total amount of water transferred between these three subbasins is unknown (RMC 2011).

FIGURE 3-1: GROUNDWATER SUBBASINS



Note: This map does not include the San Andreas Rift Zone groundwater bearing areas

3.2.1.1.1 Lancaster Subbasin

The Lancaster subbasin is located in the center of the Antelope Valley Groundwater Basin with its southernmost portions lying within the PWD service area. It is bounded by bedrock to the south and by the Buttes and Pearland subbasins to the east. Alluvium in this subbasin reaches a thickness of about 1,100 feet in the northern portion of the service area. Two aquifer zones occur in this subbasin. The principal (upper) aquifer is confined and is several hundred feet thick within the PWD service area. The PWD has 12 wells in the Lancaster subbasin. Currently, the PWD operates 10 wells in the Lancaster subbasin, with a pumping capability of approximately 12,500 gallons per minute (gpm).

3.2.1.1.2 Buttes Subbasin

The Buttes subbasin is located southeast of the Lancaster subbasin. A small portion underlies the PWD service area. The PWD does not currently have any wells or pump water from this subbasin. The aquifer zone consists of approximately 150 feet of saturated alluvial deposits.

3.2.1.1.3 Pearland Subbasin

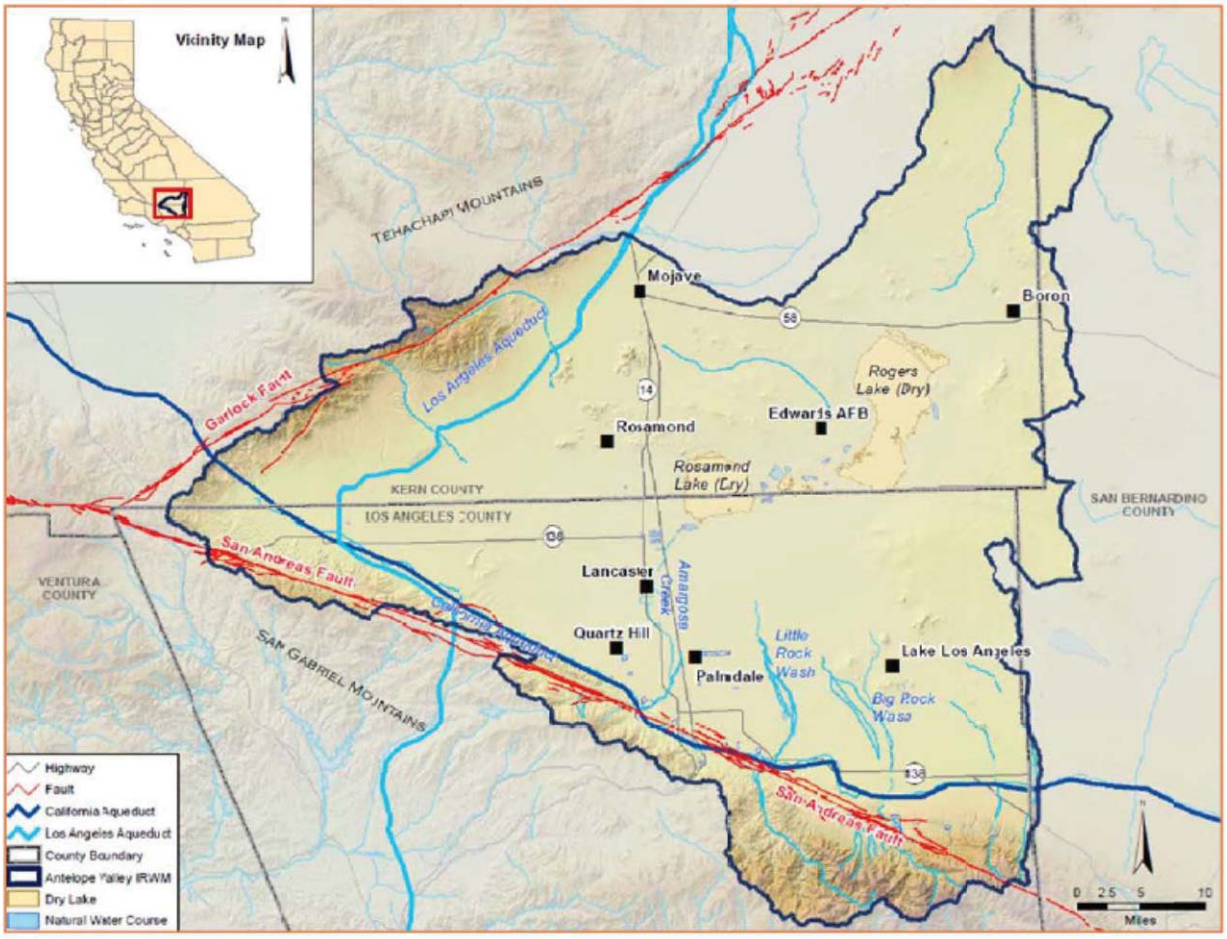
The Pearland subbasin is also located southeast of the Lancaster Subbasin. This subbasin is bounded on the south by bedrock, on the north by a fault separating it from Buttes subbasin and on the West by the basin boundary. The northern most portion of the subbasin lies within the PWD service area. A single aquifer zone occurs within the Pearland subbasin and consists of approximately 250 feet of saturated alluvial deposits. The PWD has 11 wells in the Pearland subbasin. Currently, the PWD operates 10 wells in the Pearland subbasin, with a pumping capability of 3,500 gpm.

3.2.1.1.4 San Andreas Rift Zone

The San Andreas rift zone has two general groundwater-bearing areas. These areas generally lie east and west of the intersection of Pearblossom Highway and Barrel Springs Road. The area to the east is a narrow valley, with poor groundwater production potential. The area to the west is a broader valley with more extensive groundwater-bearing deposits. The PWD has 4 wells in the San Andreas rift zone, 2 in the western area and 2 in the eastern area. Currently, the PWD operates 3 of these wells pumping approximately 150 AF each year.

The depth to water along the San Andreas rift zone is generally about 25 feet below the ground surface, with a seasonal groundwater level fluctuation of 15 feet. Over the long term, groundwater levels in sediments within the fault zone have remained relatively stable, suggesting that the groundwater-bearing sediments have not been overdrawn. The rift zone is shown on Figure 3-2.

FIGURE 3-2: ANTELOPE VALLEY HYDROLOGIC FEATURES



Source: 2013 Antelope Valley Integrated Regional Water Management Plan

3.2.1.2 Historical Groundwater Pumping

Recent total groundwater pumped from the Antelope Valley Groundwater Basin by the PWD is shown in Table 3-2. The PWD's groundwater supplies accounted for 26 to 64 percent of the PWD's water supplies between 2011 and 2015. The projected groundwater pumping volumes are discussed in Section 3.2.1.3. As described in that section, pumping in the Antelope Valley Groundwater Basin will decrease in the future due to the adjudication process.

TABLE 3-2: HISTORICAL PUMPING BY PWD FROM THE ANTELOPE VALLEY GROUNDWATER BASIN (AF)

Basin Name	2011	2012	2013	2014	2015	Average
Antelope Valley	7,000	7,500	9,400	12,400	11,200	9,500

Source: PWD Groundwater and Surface water comparison production spreadsheet; 1994-2016.
Note: Values are rounded.

3.2.1.3 Adjudication and Projected Groundwater Pumping

The PWD is one of the entities involved in the adjudication of groundwater rights for the Antelope Valley Groundwater Basin that began in 2004. As part of an adjudication process, the court determines all the water rights in the basin, and orders either the reduction of groundwater extractions to levels that will stabilize or reverse groundwater level declines, or the purchase of imported water to replace over extraction of groundwater, or both.

In late 2015, the PWD as well as the majority of parties involved agreed to a stipulated judgment for the adjudication of the Antelope Valley Groundwater Basin[1]. This resulted in the PWD receiving a groundwater production right of 2,770 AFY. The judgment is on appeal, but the PWD believes that it is unlikely that its groundwater production right will change significantly as a result of the appeal. Prior to the judgment the PWD had an unquantified right to pump water for beneficial use, and assumed projected pumping volumes at 12,000 AF based on pumping capacity.

The judgment allows the PWD seven years, until 2023, to ramp down pumping and come into compliance with the new groundwater right. For the purpose of this analysis it is assumed that the PWD will be in full compliance by 2025 as shown in Table 3-3.

In addition to its groundwater production right, the PWD is entitled to a share of the unused federal reserved right: The judgment gives the federal government a right to pump 7,600 AFY, but it does not currently pump that much. The amount that the federal government does not pump is allocated among certain public water suppliers. Currently, the average amount of the PWD's share of unused Federal Reserved Water Right Production is 1,370 AFY. Although the federal government has the right to increase its pumping at any time, the PWD believes that it will be able to pump this amount at least until 2025.

The PWD is also entitled to a pumping allocation for return flow credit of imported water used. The return flow credit is equal to 39.1% of all of the SWP water utilized by the PWD either for direct use via the Leslie O. Carter Water Treatment Plant (WTP) or for recharge at the Palmdale Regional Groundwater Replenishment and Recovery Project (GRRP; described in Section 3.3.3.1). Based on the analyses conducted as part of the Palmdale Regional GRRP planning reports (Kennedy/Jenks 2015 and 2016), return flow credits are projected to range between approximately 4,900 AFY and 6,000 AFY through 2040. For purposes of supply projections in this UWMP, 5,000 AFY in return flow credits are assumed to be available through 2040, for all water year types. These projections are shown in Table 3-4.

[1] Judgment, *Antelope Valley Groundwater Cases*, Los Angeles County Superior Court, Judicial Council Coordination Proceeding No. 4408 (filed Dec. 28, 2015) (provided in Appendix J).

Finally, under the adjudication judgment, the PWD is able to purchase or lease groundwater rights from other parties. It is expected that additional rights will be available to the PWD throughout the period covered by this plan, if needed.

TABLE 3-3: PROJECTED PUMPING BY PWD FROM THE ANTELOPE VALLEY GROUNDWATER BASIN (AF)[(a)(b)]

Basin Name	2020	2025	2030	2035	2040
Antelope Valley					
Normal Year	6,280	4,140	2,770	2,770	2,770
Single Dry Year	6,280	4,140	2,770	2,770	2,770
Multiple Dry Year	6,280	4,140	2,770	2,770	2,770

Source: Personal Communication, PWD, April 2016
Note: Values are rounded.
(a) For the purpose of this analysis it is assumed that the PWD will be in compliance with the lowered groundwater right by 2025 as stipulated by the adjudication judgment.
(b) Values include both the PWD's production right and its share of the unused federal reserved right.

TABLE 3-4: PROJECTED GROUNDWATER RETURN FLOW CREDITS (AF)

Water Source	2020	2025	2030	2035	2040
Return Flow Credit[(a)]	5,000	5,000	5,000	5,000	5,000

Note:
(a) Assumes same availability for all water year types.

3.2.1.4 Groundwater Management Plan

The PWD has not adopted a groundwater management plan, and no regional groundwater management plan currently exists for the basin. The adjudication, however, includes a court-ordered physical solution, which is a plan for managing groundwater.

In 2014 the Sustainable Groundwater Management Act (SGMA) was passed. SGMA requires the formation of local groundwater sustainability agencies (GSAs) that must assess conditions in their local groundwater basins and adopt locally-based management plans. For those basins DWR has identified as medium to high priority (the Antelope Valley Groundwater Basin is a high-priority basin), SGMA requires GSA's to implement plans and achieve long-term groundwater sustainability. However, because the superior court issued a final judgment in the adjudication, the Antelope Valley Basin is exempt from the requirements of SGMA..

3.2.1.5 Groundwater Reliability

The most recent version of DWR's Bulletin 118, California's Groundwater (2003), does not characterize the groundwater basin as overdrafted, however it was deemed a 'high-priority' basin by DWR. It is noted that the prior version of Bulletin 118 (1980) identified the Antelope Valley groundwater basin as overdrafted. The court in the ongoing adjudication referred to above made a finding that the basin is overdrafted, and the PWD agrees with that finding. The adjudication judgment and physical solution will eliminate, over time, the long-term overdraft,

either by reduction of pumping or the purchase of replacement water. Additional detail is provided in Section 3.2.1.3.

3.2.2 Local Surface Water

Littlerock Dam Reservoir was built in 1922. This reservoir constitutes the PWD's local surface water supply source and is located in the hills southwest of the PWD service area. Recent renovations to Littlerock Dam Reservoir have increased its storage capacity to 3,500 AF, or 1.1 billion gallons of water.

Littlerock Dam reservoir is fed by natural runoff from snow pack in the local San Gabriel Mountains and from rainfall. The principal tributary streams supply water to the PWD service area are Littlerock and Big Rock Creeks, which flow north from the San Gabriel Mountains along the PWD's southern boundary. Numerous intermittent streams also flow into the service area, however run-off is meager.

The Littlerock Dam Reservoir intercepts flows from Littlerock and Santiago Canyons. Runoff from the 65 square mile watershed in the Angeles National Forest to the reservoir is seasonal and varies widely from year to year.

The water is transferred from Littlerock Dam Reservoir through a seven mile long open ditch to Lake Palmdale. Although Littlerock Creek flows mainly during winter and spring months, this is buffered somewhat by Littlerock Dam Reservoir, allowing this water to be available throughout the year.

3.2.2.1 Local Surface Water Entitlements

Since 1922, the PWD has shared water from this source with LCID. PWD and LCID jointly hold long-standing water rights to divert 5,500 AFY from Littlerock Creek flows. Per an agreement between the two districts, the first 13 cubic feet per second (cfs) of creek flows is available to LCID (with modifications as described below). Any flow above 13 cfs is shared between the two districts with 75 percent going to the PWD and 25 percent to LCID. Each district is entitled to 50 percent of the reservoir's storage capacity. On average, the PWD has taken approximately 4,000 AF per year from Littlerock Dam Reservoir.

In 1992, during renegotiations of the PWDs' agreement, a plan to rehabilitate the existing dam was implemented. The plan involved reinforcing the original multiple-arch construction with roller-compacted concrete buttress, raising the dam by 12 feet to increase capacity, providing recreational facilities around the reservoir, and replacing the historic wooden trestle between the creek and the reservoir with an underground siphon. The entire project was completed by the end of 1995. This revised agreement gives the PWD the authority to manage the reservoir. LCID granted ownership of its water rights to the PWD for the fifty-year term of the agreement in lieu of contributing financial resources for the rehabilitation work. LCID is currently entitled to purchase from the PWD, in any one calendar year, 1,000 AF of water or 25 percent of the yield from Littlerock Dam Reservoir, whichever is less.

3.2.2.2 Historical and Projected Local Surface Water Production

The PWD's historical and current production from Littlerock Dam Reservoir is shown in Table 3-5. Historically the PWD's local surface water production accounts for approximately 1 to 10 percent of its water supplies. The projected local surface water production from Littlerock Dam Reservoir is shown in Table 3-6. It is assumed the PWD will diversify its water supply portfolio and maintain constant production volumes from Littlerock Dam Reservoir.

TABLE 3-5: HISTORICAL SURFACE WATER SUPPLIES (AF)

Water Source	2011	2012	2013	2014	2015	Average
Littlerock Reservoir	2,600	0	1,600	700	500	1,100

Source: PWD Public Water System Statistics.
Note: Values are rounded.

TABLE 3-6: PROJECTED SURFACE WATER SUPPLIES (AF)

Water Source	2020	2025	2030	2035	2040
Littlerock Reservoir					
Normal Year	4,000	4,000	4,000	4,000	4,000
Single Dry Year	4,000	4,000	4,000	4,000	4,000
Multiple Dry Year	4,000	4,000	4,000	4,000	4,000

Source: Personal Communication, PWD, January 2016

3.2.3 Imported Water

In the early 1960s, DWR entered into individual SWP Water Supply Contracts with urban and agricultural public water supply agencies located throughout northern, central and southern California for SWP water supplies. The PWD is one of 29 water agencies (commonly referred to as "contractors") that have an SWP Water Supply Contract with DWR. Each SWP contractor's SWP Water Supply Contract contains a "Table A," which lists the maximum amount of contract water supply, or "Table A water," an agency may request each year throughout the life of the contract. The Table A Amounts in each contractor's SWP Water Supply Contract ramped up over time, based on projections at the time the contracts were signed of future increases in population and water demand, until they reached a maximum Table A Amount. Most contractor's Table A Amounts reached their maximum levels in the early to mid-1990s. Table A Amounts are used in determining each contractor's proportionate share, or "allocation," of the total SWP water supply DWR determines to be available each year.

DWR provides water supply from the SWP to its 29 SWP Contractors in exchange for Contractor payment of all costs associated with providing that supply. DWR and each of the Contractors entered into substantially uniform long-term Water Supply Contracts in the 1960s with initial 75-year terms, which thus would begin to expire in 2035. While the Contracts provide for continued water service to the Contractors beyond the initial term, efforts are currently underway to extend the Contracts to improve financing for the SWP.

The majority of the capital costs associated with the development and maintenance of the SWP is financed using revenue bonds. These bonds have historically been sold with 30-year terms. It has become more challenging in recent years to affordably finance capital expenditures for the SWP because bonds used to finance these expenditures are limited to terms that only extend to the year 2035, less than 30 years from now. To ensure continued affordability of debt service to Contractors, it is necessary to extend the term of the Contracts, which will allow DWR to continue to sell bonds with 30-year terms.

Negotiations on extending the Contracts took place between DWR and the Contractors during 2013 and 2014, and were open to the public. The following terms were agreed to and are currently the subject of analysis under the requirements of the California Environmental Quality Act (CEQA) (Notice of Preparation dated September 12, 2014):

- Extend the term of the 29 Water Supply Contracts to December 31, 2085.
- Provide for increased SWP financial operating reserves during the extended term of the Contracts.
- Provide additional funding mechanisms and accounts to address SWP needs and purposes.
- Develop a revised payment methodology with a corresponding billing system that better matches the timing of future SWP revenues to future expenditures.

It is anticipated that the term of the SWP Contracts will be extended to December 31, 2085 and the data and information contained in this UWMP reflect that assumption to improve coordination between supply and demand projections beyond the year 2035 as provided in the Urban Water Management Planning Act. (CWC Section 10631[b].)

The total planned annual delivery capability of the SWP and the sum of all Contractors' maximum Table A amounts was originally 4.23 million AF. The initial SWP storage facilities were designed to meet Contractors' water demands in the early years of the SWP, with the construction of additional storage facilities planned as demands increased. However, essentially no additional SWP storage facilities have been constructed since the early 1970s. SWP conveyance facilities were generally designed and have been constructed to deliver maximum Table A Amounts to all contractors. After the permanent retirement of some Table A Amount by two agricultural contractors in 1996, the maximum Table A amounts of all SWP contractors now totals about 4.17 million AF. Currently, the PWD's annual Table A Amount is 21,300 AF. Over the last decade, the PWD has received between 41 percent and 77 percent of its 21,300 AF contractual amount.

3.2.3.1 Historical Imported Water Deliveries

The PWD's recent SWP deliveries are shown in Table 3-7. Since 2011, imported water has accounted for approximately 26 to 66 percent of the PWD's water supply.

TABLE 3-7: HISTORICAL IMPORTED WATER SUPPLIES (AF)

Water Source	2011	2012	2013	2014	2015	Average
Imported SWP	17,313	14,695	7,681	4,675	5,800	10,033

Source: 2015 DCR. Values include carryover supplies.

3.2.3.2 Imported Water Reliability

SWP supplies originate in northern California, primarily from the Feather River watershed. The availability of these supplies is dependent on the amount of precipitation in the watershed, the amount of that precipitation that runs off into the Feather River, water use by others in the watershed and the amount of water in storage in the SWP's Lake Oroville at the beginning of the year. Variability in the location, timing, amount and form (rain or snow) of precipitation, as well as how wet or dry the previous year was, produces variability from year to year in the amount of water that flows into Lake Oroville. However, Lake Oroville acts to regulate some of that variability, storing high inflows in wetter years that can be used to supplement supplies in dry years with lower inflows.

As discussed in Section 1.8 and in DWR's 2015 DCR, climate change adds another layer of uncertainty in estimating the future availability of SWP source water. Current literature suggests that global warming may change precipitation patterns in California from the patterns that occurred historically. While different climate change models show differing effects, potential changes could include more precipitation falling in the form of rain rather than snow and earlier snowmelt, which would result in more runoff occurring in the winter rather than spread out over the winter and spring.

DWR prepares a biennial report to assist SWP contractors (including PWD) and local planners in assessing the near and long-term availability of supplies from the SWP. DWR issued its most recent update, the 2015 DCR, in July 2015. In the 2015 DCR, DWR provides SWP supply estimates for SWP contractors to use in their planning efforts, including for use in their 2015 UWMPs. The 2015 DCR includes DWR's estimates of SWP water supply availability under both current and future conditions.

In the 2015 DCR, DWR estimates that for all contractors combined, the SWP can deliver on a long-term average basis a total Table A supply of 62 percent of total maximum Table A Amounts under current conditions and 61 percent under future conditions[2]. In the worst-case single critically dry year, DWR estimates the SWP can deliver a total Table A supply of 11 percent of total maximum Table A Amounts under current conditions and 8 percent under future conditions. During multiple-year dry periods, DWR estimates the SWP can deliver a total Table A supply averaging 28 to 33 percent of total maximum Table A Amounts under current conditions and 27 to 34 percent under future conditions. For this 2015 UWMP for the PWD the

[2] DWR's estimates of SWP deliveries in the 2015 DCR are based on a computer model that simulates monthly operations of the SWP and Central Valley Project systems. One of the model studies used to evaluate SWP supply availability under future conditions in the 2015 DCR is the Early Long Term (ELT) scenario, which uses the same model assumptions for current conditions, but also changes expected to occur from climate change, specifically, a 2025 emission level and a 15 cm sea level rise. In this 2015 UWMP, future SWP supply availability is based on the ELT study included in the 2015 DCR.

4-year multiple dry year scenario, assuming a repeat of years 1931 to 1934, was assumed. Given a repeat of hydrologic conditions 1931 to 1934 the SWP is expected to deliver 33 percent of the PWD's Table A allocation. Imported water supply projections are shown in Table 3-8.

The extremely dry sequence from the beginning of January 2013 through the end of 2014 was one of the driest two-year periods in the historical record. Water year 2013 was a year with two hydrologic extremes.[3] October through December 2012 was one of the wettest fall periods on record, but was followed by the driest consecutive 12 months on record. Accordingly, the 2013 SWP supply allocation was a low 35% of SWP Table A Amounts. The 2013 hydrology ended up being even drier than DWR's conservative hydrologic forecast, so the SWP began 2014 with reservoir storage lower than targeted levels and less stored water available for 2014 supplies. Compounding this low storage situation, 2014 also was an extremely dry year, with runoff for water year 2014 the fourth driest on record. Due to extraordinarily dry conditions in 2013 and 2014, the 2014 SWP water supply allocation was a historic low of 5% of Table A Amounts.

The dry hydrologic conditions that led to the low 2014 SWP water supply allocation were extremely unusual, and to date have not been included in the SWP delivery estimates presented in DWR's 2015 DCR.[4] It is anticipated that the hydrologic record used in the DWR model will be extended to include the period through 2014 during the next update of the model, which is expected to be completed prior to issuance of the next update to the biennial SWP Delivery Capability Report. For the reasons stated above, this 2015 UWMP uses a conservative assumption that a 5% allocation of SWP Table A Amounts represents the "worst case" scenario.

[3] A water year begins in October and runs through September. For example, water year 2013 is October 2012 through September 2013.

[4] SWP delivery estimates from DWR's 2015 SWP Delivery Capability Report are from computer model studies which use 82 years of historical hydrologic inflows from 1922 through 2003.

TABLE 3-8: PWD IMPORTED WATER SUPPLY RELIABILITY AVERAGE, SINGLE-DRY YEAR AND MULTIPLE-DRY YEAR CONDITIONS

Imported SWP Supplies	2020	2025	2030	2035	2040
PWD Table A Allocation	**21,300**	**21,300**	**21,300**	**21,300**	**21,300**
Average Water Year[a]					
% of Table A Amount Available	62%	61%	61%	61%	61%
Anticipated Deliveries (AF)[d]	13,200	13,000	13,000	13,000	13,000
Single-Dry Year[b]					
% of Table A Amount Available	11%	10%	9%	9%	8%
Anticipated Deliveries (AF)[d]	2,300	2,100	1,900	1,900	1,700
% of Table A Amount Available	5%	5%	5%	5%	5%
Anticipated Deliveries (AF)[d]	1,065	1,065	1,065	1,065	1,065
Multiple-Dry Year[c]					
% of Table A Amount Available	33%	33%	33%	33%	33%
Anticipated Deliveries (AF)[d]	7,000	7,000	7,000	7,000	7,000

Notes:

(a) Supplies to the PWD are based on DWR analyses presented in its "2015 State Water Project Delivery Capability Report" (2015 DCR), assuming existing SWP facilities and current regulatory and operational constraints.

(b) Based on a repeat of the worst case historic single dry year of 1977 (from 2015 DCR).

(c) Supplies shown are annual averages over four consecutive dry years, based on a repeat of the historic four-year dry period of 1931-1934.

(d) Values are rounded.

The projected imported water deliveries to the PWD are shown in Table 3-9. It is assumed the PWD will diversify its water supply portfolio in the coming years in addition to using available imported SWP supplies.

TABLE 3-9: PROJECTED IMPORTED WATER SUPPLIES (AF)

Water Source	2020	2025	2030	2035	2040
Imported SWP Supplies					
Normal Year	13,200	13,000	13,000	13,000	13,000
Single-Dry Year	2,300	2,100	1,900	1,900	1,700
Multiple-Dry Year	7,000	7,000	7,000	7,000	7,000

Source: See Table 3-8.

3.2.4 Potential Supply Inconsistency

The PWD's supply reliability (discussed in detail in Section 6), can be impacted by many factors, including changes in the availability of supplies due to climatic or infrastructure changes, prolonged drought, as well as the efficient use of those supplies in both average and dry periods. These factors can result in acute impacts (facility failures), short-term impacts (SWP limitations), or long-term (drought) impacts to the reliability of its supplies. The factors resulting in the inconsistency of water supply, by source are identified in Table 3-10.

TABLE 3-10: FACTORS RESULTING IN INCONSISTENCY OF WATER SUPPLY

Water Source	Description	Limitation	Legal	Environmental	Water Quality	Climatic
Groundwater	Antelope Valley Groundwater Basin	Limited by well production capacity and adjudication	X		X	
Surface Water	Littlerock Reservoir	Limited by hydrology and diversion right	X			X
Imported Water	SWP (California Aqueduct)	Limited by Table A allocation and hydrologic conditions and/or regulatory constraints	X	X		X

3.3 Transfers, Exchanges, and Groundwater Banking Programs

In addition to SWP water supplies, local surface water, and groundwater, the PWD is currently exploring opportunities to utilize recycled water, groundwater banking, and other anticipated new sources.

3.3.1 Existing Transfer Agreement

The PWD currently has a long term lease agreement with Butte County for up to 10,000 AFY of their SWP Table A Amount. The amount available through this lease varies primarily on the final annual allotment from DWR to the State Water Contractors and can be roughly calculated by multiplying the final allotment percentage by 10,000 AF. This lease runs through 2019 and has 5 year renewal options through 2035, at which time the agreement will be renegotiated. The District assumes this supply for the purposes of this plan will continue through the planning period, to 2040. Supplies from this agreement are accounted for in PWD planned supplies and are anticipated to be available in future years based on SWP Table A Amounts projected for the PWD under normal, single-dry and multiple-dry year scenarios as described in Section 3.2.3.2. Accordingly, 62% or 6,200 AFY is anticipated to be available in 2020 and 61% or 6,100 AFY thereafter, as shown in Table 3-1.

3.3.2 Transfer and Exchange Opportunities

The PWD has evaluated various transfer and exchange opportunities that could aid in meeting projected water demands and has participated in a number of water transfers over the last several years. The PWD's anticipated new sources consist of additional water supply transfer and exchange opportunities. The PWD will utilize a combination of various transfer and exchange opportunities, as necessary, to meet its projected water demands.

The PWD recently completed and adopted its Strategic Water Plan (PWD 2014b) wherein it identified additional needed surface water acquisitions and transfers as a component of its overall water supply strategy. Table 3-11 describes these potential water transfer and acquisition opportunities.

TABLE 3-11: TRANSFER AND EXCHANGE OPPORTUNITIES

Transfer Agency	Transfer or Exchange	Short Term or Long Term	Proposed Volume (AF)
DWR	Excess Wet Year Water (Article 21)	Short Term	5,000-10,000
SWP	Wet-Year (1 Year)	Short Term	26,000
SWC/DWR	Dry year	Short Term	5,000-10,000
		Subtotal	*36,000-46,000*
SWP	Long-Term Lease	Long Term	10,000
SWP/Central Valley Project (CVP)	Permanent Transfer	Long Term	34,500
		Subtotal	*44,500*
SWP	Table A SWP Water	Short Term/ Permanent	10,000
CVP	CVP Water	Short Term/ Permanent	10,000
PRE-14	Non-SWP Water	Short Term/ Permanent	5,000-10,000
		Subtotal	*25,000-30,000*

For transfer and exchange strategic purposes, the PWD will:

- Establish the ability to bank available imported water and develop supply reliability within the Antelope Valley Groundwater Basin as soon as possible.
- Pursue partners to participate in developing the PWD's storage facilities including other Antelope Valley State Water Contractors Association (AVSWCA) members.
- Consider water banking in locations outside the PWD if they are cost effective and the project produces a value-added benefit (such as additional aqueduct delivery capacity).

3.3.3 Groundwater Banking Programs

3.3.3.1 Palmdale Groundwater Replenishment and Recovery Project

The PWD does not operate a banking program but is actively pursuing this future water supply reliability option. Currently the PWD is researching the feasibility of the Palmdale Groundwater Replenishment and Recovery Project (GRRP). This project would help to meet future water demands and improve water supply reliability. New facilities will be constructed to recharge and recover SWP water as well as recycled water. Infrastructure would include new spreading grounds to recharge water as well as recovery facilities. Recycled water will be augmented with surplus SWP water stored during normal and wet years allowing for the efficient utilization of SWP water when available. The GRRP will leverage imported water as a diluent source to recharge recycled water. It is anticipated that the GRRP recharge will have a ratio of 20% recycled water to 80% diluent (imported) water blend, which will transition to a 40% recycled water to 60% diluent water in the future.

The recovery of potable groundwater would be continuous as a base potable water supply; production rates will help the PWD meet future water demands during all water types when

combined with existing supply facilities. The project will be developed in three phases in order to meet Title 22 requirements, align with PWD's future water demands and spread capital infrastructure investments over time. The first phase of the project, anticipated to be operational beginning in 2019, is expected to provide on average 7,500 AFY of recharge water available for extraction starting in 2020. As the GRRP facilities are expanded through the remaining phases, the anticipated recharge volumes and potential extraction volumes will increase to an average extraction of 10,800 AF. More information can be found in the 2016 Title 22 Engineering Report (Kennedy/Jenks 2016) and the 2015 Feasibility Study (Kennedy/Jenks 2015).

3.3.3.2 Additional Groundwater Banking Opportunities

In addition, there are other water banks operating in a variety of locations throughout the state and in various forms. The PWD is currently exploring banking opportunities within and outside the Antelope Valley. The list below includes the PWD's current groundwater water banking options.

- **Storage North of Delta**: This would consist of an exchange or transfer with agricultural entities north of the Delta in site specific areas for an interim or short-term basis. The PWD could store 5,000 to 10,000 AF and recover 2,500 to 5,000 AF.

- **San Joaquin Valley Storage**: This would consist of purchasing shares in the Semitropic Water Bank, which is currently in operation. The PWD could store over 60,000 AF and recover 10,000 to 20,000 AFY. Other banking programs may also be available.

- **Storage within the Antelope Valley**: This would consist of banking above-average SWP allocations in planned water banking projects in locations within the Antelope Valley. The PWD could store over 60,000 AF and recover 10,000 to 15,000 AFY.

- **Storage South of the PWD**: This would consist of banking above-average SWP allocations by providing these supplies to SWP contractor agencies for groundwater recharge or in-lieu recharge within their service areas and in turn, during dry years, the PWD would receive SWP water from these agencies. This groundwater banking opportunity could store 10,000 to 30,000 AF and recover 5,000 to 15,000 AFY.

- **Storage within the PWD**: This would consist of installing a recharge and recovery facility within the PWD's groundwater basin area to augment supplies. The PWD would store 39,000 to 105,000 AF in the local groundwater basin and would recover 13,000 to 35,000 AFY.

3.3.4 Development of Desalination

3.3.4.1 Brackish Water and/or Groundwater Desalination

The groundwater that underlies the PWD service area is not brackish in nature and does not require desalination. However, the PWD could provide financial assistance to other SWP contractors to construct brackish desalination facilities in exchange for SWP supplies delivered via the East Branch of the Aqueduct. Communities near a brackish desalination plant would

receive the desalinated water and an equivalent volume of SWP supplies would be exchanged and allocated to the PWD. Should the need arise the PWD may consider this option in the future.

3.3.4.2 Seawater Desalination

Since the PWD is not located in a coastal area, it is not practical nor economically feasible to implement a seawater desalination program. However, the PWD could provide financial assistance to other SWP Contractors to construct seawater desalination facilities in a coastal location in exchange for SWP supplies delivered via the East Branch of the Aqueduct.

As of December 2015, there was an estimated 10 active proposals for seawater desalination plants along the California Coast, as well as two additional proposed plants in Baja California, Mexico that would provide water to southern California communities (Pacific Institute, 2015). This is down from an estimated 21 proposals in 2006 and 19 in 2012 (Pacific Institute, 2015).

Most of the existing and proposed seawater desalination facilities are/would be operated by agencies that are not SWP contractors. Thus for an exchange of SWP supplies to take place, a third party would have to be involved.

At this point in time, the PWD has determined that desalination is not a cost-effective solution for water supply needs due to the local project and water resource opportunities that are currently available at a lower cost.

3.3.5 Recycled Water

Currently the PWD is actively working with the Sanitation Districts of Los Angeles County (LACSD) to develop recycled water supplies for its service area customers. Further details on the PWD's recycled water plans can be found in Section 4.

3.4 Anticipated Water Supply Sources in a Normal, Single Dry, and Multiple Dry Years

Tables 3-12, 3-13, and 3-14 provide details on supplies anticipated to be available to the PWD in normal, single-dry, and multiple-dry years. For groundwater, the PWD expects pumping to be consistent in normal, single-dry, and multiple-dry years. For surface water from Littlerock Reservoir, the PWD used the driest year on record of 1951. Thus the PWD expects to use 4,000 AF of its diversion rights under normal, single-dry, and multiple-dry year conditions. This amount is calculated as 50 percent of the average available yield from Littlerock Reservoir (50 percent of 8,000 AF) and is considered to be available for supply in all years. SWP and Butte County transfer supply allocations are variable during single-dry and multiple-dry years, and the PWD relied on the 2015 DCR to project volumes in these hydrologic years. Return flow credits and recycled water are assumed to be available in all hydrologic years.

TABLE 3-12: WATER SUPPLY ESTIMATES – NORMAL YEAR (AF)

	2020	2025	2030	2035	2040
Existing Supplies					
Groundwater (from Table 3-3)	6,280	4,140	2,770	2,770	2,770
Groundwater Return Flow Credits (from Table 3-4)	5,000	5,000	5,000	5,000	5,000
Local Surface Water (from Table 3-6)	4,000	4,000	4,000	4,000	4,000
Imported SWP Water (from Table 3-9)	13,200	13,000	13,000	13,000	13,000
Butte Transfer Agreement[(a)]	6,200	6,100	6,100	6,100	6,100
Recycled Water (from Table 4-4)	2,500	5,000	5,500	6,000	6,000
Total Supplies	**37,180**	**37,240**	**36,370**	**36,870**	**36,870**

Notes: Values are rounded.
(a) For details see Section 3.3.1.

TABLE 3-13: WATER SUPPLY ESTIMATES – SINGLE-DRY YEAR (AF)

	2020	2025	2030	2035	2040
Existing Supplies					
Groundwater (from Table 3-3)	6,280	4,140	2,770	2,770	2,770
Groundwater Return Flow Credits (from Table 3-4)	5,000	5,000	5,000	5,000	5,000
Local Surface Water (from Table 3-6)	4,000	4,000	4,000	4,000	4,000
Imported SWP Water (from Table 3-9)	2,300	2,100	1,900	1,900	1,700
Butte Transfer Agreement[(a)]	1,100	1,000	900	900	800
Recycled Water (from Table 4-4)	2,500	5,000	5,500	6,000	6,000
Total Supplies	**21,180**	**21,240**	**20,070**	**20,570**	**20,270**

Note: Values are rounded.
(a) For details see Section 3.3.1.

TABLE 3-14: WATER SUPPLY ESTIMATES – MULTIPLE-DRY YEARS (AF)

	2020	2025	2030	2035	2040
Existing Supplies					
Groundwater (from Table 3-3)	6,280	4,140	2,770	2,770	2,770
Groundwater Return Flow Credits (from Table 3-4)	5,000	5,000	5,000	5,000	5,000
Local Surface Water (from Table 3-6)	4,000	4,000	4,000	4,000	4,000
Imported SWP Water (from Table 3-9)	7,000	7,000	7,000	7,000	7,000
Butte Transfer Agreement[(a)]	3,300	3,300	3,300	3,300	3,300
Recycled Water (from Table 4-4)	2,500	5,000	5,500	6,000	6,000
Total Supplies	**28,080**	**28,440**	**27,570**	**28,070**	**28,070**

Note: Values are rounded.
(a) For details see Section 3.3.1.

Section 4: Recycled Water

4.1 Overview

This section of the Plan describes the existing and future recycled water opportunities available to the PWD service area. The description includes estimates of potential recycled water supply and demand for 2020 to 2040 in five year increments, as well as the PWD's proposed incentives and implementation plan for recycled water.

4.2 Recycled Water Planning

Due to current and anticipated growth, as well as increasing uncertainty of the PWD's ability to meet local water demands with imported water and groundwater, the PWD is taking proactive steps towards expanding the use of non-potable water to meet a variety of non-potable and indirect potable uses. The PWD has been actively working with the Los Angeles County Waterworks Districts, City of Palmdale, City of Lancaster, and LACSD to develop a regional recycled water system.

The PWD developed a Recycled Water Facilities Plan in 2010 (RMC 2010) as part of the first non-potable reuse phase for the 2007 Antelope Valley Recycled Water Project Facilities Planning Report (Kennedy/Jenks 2006).

In 2012, the Palmdale Recycled Water Authority (PRWA) was established to manage recycled water generated and used within the PWD service area, which coincides with the PRWA boundaries. PRWA is a joint entity comprised of the PWD and City of Palmdale which manages all aspects of recycled water use, including agreements to obtain recycled water from sanitation districts, planning for, designing and constructing supporting facilities, and financing these efforts. Among the initial efforts of the PRWA, existing master planning documents were updated and consolidated within the 2015 PRWA Recycled Water Facilities Master Plan (Carollo 2015).

Implementation of the Recycled Water Facilities Master Plan, which is still in the planning phase, would include expansion of the existing non-potable distribution system. Projected recycled water supplies would be provided to PWD customers, primarily for landscape irrigation at parks, schools, and golf courses, as well as for recharge in the Lancaster subbasin, as described in more detail below.

4.3 Existing Wastewater Treatment Facilities

Wastewater collection and treatment for the cities of Palmdale and Lancaster are provided by LACSD, which provides service to the Antelope Valley through its Districts No. 14 and 20. The two districts serve a combined wastewater service area of approximately 76 square miles and approximately 310,000 people. Collection is provided through a network of 104 miles of trunk sewers, which are all designed to provide wastewater conveyance through gravity flow.

The Palmdale Water Reclamation Plant (WRP) is located in the City of Palmdale and currently provides tertiary treatment for approximately 12,000 AFY of wastewater generated in and around the City of Palmdale. In 2012, the Palmdale WRP was expanded to reach its current treatment capacity of 12 MGD. The Palmdale WRP is operated by the LACSD District No. 20. Currently, the tertiary-treated effluent is disposed of via agricultural irrigation of fodder crops on land leased by the LACSD from the City of Los Angeles World Airports. Table 4-1 presents influent and effluent flows at the Palmdale WRP in 2015.

TABLE 4-1: 2015 WASTEWATER FLOWS AT PALMDALE WRP (AF)

Palmdale WRP Flows	2015
Influent	12,140
Effluent	10,770

Source: Palmdale WRP Annual Monitoring Report 2015.

All wastewater treated at the Palmdale WRP is treated to tertiary level and is used, discharged or stored within the PWD service boundaries, as described further in Section 4.4.

The Antelope Valley is a closed basin without an outlet to the ocean, and so treated wastewater either evaporates, is reused, or infiltrates into the Antelope Valley Groundwater Basin. LACSD anticipates reducing the amount of recycled water that it provides for agriculture as other beneficial uses are developed. However, until these alternative uses become effective, the recycled water must still be disposed of via agricultural irrigation (Carollo 2015, ESA 2014).

4.3.1 Proposed Recycled Water System

A Recycled Water Backbone System has been proposed for the Antelope Valley that would connect the Lancaster WRP and Palmdale WRP, allowing recycled water from both plants to be used throughout the region. The Lancaster WRP, operated by the LACSD District No. 14, provides tertiary treatment for, on average, 12 MGD of wastewater generated in each of the cities of Lancaster and Palmdale. The PWD does not currently receive recycled water from the Lancaster WRP and there are no plans to use effluent from the Lancaster WRP within the PWD service area.

Portions of the Recycled Water Backbone System have already been constructed by the City of Lancaster, City of Palmdale, and Los Angeles County Waterworks District No. 40. The City of Palmdale has partnered with Waterworks No. 40 to design and construct a portion of the Recycled Water Backbone System that will complete the connection of the Lancaster WRP and Palmdale WRP and serve the proposed Palmdale Hybrid Power Plant and the Antelope Valley Country Club. The portions of the Recycled Water Backbone System that have been designed or constructed are all located outside of the District's service area. The primary benefit to the PRWA of these portions is the potential ability to move recycled water between the Lancaster WRP and Palmdale WRP. The tertiary treated water that will be used in the PWD service area will originate at the Palmdale WRP (Carollo 2015, ESA 2014).

4.4 Recycled Water Supply

Recycled water available for use within the PWD service area can be supplied from the LACSD Palmdale WRP. The City of Palmdale has an existing agreement with the LACSD for 2,000 AFY of recycled water to provide to customers throughout the City's service area (Carollo 2015, ESA 2014). However, as noted above, uses for this recycled water are still being developed.

Currently the Palmdale WRP produces about 10,700 AFY of Title 22 recycled water on average. For future recycled water supply projections, it was assumed that recycled water production would grow linearly at the same rate as potable demands, which were estimated at approximately 0.9 percent per year on average for the period 2020 to 2040. As a result, the total recycled water supply is estimated to grow up to about 13,500 AFY by 2040, as shown in Table 4-2.

TABLE 4-2: EFFLUENT FLOW PROJECTIONS FOR PALMDALE WRP (AF)

	2015[(a)]	2020	2025	2030	2035	2040
PWRP Effluent Flows	10,770	11,300	11,800	12,300	12,900	13,500
Total Recycled Water Available to PWD	10,770	11,300	11,800	12,300	12,900	13,500

Notes:
(a) 2015 Effluent flows as reported in Palmdale WRP 2015 Annual Report.

4.5 Recycled Water Demand – Current and Projected

Primary existing recycled water customers served by the Palmdale WRP include growers and the City of Palmdale. The primary City demand is for landscape irrigation at McAdam Park, which makes up a small portion of total recycled water produced at the Palmdale WRP. The remaining major portion of Palmdale WRP recycled water is agricultural irrigation at agronomic rates on an agricultural site leased by the LACSD from Los Angeles World Airports. Seasonal storage ponds are used when more effluent water is produced than demanded. The stored recycled water is typically used in spring and summer months when agronomic crop needs exceed recycled water production from the Palmdale WRP.

Actual recycled water use in 2015 is summarized in Table 4-3.

TABLE 4-3: ACTUAL RECYCLED WATER USE IN 2015 (AF)

Water Use	2015
PRWA/City of Palmdale Direct Reuse[(a)]	110
Total Recycled Water Use[(b)]	**110**

Notes:
(a) Based on correspondence from PWD and LACSD.
(b) Total recycled water demand within PWD service area. Values are rounded.

Market assessments by the PRWA have identified numerous potential recycled water customers including schools, parks, landscape maintenance districts, and others. Total annual

demands of these customers were estimated at 2,392 AFY (Carollo 2015, ESA 2014). It is anticipated that the recycled water use for landscape irrigation will not exceed 2,000 AFY at buildout (Kennedy/Jenks 2015).

Additional major future recycled water uses include direct groundwater recharge, described as follows.

Palmdale Regional Groundwater Recharge and Recovery Project (GRRP)

Among the potential options to augment water supplies with local recycled water, there is potential to use a blend of imported and recycled water to recharge the Lancaster subbasin within the Antelope Valley Groundwater Basin. The PWD is leading the project and is seeking partnership from AVEK, LACSD, and other agencies. The project entails construction of recharge basins to spread a blend of untreated SWP water and recycled water from LACSD's Palmdale WRP. Extraction wells surrounding the recharge basins will provide groundwater for treatment and delivery to PWD's service area or to partner agencies. As the project comes online and recharge with recycled water increases (with regulatory approvals), delivery of LACSD tertiary water to agricultural users will be reduced.

Projected Recycled Water Uses are shown in Table 4-4.

TABLE 4-4: PROJECTED RECYCLED WATER DEMANDS (AF)

Water Use	2020	2025	2030	2035	2040
Palmdale Regional GRRP[(a)]	2,000	4,000	4,000	4,000	4,000
Direct Reuse[(b)]	500	1,000	1,500	2,000	2,000
Total Recycled Water Demands	**2,500**	**5,000**	**5,500**	**6,000**	**6,000**

Source: Data from Littlerock Creek Groundwater Recharge and Recovery Project (2015) and Title 22 Engineering Report (2016).

(a) Volume available for GRRP recharge. Maximum possible recharge would be lower due to blending ratio requirements.

(b) Includes City direct demands and other potential landscape irrigation demands.

4.5.1 Recycled Water Use Comparisons

The 2010 UWMP anticipated 2015 recycled water use at 1,000 AF, and assumed it would be used only for landscape and agricultural irrigation. Actual recycled water use within the PWD service area totaled 110 AFY in 2015, as shown in Table 4-5.

TABLE 4-5: RECYCLED WATER USE PROJECTIONS COMPARED TO ACTUAL USE (AF)

User Type	2010 Projected for 2015[(a)]	2015 Actual
Municipal and Industrial, and Agricultural Irrigation	1,000	110
Groundwater Recharge	0	0
Total	**1,000**	**110**

Note:
(a) From 2010 PWD UWMP.

4.5.2 Encouraging Recycled Water Use

Future recycled water projects have the potential to use all available recycled water supplies through 2040, as described above. As necessary, the PWD intends to use financial incentives to assist and encourage future users to connect to and utilize recycled water. These financial incentives will consist of recycled water rates that are lower than potable rates (typically 70 to 90 percent). A lower rate provides an incentive for existing or future customers to use recycled water in place of potable water.

Section 5: Water Quality

5.1 Overview

Water quality is an important factor in determining overall supply reliability; if adequate drinking water quality cannot be maintained, then the supply will no longer be available for use. Water quality is dynamic in nature and can vary over the course of a year. This is true for both the SWP and the local groundwater of the Basin. During periods of intense rainfall or snowmelt, routes of surface water movement are changed and new constituents are mobilized and enter the water while other constituents are diluted or eliminated. The quality of water changes over the course of a year. These same basic principles apply to groundwater. Depending on water depth, groundwater will pass through different layers of rock and sediment and potentially leach different materials from those strata. Water depth is a function of recharge from local rainfall and snowmelt and withdrawal from groundwater pumping. During periods of drought, the mineral content of groundwater increases. Water quality is not a static feature of water, and these dynamic variables must be recognized.

The PWD understands the quality of supply sources can change over time and is therefore constantly working to anticipate and mitigate those changes. Water quality regulations also change. This is the result of the discovery of new contaminants, changing understanding of the health effects of previously known as well as new contaminants, development of new analytical technology, and the introduction of new treatment technology. All retail water purveyors are subject to drinking water standards set by the U.S. Environmental Protection Agency (EPA) and the DDW.

The PWD's regular monitoring of its water supply quality and understanding of current and potential regulations allows it to respond readily to any quality induced reliability issues. This section provides a general description of the quality of each of the PWD's three water sources; groundwater from the Antelope Valley Groundwater Basin, imported water from the SWP, and seasonal supply from Littlerock Reservoir. SWP water is conveyed directly from the District turnout into Lake Palmdale, which feeds the Leslie O. Carter Water Treatment Plant (WTP). Flows from Littlerock Reservoir are also conveyed into Lake Palmdale via an eight-mile earthen lined canal, referred to as the Palmdale Ditch. The intake for the WTP is located along Lake Palmdale's north shore. All three sources are constantly tested and treated in compliance with all applicable regulations to ensure high water quality and dependability of the water system.

This section provides a general description of the water quality of both imported water and existing groundwater supplies. A discussion of potential water quality impacts on the reliability of these supplies is also provided.

5.2 Groundwater Protection and Quality

The PWD obtains groundwater from the Antelope Valley Groundwater Basin though twenty-two wells. This water is treated with chlorine at the wellhead and pumped directly into the distribution system. Groundwater has proved to be of suitable quality for municipal, irrigation and most industrial uses.

The general goal of groundwater protection activities is to maintain the groundwater and the aquifer to ensure a reliable high quality supply. Activities to meet this goal include continued and increased monitoring, data sharing, education and coordination with other agencies that have local or regional authority or programs. As part of its protection activities, the PWD has been taking the following actions:

- Water quality monitoring
- Wellhead protection
- Participation in the regional salt and nutrient management plan

5.2.1 Water Quality Monitoring

The PWD monitors drinking water constituents consistent with federal and state laws. The PWD annually provides a Consumer Confidence Report (CCR) detailing the water quality of its sources to all of its customers. This Report includes details about the source water, quality of the water, and how it compares to Drinking Water standards. Stringent water quality testing is performed before the water is delivered to consumers. In 2014 (2014a), the PWD tested more than 3,000 samples for over 80 regulated contaminants. Of the primary standard contaminants detected in 2014, all were at levels below the Maximum Contaminant Level (MCL) allowed by the State.

In the Antelope Valley region, the groundwater basin is primarily used for private and public water supply and irrigation. The predominant sources of groundwater are from the recharge of runoff from surrounding mountains, and water from direct infiltration by irrigation, sewer and septic systems. The main discharge sources include pumping wells and evapotranspiration areas near dry lakebeds. Groundwater quality is assessed through the Groundwater Ambient Monitoring and Assessment (GAMA) Priority Basin Project (PBP), which consists of analyzing raw groundwater that provides drinking public water supply in the region. PBP sampled a large distribution of wells in the area and analyzed organic constituents as well as chromium, lead, molybdenum, sulfate and chloride; all were detected at moderate concentrations, and volatile organic compounds were detected at low concentrations.

Two primary constituents that present concerns for groundwater quality in the Antelope Valley Groundwater Basin are Total Dissolved Solids (TDS) and nitrate. Past groundwater sampling data has shown TDS concentrations that range from 150 to 490 milligrams per liter (mg/L) (2014 CCR). Nitrate levels have ranged from non-detect to 28.4 mg/L. Arsenic has also emerged as a potential concern but is still well under the MCL of 0.01 mg/L. Water quality data is regularly reported on in the annual CCR; the most recent is the 2014 CCR.

The PWD's drinking water sources are considered most vulnerable to the following activities associated with contaminants detected in the water supply: illegal activities, such as unauthorized dumping; recreation; highways; railroads; and sewer collection systems. A comprehensive source water protection program can prevent contaminants from entering the public water supply, reduce treatment costs and increase public confidence in the reliability and safety of drinking water.

5.2.2 Wellhead Protection

The PWD has developed a Sanitary Survey of its water sources, including a Source Water Assessment of surface waters, which was updated in 2012 in compliance with State of California regulations. The assessment of surface water sources included Littlerock Reservoir and Palmdale Lake. A Groundwater Assessment and Protection Program was completed in January of 1999, and a Wellhead Protection Plan was completed in November 2000. The goal of local source water protection is to identify, develop and implement local measures that provide protection to the drinking water supply. Wellhead protection provides one more barrier to contamination in a multi-barrier protection treatment train.

5.2.3 Participation in the Antelope Valley Salt and Nutrient Management Plan

In February 2009, the SWRCB adopted the Recycled Water Policy to encourage and provide guidance for the use of recycled water in California. The Recycled Water Policy requires local water and wastewater entities, together with local stakeholders, to develop a Salt and Nutrient Management Plan (SNMP) in a cooperative and collaborative manner for each groundwater basin in California. The SNMPs are intended to help streamline the permitting of new recycled water and stormwater projects while ensuring compliance with water quality objectives. Los Angeles County Department of Public Works (District 40), LACSD (Districts No. 14 and 20), and the Antelope Valley SNMP planning stakeholders group (which includes PWD) prepared the Antelope Valley SNMP in 2014. As a stakeholder in the plan the PWD assisted with provision of water quality data for the plan, reviewed the modeling and other analyses of salt and nutrient assimilative capacity of local groundwater, and helped develop a plan to track the long-term impacts to groundwater quality resulting from past, current, and future land uses.

5.3 Imported Water Quality

Surface water is imported from the SWP. This water source begins in Northern California, flows into the Sacramento-San Joaquin Delta, and is pumped south through the California Aqueduct to Palmdale Lake. The District has a maximum contractual Table A Amount of 21,300 AFY. The annual allocations based on this contractual amount can vary based on the amount of stored water in northern California, demands by other SWP Contractors and various hydrologic factors. Imported water is generally of acceptable quality and receives treatment from the WTP. The District does not currently experience and does not foresee issues with its imported water quality given controls on the incoming water and treatment process.

One important property of SWP water is the mineral content. SWP water is generally low in dissolved minerals, such as calcium, magnesium, sodium, potassium, iron, manganese, and sulfate. Most of these minerals do not have health based concerns. Nitrate is the main exception, as it has significant health effects for infants; however, the nitrate content of SWP water is very low.

Also of significance is the salinity content measured as TDS. Only at very high concentrations is TDS a health hazard, but TDS can be an aesthetic issue, can limit crop productivity, and can shorten the useful life of pipes and water-based appliances in homes and businesses. Although the quality of SWP water varies seasonally, the PWD does not foresee issues with imported water quality as it receives adequate treatment from the WTP.

5.4 Local Surface Water Quality

The PWD's surface water is stored at Littlerock Creek Dam Reservoir and Lake Palmdale. Littlerock Dam Reservoir has a capacity of approximately 3,000 AF and is filled by natural runoff from the local San Gabriel Mountains. Water from Littlerock Reservoir is transferred to Palmdale Lake through an open channel connecting the two reservoirs. This local surface water supply has historically been of very high quality. The PWD does not currently experience and does not foresee issues with local surface water. This water receives treatment at the PWD's Leslie O. Carter WTP.

5.5 Water Quality Impacts on Reliability

Three factors affecting the availability of groundwater are sufficient source capacity (wells and pumps), sustainability of the groundwater resource to meet pumping demand on a renewable basis and protection of groundwater sources (wells) from known contamination, or provisions for treatment in the event of contamination. The quality of water dictates numerous management strategies a retail water purveyor will implement, including, but not limited to, the selection of raw water sources, treatment alternatives, blending options, and modifications to existing treatment facilities. Maintaining and utilizing high quality sources of water simplifies management strategies by increasing water supply alternatives, water supply reliability, and decreasing the cost of treatment. The source water supplies are of generally good quality for the PWD. Maintaining high quality source water allows for efficient management of water resources by minimizing costs.

Maintaining the quality of water supplies increases the reliability of each source by ensuring that deliveries are not interrupted due to water quality concerns. A direct result from the degradation of a water supply source is increased treatment cost before consumption. The poorer the quality of the source water, the greater the treatment cost. Water may degrade in quality to the point that it is not economically feasible for treatment. In this scenario the degraded source water is taken off-line. This in turn can decrease water supply reliability by potentially decreasing the total supply and increasing demands on alternative water supplies.

Overall, the management of water supplies by the PWD will allow it to meet near term and long term demands within the its service area. Therefore, no anticipated change in reliability or supply due to water quality issues is anticipated based on the present data, as shown in Table 5-1.

TABLE 5-1: PROJECTED WATER SUPPLY CHANGES DUE TO WATER QUALITY (PERCENTAGE CHANGE)

Water source	2020	2025	2030	2035	2040
Groundwater	0%	0%	0%	0%	0%
Imported Water	0%	0%	0%	0%	0%
Local Surface Water	0%	0%	0%	0%	0%

Section 6: Water Supply Reliability

6.1 Overview

The UWMP Act requires urban water suppliers to assess water supply reliability that compares total projected water use with the expected water supply over the next twenty years in five year increments. The Act also requires an assessment for a single-dry year and multiple-dry years. This section presents the reliability assessment for the PWD's service area.

The PWD's supply reliability can be impacted by many factors, including changes in the availability of supplies due to climatic or infrastructure changes, as well as the efficient use of those supplies in both average and dry periods. These factors can result in immediate (such as facility failures), short-term (SWP allocation limitations), or long-term (climate change) impacts to reliability and must therefore be considered in future planning.

The impacts of these factors on supply reliability increase under single-dry and multiple-dry year hydrologic conditions. Although not all shortages can be prevented, the PWD's overall goal to further diversify its supply portfolio is the most important factor in improving the immediate, near- and long- term reliability of supplies. If shortages do occur, the PWD has implemented a water shortage contingency plan to manage these situations.

The reliability within the PWD service area is a composite of the reliability of each source of supply as briefly discussed below.

6.1.1 Groundwater Reliability

Groundwater is traditionally considered a highly reliable supply since it is not immediately susceptible to changes in climate and surface flows. However, the two main factors that impact the reliability of groundwater supplies are legal and water quality. See Section 3 for more discussion of the region's groundwater resources.

Legal Factors

On December 23, 2015, the PWD as well as the majority of parties involved agreed to a stipulated judgment for the adjudication of the Antelope Valley Groundwater Basin[5]. This resulted in the PWD receiving a groundwater production right of 2,770 AFY. The judgment is on appeal, but the PWD believes that it is unlikely that its groundwater production right will change significantly as a result of the appeal. Prior to the judgment the PWD had an unquantified right to pump water for beneficial use, and assumed projected pumping volumes at 12,000 AF based on pumping capacity. Additionally, return flow credits will be available to the PWD, as described in Section 3.2.1.3.

[5] Judgment, *Antelope Valley Groundwater Cases*, Los Angeles County Superior Court, Judicial Council Coordination Proceeding No. 4408 (filed Dec. 28, 2015) (provided in Appendix J).

Water Quality Factors

The water quality of groundwater supplies is a factor in the PWD's reliability as it needs to meet drinking water standards. The PWD relies on groundwater to provide a large portion of its water supply and therefore has taken measures to ensure protection of groundwater quality. These measures are discussed in detail in Section 5.

6.1.2 Imported Water Reliability

The PWD receives imported water from the SWP. The factors affecting the reliability of imported water supplies from the SWP include legal, environmental, water quality, and climatic factors.

Legal Factors

Legal factors include policies and contract stipulations from DWR. Any legal actions can impact supplies from SWP water supplies in various ways, such as the various court decisions limiting SWP pumping due to perceived impacts on endangered fish in the Sacramento-San Joaquin Delta (Delta) estuary.

Environmental Factors

Environmental factors such as impacts to endangered species, their habitat, and other related concerns can impact SWP water supplies, as above.

Water Quality Factors

The quality of SWP water sources can impact the treatment processes needed to ensure compliance with drinking water standards, however no impact to water supply availability is projected to occur.

Climatic Factors

Imported water supplies rely heavily on runoff from rainfall and snowpack. If annual snowpack and rainfall amounts change significantly without corresponding investment in infrastructure and/or management practices, the quantity of water available from the SWP in any given year is subject to potential reductions. At this time, the impacts of climate change to imported water supplies are uncertain, and provisions for estimating them is included in the supply reliability section below.

6.1.3 Local Surface Water Reliability

The PWD expects a certain amount of Littlerock Dam Reservoir water to be available for supply in all years. This amount is estimated at 50 percent of the average available historical yield (8,000 AF) such that 4,000 AF is available in all years.

Climatic Factors

The PWD diverts surface water from Littlerock Dam Reservoir, which receives flows from Littlerock Creek. Littlerock Creek flows can be variable given changes in local precipitation and ETo. Most Littlerock Creek flows occur seasonally during the winter months and decrease significantly during the dry months. The PWD recognizes that annual climatic changes can potentially impact the reliability of Littlerock Dam Reservoir.

6.2 Projected Water Supply Reliability

There are two aspects of supply reliability. The first relates to immediate service needs and is primarily a function of the availability and adequacy of supply facilities. The second aspect is climate-related, and involves the availability of water during varying dry periods. This section considers the PWD's water supply reliability during three water scenarios: normal water year, single-dry water year, and multiple-dry water years. These scenarios are defined as follows:

- **Normal Year**: The normal year is a year in the historical sequence that most closely represents median runoff levels and patterns. The supply quantities for this condition are derived from historical average yields.

- **Single-Dry Year**: This is defined as the year with the minimum useable supply. The supply quantities for this condition are derived from the minimum historical annual yield.

- **Multiple-Dry Years**: This is defined as the three consecutive years with the minimum cumulative useable supply. Water systems are more vulnerable to these droughts of longer duration because they deplete water storage reserves in local and state reservoirs and in groundwater basins. The supply quantities for this condition are derived from historical three-year running minimum average yields.

For groundwater, it is assumed the PWD will receive a groundwater allocation of approximately 2,770 AFY effective beginning 2023 (see Section 3.2.1.3). It is expected that these supplies will be consistently available under normal, single-dry year, and multiple-dry years. For Littlerock Dam Reservoir, the PWD used the driest year on record of 1951 to estimate reliable availability. Accordingly, the PWD expects to have up to 4,000 AF of its diversion rights under normal, single-dry year, and multiple-dry years. This amount is calculated as 50 percent of the average available yield from the Littlerock Dam Reservoir (50 percent of 8,000 AF) and is considered to be available for supply in all years.

For SWP water, the PWD used the 2015 SWP DCR to identify its single-dry and multiple-dry water years. A single year drought, such as the one that occurred in 1977, would result in a yield of approximately 8-11 percent of the District's Table A Amount. In an extended drought, such as the one that occurred in 1931-1934, the PWD expects to receive an average of 33 percent of its Table A Amount. Groundwater pumping and Littlerock Dam Reservoir diversions are expected to remain the same during a normal water year, single-dry year, and multiple-dry years. SWP water is the only water supply source the PWD expects to have variability during single-dry and multiple-dry years.

6.3 Normal Water Year

This section summarizes the PWD's water supplies available to meet demands over the 25-year planning period during an average/normal year and compares them to demands for the same period. Assumptions about supplies and demands are provided in Sections 2 and 3. Table 6-1 demonstrates that the PWD anticipates adequate supplies for years 2020 to 2040 under normal hydrologic conditions.

TABLE 6-1: COMPARISON OF SUPPLIES AND DEMANDS – NORMAL YEAR (AF)

	2020	2025	2030	2035	2040
Existing Supplies					
Groundwater (from Table 3-3)	6,280	4,140	2,770	2,770	2,770
Groundwater Return Flow Credits (from Table 3-4)	5,000	5,000	5,000	5,000	5,000
Local Surface Water (from Table 3-6)	4,000	4,000	4,000	4,000	4,000
Imported SWP Water (from Table 3-9)	13,200	13,000	13,000	13,000	13,000
Butte Transfer Agreement[(a)]	6,200	6,100	6,100	6,100	6,100
Recycled Water[(] (from Table 4-4)	2,500	5,000	5,500	6,000	6,000
Total Supplies	**37,180**	**37,240**	**36,370**	**36,870**	**36,870**
Potable Water Demands	20,800	21,900	22,900	23,900	25,000
Recycled Water Demands	2,500	5,000	5,500	6,000	6,000
Total Demand[(b)]	**23,300**	**26,900**	**28,400**	**29,900**	**31,000**
Difference (Supply-Demand)	***13,880***	***10,340***	***7,970***	***6,970***	***5,870***

Notes: Values are rounded.
(a) For details see Section 3.3.1.
(b) Demands are not expected to change during drought conditions; the region typically receives little rain, and with implementation of DMM's water demands for irrigation do not increase in the PWD under single-dry and multiple-dry year conditions.

6.4 Single-Dry Year

The water supplies and demands for the PWD service area over the 25-year planning period were analyzed in the event that a single-dry year occurs, similar to the drought that occurred in California in 1977. Table 6-2 summarizes the existing and planned supplies available to meet demands during a single-dry year (assuming 8-11% of SWP supply from the 2015 DCR). Table 6-2 shows that the PWD anticipates demands to exceed existing supplies starting in 2020 under single-dry year hydrologic conditions. A discussion on how the PWD anticipates making up for supply deficits is discussed below in Section 6.6.

TABLE 6-2: COMPARISON OF SUPPLIES AND DEMANDS – SINGLE-DRY YEAR (AF)

	2020	2025	2030	2035	2040
Existing Supplies					
Groundwater (from Table 3-3)	6,280	4,140	2,770	2,770	2,770
Groundwater Return Flow Credits (from Table 3-4)	5,000	5,000	5,000	5,000	5,000
Local Surface Water (from Table 3-6)	4,000	4,000	4,000	4,000	4,000
Imported SWP Water (from Table 3-9)	2,300	2,100	1,900	1,900	1,700
Butte Transfer Agreement[(a)]	1,100	1,000	900	900	800
Recycled Water (from Table 4-4)	2,500	5,000	5,500	6,000	6,000
Total Supplies	**21,180**	**21,240**	**20,070**	**20,570**	**20,270**
Potable Water Demands	20,800	21,900	22,900	23,900	25,000
Recycled Water Demands	2,500	5,000	5,500	6,000	6,000
Total Demand[(b)]	**23,300**	**26,900**	**28,400**	**29,900**	**31,000**
Difference (Supply-Demand)	***-2,120***	***-5,660***	***-8,330***	***-9,330***	***-10,730***

Note: Values are rounded.
(a) For details see Section 3.3.1.
(b) Demands are not expected to change during drought conditions; the region typically receives little rain, and with implementation of DMMs water demands for irrigation do not increase in the PWD under single-dry and multiple-dry year conditions.

6.5 Multiple-Dry Year

The water supplies and demands for the PWD service area over the 25-year planning period were analyzed in the event that a four-year multiple-dry year event occurs, similar to the drought that occurred during the years 1931 to 1934. Table 6-3 summarizes the existing and planned supplies available to meet demands during multiple-dry years (assuming 33% SWP supply from the 2015 DCR). Table 6-3 shows that the PWD anticipates demands to exceed existing supplies starting in 2030 under multiple-dry year hydrologic conditions. A discussion on how the PWD anticipates making up for supply deficits is discussed below in Section 6.6.

TABLE 6-3: COMPARISON OF SUPPLIES AND DEMANDS – MULTIPLE-DRY YEAR (AF)

	2020	2025	2030	2035	2040
Existing Supplies					
Groundwater (from Table 3-3)	6,280	4,140	2,770	2,770	2,770
Groundwater Return Flow Credits (from Table 3-4)	5,000	5,000	5,000	5,000	5,000
Local Surface Water (from Table 3-6)	4,000	4,000	4,000	4,000	4,000
Imported SWP Water (from Table 3-9)	7,000	7,000	7,000	7,000	7,000
Butte Transfer Agreement[(a)]	3,300	3,300	3,300	3,300	3,300
Recycled Water (from Table 4-4)	2,500	5,000	5,500	6,000	6,000
Total Supplies	28,080	28,440	27,570	28,070	28,070
Potable Water Demands	20,800	21,900	22,900	23,900	25,000
Recycled Water Demands	2,500	5,000	5,500	6,000	6,000
Total Demand[(b)]	**23,300**	**26,900**	**28,400**	**29,900**	**31,000**
Difference (Supply-Demand)	***4,780***	***1,540***	***-830***	***-1,830***	***-2,930***

Note: Values are rounded.
(a) For details see Section 3.3.1.
(b) Demands are not expected to change during drought conditions; the region typically receives little rain, and with implementation of DMMs water demands for irrigation do not increase in the PWD under single-dry and multiple-dry year conditions.

6.6 Summary of Comparisons

As shown in the analyses above, the PWD projects adequate existing supplies to meet demands during normal years throughout the planning period. However, PWD anticipates that during single-dry year conditions, demands will exceed existing supplies starting in 2020 and that during multiple-dry year conditions, demands will exceed existing supplies starting in 2030. Therefore additional supplies are assumed to be needed to meet demands under those conditions.

As described in Section 3, the PWD is currently in the process of developing the Palmdale Regional GRRP, which is anticipated to provide 7,500 AFY up to potentially 10,800 AF once the project is built-out through the recharge of recycled and imported water supplies, starting in 2020 (see Section 3.3.3.1). In addition, the PWD has identified numerous short-and long-term transfer and exchange opportunities, as described in Section 3.3.3.2, which would provide additional supplies to help overcome supply shortages.

Therefore, it is anticipated that existing supplies in combination with identified future and potential water supply opportunities will enable the PWD to meet all future water demands under all hydrologic conditions through the end of the planning period.

Section 7: Water Demand Management Measures

7.1 Demand Management

This section describes the Demand Management Measures (DMMs) that the PWD is currently implementing, and plans to implement in order to meet its urban water use reduction targets (see Section 2.5).

In addition, Governor Edmund J. Brown's April 2014 emergency declaration requires that all state agencies that distribute funding for projects that impact water resources, including groundwater resources, will require recipients of future financial assistance to have appropriate conservation and efficiency programs in place.

Recent legislation significantly revised the UWMP Act to simplify and clarify the DMM reporting requirements for the 2015 UWMP cycle. Since the PWD is a member of the California Urban Water Conservation Council (CUWCC) it may continue to submit its annual reports as required by Section 6.2 of the Memorandum of Understanding Regarding Urban Water Conservation in California in order to comply with this section of the Act. The PWD has provided its 2013 and 2014 annual reports for inclusion in this 2015 UWMP as Appendix G.

The PWD recognizes that conserving water is an integral component of a responsible water management strategy. The PWD has a uniquely low water use for a high desert area, located in the South Lahontan Hydrologic Region. Based on data reported in the 2010 UWMPs, the South Lahontan Hydrologic Region had a population-weighted baseline 5-year average water use of 258 GPCD with an average population-weighted 2020 target of 207 GPCD (DWR 2014). With a 2015 GPCD of 128 gallons (see Table 2-9 in Section 2), the PWD's water use is significantly lower than the rest of the South Lahontan Hydrologic Region. The District has achieved its goals largely by focusing on system performance, rate increases and a community culture of conservation and small landscapes. It will maintain this level of demand, and possibly reduce demand even further, by continuing to implement the CUWCC BMPs.

For the purposes of this UWMP the DMMs are categorized as "Foundational" and "Other." Foundational DMMs, listed below, are those DMMs that the UWMP Act and Water Code specifically mention for retail water suppliers such as PWD:

1. Water waste prevention ordinances
2. Metering
3. Conservation Pricing
4. Public Education and Outreach
5. Programs to assess and manage distribution system real loss
6. Water conservation program coordination and staff support

Activities outside of the Foundational DMMs that encourage less water use in the PWD's service area fall in the "Other" category.

7.2 Plan to Reduce Water Use

The PWD currently has a water conservation program and will continue to expand this program over the next five years and tis dedicated to water conservation as a vital part of its water supply portfolio. Several water conservation programs have been implemented over the last few decades, including classroom education programs, public outreach, and various rebate programs. The PWD will continue to provide these programs as part of its conservation efforts on a yearly basis.

This section describes the PWD's plan to achieve the water use reductions necessary to meet the per capita water use targets, consistent with the Water Conservation Act of 2009 (SBX7-7). The urban water use targets and calculations are described in Section 2. As mentioned above and in Section 2, the PWD has met its 2015 and 2020 water use reduction targets. While the 2015 water conservation targets substantially reduced the PWD's needed revenues for capital improvement projects, the PWD plans to continue implementing water conservation programs to ensure that the targets continue to be met.

7.2.1 Foundational DMMs

7.2.1.1 Water Waste Prevention Ordinances and Prohibition

In 2001 the Board of Directors adopted the Waste of Water Policy, which outlines actions to be taken by the PWD to prevent and address waste and unreasonable use of water, including penalties for violations. In December 2009, the Board of Directors adopted and approved Resolution No. 09-19 declaring water conservation regulations, with the intent to meet the water use reduction goals of 20 percent by 2020 and ensure adequate water supply for human consumption, sanitation, and fire protection. Both resolutions are included in Appendix F.

7.2.1.2 Metering

The PWD is fully metered with all customers have metered accounts. The PWD is in the process of changing older and outdated meters with new efficient meters to ensure more accurate reading and data capture. This is considered a water conservation initiative, in addition to a financial best management practice.

7.2.1.3 Conservation Pricing

The PWD uses a budget based tiered rate approach for water pricing. The most recent September 17th 2014 Proposition 218 process redistributed the old Tier 1 pricing into a new two-tier approach. Tier 1 now is a customer's Indoor allocation for use of all residential activities inside the home. Tier 2 is a customer's Outdoor water allocation. Pricing varies between the two Tiers. Tier 1 is the least expensive while Tier 2 water increases in price due to increased water usage for irrigation. Four (4) additional tiers remain, with the cost per unit increasing progressively at each tier. See CUWCC BMP reports in Appendix G.

7.2.1.4 Public Education and Outreach

The PWD has school education programs in place that provide educational materials and instructional assistance. This program is intended to reach the youngest water users and emphasize the need to engage them in water conservation.

To provide PWD customers with the tools to maintain water conservation goals, public education efforts have included, radio spots, TV public service announcements, bill inserts, newsletters, press releases, rebate programs including Cash 4 Grass and some indoor high efficiency appliances, booths at local events, parades, public speaking engagements, and school interaction. The PWD is committed to providing its customers with the education and tools to maintain their low use, all of which can be found on the PWD's website at: http://www.palmdalewater.org/conservation/ . See the CUWCC BMP reports in Appendix G.

7.2.1.5 Programs to assess and mange distribution system real loss

The PWD regularly checks and evaluates the mainline piping system to detect leaks. Distribution system loss is discussed in Section 2.4.3 and reported in Appendix E.

7.2.1.6 Water conservation program coordination and staffing support

Water conservation activities include significant public outreach efforts as described earlier. In addition, there are two full-time conservation staff members with a moderate budget. Contact information: Mike McNutt, Water Conservation Director/PIO mmcnutt@palmdalewater.org, 661-456-1041; Linda Garza-Trevino, Water Conservation Aide, ltrevino@palmdalewater.org, 661-456-1001.

7.2.2 Other DMMs

7.2.2.1 Rebate Programs

The PWD started several rebate programs for customers in the later part of 2009; these are detailed in the CUWCC BMP reports in Appendix G. Customers were given rebates as credits on their water bills if they filled out an application after buying the rebated product and returning the original receipt and a copy of the water bill to the PWD. In addition, the PWD implements a number of rebate programs to encourage water conservation:

1. High Efficiency Toilet (HET) Rebate Program: A HET rebate program was instituted in 2009 for residential and commercial customers. The rebate amount for this program is a credit on their water bill of $60.00 per toilet installed. If a customer replaces an Ultra-Low-Flush toilet (ULFT) with an HET, the rebate amount will consist of $30.00.

2. High Efficiency Washing Machines Rebate Program: A washing machine rebate program is available for customers who wish to purchase a water efficient washing machine with a water factor of 5.0 or less. The rebate amount for this program is a credit on the customer's account of $100.00 per washer bought.

3. Cash for Grass: The PWD has been working with the City of Palmdale, the local high school, local elementary schools, and residential customers to substitute grass on large

landscape areas by implementing the cash for grass program. This program encourages the replacement of grass with "water-smart" landscaping to conserve water.

Rebate programs were previously available for sprinkler devices and systems, but the PWD is moving away from incentivizing any outdoor irrigation and no longer offers those programs.

7.2.3 Planned Implementation of DMMs to Achieve Water Use Targets

The PWD will continue to implement the DMMs described in this section. These programs, taken together, will help to maintain progress on meeting 20x2020 water use reduction targets as described in Section 2 of this UWMP.

Section 8: Water Shortage Contingency Planning

For the purposes of this Public Draft Plan, some elements of this Section are still in progress and may be updated (e.g., updated resolutions/ordinances) in the Final Plan.

Water supplies may be interrupted or reduced significantly in a number of ways, such as a drought that limits supplies, an earthquake that damages water delivery or storage facilities, a regional power outage or a toxic spill that affects water quality. This Section describes how the District plans to respond to various stages of shortage.

Since the 1991 drought, the PWD has approved and adopted numerous conservation resolutions from establishing a voluntary water conservation program, to implementing a waste water policy, declaring water shortage emergency conditions, identifying stages of action and response requirements, and establishing emergency water conservation regulations. In addition, due to recent drought conditions and the Governor's emergency declarations that require a 25 percent reduction in overall potable urban water use statewide, the PWD developed ordinances and other planning documents to incentivize individual customer conservation and reduce overall water demands.

PWD updated its Water Shortage Contingency Plan (WSCP) with the details described in this Section, which will be adopted together with the UWMP. The PWD updated its budget-based tiered water rates on January 1, 2016. The PWD Board of Directors may institute water restrictions to limit outdoor water use in conjunction with a drought surcharge to help with fixed cost recovery due to revenue shortages resulting from conservation.

8.1 Stages of Action to Respond to Water Shortages

PWD's WSCP establishes five stages of escalating response to a water shortage caused by droughts and/or emergencies. Each stage may be triggered by a declaration from federal or state authorities, or PWD to address events that result in a water shortage. The stages and applicable water supply conditions are summarized in Tables 8-1 and 8-2.

TABLE 8-1: RATIONING AND REDUCTION GOALS

Deficiency or State Mandated Reduction	Stage	Demand Reduction Goal	Type of Program
1-15%	1	15% reduction	Voluntary
16-25%	2	25% reduction	Mandatory
26-40%	3	40% reduction	Mandatory
41-50%	4	50% reduction	Mandatory
>50%	5	>50% reduction	Mandatory

TABLE 8-2: STAGES OF PWD WATER SHORTAGE CONTINGENCY PLAN

Stage	Percent Supply Reduction	Triggers
I Water Shortage Alert	1 to 15%	• Federal, state or local disaster declaration that may impact water supplies • State declaration due to drought or system maintenance • PWD Board of Directors determination • Unplanned PWD water system maintenance
I Water Shortage Warning	16 to 25%	• Federal, state or local disaster declaration that may impact water supplies • State declaration due to drought or system maintenance • PWD Board of Directors determination • Unplanned PWD water system maintenance requiring more time to repair
III Water Shortage Emergency	25 to 50%	• Federal, state or local disaster declaration that may impact water supplies • State determination due to drought or significant system failure • State outdoor irrigation restriction; and/or • PWD Board of Directors determination • Unplanned PWD water system failure or emergency
IV and V Critical Water Shortage Emergency	50% or higher	• Federal, state or local disaster declaration that may impact water supplies • Sacramento to Delta/SWP failure • State determination due to drought or significant system failure • PWD Board of Directors determination • Natural or human-caused catastrophe disrupting delivery of water to, or within the service area • Severe PWD water system failure

8.2 Procedures for Water Shortage Level Determination

The PWD General Manager will recommend activation of one or more elements of the WSCP whenever water supplies of the PWD have a reasonable prospect for being inadequate to meet the needs of customers. The recommendation shall be presented to the Board of Directors in the form of a written report, which includes the reasons for the recommendation. The Board will also be presented with a draft resolution for consideration and possible action. The Board shall consider the report at a duly noticed public hearing. In case of emergencies, a special meeting may be called by a majority of the Board on less than twenty-four hour notice and without an agenda to deal with the disruption of service.

If an emergency arises which would ordinarily be brought to the attention of the Board but insufficient time exists, the General Manager has administrative authority to take action as he deems appropriate and reasonable.

PWD uses various public notification forms like media outlets, direct mail, automated voice recording, website, social media, group presentations and public meetings. The form and extent of notification depends on the severity and duration of the emergency condition.

8.3 Prohibition of End Uses and Consumption Reduction Methods

PWD permanently implements general water conservation measures and irrigation practices aimed at increasing everyday water use efficiency. Those measures, plus those to be enacted in the various stages, are presented in Table 8-3.

TABLE 8-3: PROHIBITIONS DURING DIFFERENT SHORTAGE STAGES

Stage	Prohibition/Requirement
In Effect at All Times	Water waste is prohibited at all times. Water waste includes but is not limited to: • Application of potable water to outdoor landscapes in a manner that causes runoff. • Water leaks shall be repaired in a timely manner and sprinklers shall be adjusted to eliminate over-spray. • Hosing of hardscape surfaces, except where health and safety needs dictate, is prohibited. Other • Water for construction purposes, including but not limited to de-brushing of vacant land, compaction of fills and pads, trench backfill and other construction uses shall be in an efficient manner.
Stage I	• Watering of outdoor landscapes within 48 hours of measurable rainfall. • Car washing and outside cleaning activities prohibited except when performed with buckets and automatic hose shutoff devices. • The serving of drinking water other than upon request in eating or drinking establishments is prohibited. • Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. The hotel or motel shall prominently display notice of this option in each guestroom. • The PWD will expand the public information campaign. • The PWD shall evaluate the implementation of a Drought Surcharge.
Stage II	• All restrictions/prohibitions/initiatives from Stage I are in effect • Landscape watering between the hours of 1000 and 1800 hours is prohibited • Outdoor watering is limited to 3 days per week. • The PWD will increase water waste patrols. • Issuance of potable construction water meters will cease. • Irrigation with potable water outside of newly constructed homes and

Stage	Prohibition/Requirement
	buildings not delivered by drip or microspray is prohibited. • The PWD will evaluate adjustments to applicable water waste fines.
Stage III	• All restrictions/prohibitions/initiatives from Stage I and Stage II are in effect and are mandatory. • Irrigation with potable water of ornamental turf on public street medians is prohibited. • Outdoor watering is limited to 2 days per week. • Potable water cannot be used to maintain fountains, reflection ponds and decorative water bodies for aesthetic or scenic purposes, except where necessary to support aquatic life.
Stage IV	• All restrictions/prohibitions/initiatives from Stage I, Stage II, and Stage III are in effect and are mandatory. • Outdoor watering is limited to 1 day per week. • Filling of new swimming pools, spas, hot tubs or the draining and refilling of existing pools, etc is prohibited. Topping off is allowed to the extent that the designated water allocation is not exceeded. • Meters will only be installed for new accounts where the building permit was issued prior to the declaration of the water shortage.
Stage V	• All restrictions/prohibitions/initiatives from Stage I, Stage II, Stage III, and Stage IV are in effect and are mandatory. • No meters will be installed for new accounts. • Outdoor irrigation is prohibited, with the exception of drip or hand watering to preserve established trees.

According to each water shortage stage enacted, the PWD WSCP outlines actions required by customers and by PWD. These actions are presented in Table 8-4.

TABLE 8-4: CUSTOMER AND PWD WATER SHORTAGE ACTIONS

Stage	District Actions	Customer Actions
Stage I	• Initiate public information campaign • Increase awareness of conservation measures • Commence enforcement of conservation measures • Promote methods to reduce water use • Conduct focused outreach to large water users • Coordinate public outreach with the cities and County	• Voluntary water conservation • Adhere to conservation measures • Consider conversion to more efficient irrigation methods • Consider turf removal and conversion to California-friendly landscaping • Patronize local carwashes that recycle their water
Stage II	• Expand public information campaign • Step up enforcement of conservation measures • Continue previous actions	• Re-double voluntary conservation • Continue previous actions

Stage	District Actions	Customer Actions
Stage III	• Intensify public information campaign • Expand enforcement of conservation measures • Send direct notices to all customers • Provide regular media, city council and County briefings • Activate emergency connections with mutual aid agencies • Continue previous actions	• Continue previous actions • Ensure appropriate programming of irrigation controller
Stages IV and V	• Implement crisis communication plan • Activate Emergency Operations Center • Coordinate actions with regulatory agencies • Coordinate actions with public safety agencies to address enforcement and fire protection issues • Recall all temporary meters and activate water fill stations • Continue previous actions	• Continue previous actions • Terminate outdoor water use for irrigation, pools and fountains • Water may only be used outdoors for public health and safety purposes • Be on alert for Boil Water Orders if they become necessary

Multiple communication channels will be used by PWD staff to communicate water shortage conditions and necessary actions to the PWD Board of Directors, customers, residential homeowners associations, business chambers, inter-governmental bodies, essential facilities (schools, hospitals, fire), and other stakeholders. Among the communication methods to be used are the following:

- Public water conservation forums hosted at PWD headquarters and off-site locations.
- Attendance and agenda presentation at local city council meetings.
- Attendance and agenda presentations at home-owners association and business chamber meetings.
- Direct mailings and bill inserts to customers and account holders.
- Press releases.
- PWD publications, e.g., “The Pipeline”.
- Updated posting of issues and information on PWD website.
- Advertisements in local publications and cable channels.
- Cards, table tents, door hangers and other leave-behind reminders.

8.4 Penalties, Charges, Other Enforcement of Prohibitions

Enforcement actions for violations of water conservation measures are summarized in Table 8-5. PWD customers are encouraged to report water conservation violations through use of the PWD hotline.

TABLE 8-5: ENFORCEMENT ACTIONS

Violation Level	Penalties or Charges
1st Violation	The customer shall be notified in writing. The notice shall include a warning that further violations could result in stricter penalties.
2nd Violation	A 2nd violation is punishable by a fine of up to $50.
3rd Violation	A 3rd violation is punishable by a fine of up to $250.
4th Violation	A 4th violation is punishable by a fine of up to $500.
5th Violation	A 5th violation may result in termination of service.
Violation Assessment Period	Any violations occurring within twelve months of each other will be considered consecutive and result in escalating penalties. The period for assessing consecutive penalties may be extended beyond 12 months by resolution of the Board.

8.5 Determining Water Shortage Reductions

The PWD has meters on all residential, commercial and landscape service connections in the service area and requires meters on all new connections. These meters record the amount of water consumption at each location. These meters in combination with billing information will be used to monitor actual reductions in water use.

8.6 Revenue and Expenditure Impacts

Currently, only about 55 percent of PWD'S fixed costs are covered by fixed revenues. As a result, water conservation efforts can significantly impact revenues. Current drought conditions have presented a reminder of the large fluctuations in water sales volumes that can occur within the PWD service area and statewide, and emphasize the importance of measures to improve revenue stability.

According to the PWD Fiscal Year 2015-16 Adopted Budget, reductions in potable water use due to statewide mandates are anticipated to result in an operating shortfall for the Potable Water Enterprise. While operating expenses are reduced with lower sales, fixed costs cannot be fully recovered for potable water with significant reductions in sales, thereby resulting in a net operating loss. This shortfall will be made up by drawing from PWD's reserves which introduces risk associated with financial stability when a pre-established minimum reserve account is reached.

In the case of future water use reductions resulting from the implementation of the PWD WSCP, PWD would likely experience similar impacts to operating revenue and would draw as necessary and as possible from reserves. In addition, one of the objectives of the budget-based tiered rate structure implemented on January 1, 2016 is to improve revenue stability for PWD. Therefore, while revenue would inevitably fluctuate with water use reductions, PWD has established appropriate means to manage these impacts with use of drought surcharge. Future or continued reductions in consumption would ultimately cause a rate structure adjustment that would generate enough revenue to fund operations without drawing from reserves.

8.7 WSCP Resolution or Ordinance

PWD will adopt the WSCP at the time of the UWMP adoption. A copy of the draft Resolution No. 16-7 is included in Appendix I.

8.8 Actions to Prepare For Catastrophic Supply Interruption

The PWD service area is bound on the west by a major portion of the San Andreas Fault. A major earthquake along the southern portion of the San Andreas Fault would affect the PWD service area. The California Division of Mines and Geology has stated two of the aqueduct systems that import water to southern California (including the California Aqueduct) could be ruptured by displacement on the San Andreas Fault, and supply may not be restored for a three to six-week period. The situation would be further complicated by physical damage to pumping equipment and local loss of electrical power.

DWR has a contingency aqueduct outage plan for restoring the California Aqueduct to service should a major break occur, which it estimates would take approximately four months to repair.

Experts agree it may be at least three days after the earthquake before outside help could get to the area. Extended supply shortages of both groundwater and imported water, due to power outages and/or equipment damage, would be severe until the water supply could be restored.

Power outages could affect the PWD because they own and operate groundwater wells and distribution systems.

The area's water sources are generally of good quality, and no insurmountable problems resulting from industrial or agricultural contamination are foreseen. If contamination did result from a toxic spill or similar accident, the contamination would be isolated and should not significantly impact the total water supply. In addition, such an event would be addressed in PWD's emergency response plans.

8.8.1 SWP Emergency Outage Scenarios

In addition to earthquakes, the SWP could experience other emergency outage scenarios. Past examples include slippage of aqueduct side panels into the California Aqueduct near Patterson in the mid-1990s, the Arroyo Pasajero flood event in 1995 (which also destroyed part of Interstate 5 near Los Banos) and various subsidence repairs needed along the East Branch of the Aqueduct since the 1980s. All these outages were short-term in nature (on the order of weeks), and DWR's Operations and Maintenance Division worked diligently to devise methods to keep the Aqueduct in operation while repairs were made. As a result, the SWP contractors experienced no interruption in deliveries.

One of the SWP's important design engineering features is the ability to isolate parts of the system. The Aqueduct is divided into "pools." Thus, if one reservoir or portion of the California Aqueduct is damaged in some way, other portions of the system can still remain in operation. The principal SWP facilities are shown on Figure 8-1.

FIGURE 8-1: PRIMARY SWP FACILITIES

Other events could result in significant outages and potential interruption of service. Examples of possible nature-caused events include a levee breach in the Delta near the Harvey O. Banks Pumping Plant, a flood or earthquake event that severely damages the Aqueduct along its San Joaquin Valley traverse, or an earthquake event along either the West or East Branches. Such events could impact some or all SWP contractors south of the Delta.

The response of DWR, the PWD, and other SWP contractors to such events would be highly dependent on the type and location of any such event. In typical SWP operations, water flowing through the Delta is diverted at the SWP's main pumping facility, located in the southern Delta, and is pumped into the California Aqueduct. During the relatively heavier runoff period in the winter and early spring, Delta diversions generally exceed SWP contractor demands, and the excess is stored in San Luis Reservoir. Storage in SWP aqueduct terminal reservoirs, such as Pyramid and Castaic Lakes, is also refilled during this period. During the summer and fall, when diversions from the Delta are generally more limited and less than contractor demands, releases from San Luis Reservoir are used to make up the difference in deliveries to contractors. The SWP share of maximum storage capacity at San Luis Reservoir is 1,062,000 AF.

The PWD receives its SWP deliveries through the East Branch of the California Aqueduct. The other contractors receiving deliveries from the East Branch are Metropolitan Water District, Antelope Valley-East Kern Water Agency, Mojave Water Agency, Crestline-Lake Arrowhead Water Agency, Desert Water Agency, San Gabriel Valley Municipal Water District, San Bernardino Valley Municipal Water District, San Gorgonio Pass Water Agency, and Coachella Valley Water District. The East Branch has two terminal reservoirs, Silverwood Lake and Lake Perris, which were designed to provide emergency storage and regulatory storage (i.e., storage to help meet peak summer deliveries) for several of the East Branch contractors. However, the PWD does not have contract rights to storage capacity in those reservoirs.

In addition to SWP storage south of the Delta in San Luis and the terminal reservoirs, a number of contractors have stored water in groundwater banking programs in the San Joaquin Valley, and many also have surface and groundwater storage within their own service areas.

Three scenarios that could impact the delivery to the PWD of its SWP supply or other supplies delivered to it through the California Aqueduct are described below. For each of these scenarios, it was assumed that an outage of six months could occur. The PWD's ability to meet demands during the worst of these scenarios is presented following the scenario descriptions.

8.8.1.1 Scenario 1: Emergency Freshwater Pathway Description (Sacramento-San Joaquin Delta)

DWR has estimated that in the event of a major earthquake in or near the Delta, regular water supply deliveries from the SWP could be interrupted for up to three years, posing a substantial risk to the California business economy. Accordingly, a post-event strategy has been developed which would provide necessary water supply protections. The plan has been coordinated through DWR, the Army Corps of Engineers (Corps), Bureau of Reclamation, California Office of Emergency Services (Cal OES), the Metropolitan Water District of Southern California, and the State Water Contractors. Full implementation of the plan would enable resumption of at least partial deliveries from the SWP in less than six months.

DWR Delta Flood Emergency Management Plan. DWR has developed the Delta Flood Emergency Management Plan to provide strategies for a response to Delta levee failures, which addresses a range of failures up to and including earthquake-induced multiple island failures during dry conditions when the volume of flooded islands and salt water intrusion are large. Under such severe conditions, the plan includes a strategy to establish an emergency freshwater pathway from the central Delta along Middle River and Victoria Canal to the export pumps in the south Delta. The plan includes the pre-positioning of emergency construction materials at existing and new stockpiles and warehouse sites in the Delta, and development of tactical modeling tools (DWR Emergency Response Tool) to predict levee repair logistics, water quality conditions, and timelines of levee repair and suitable water quality to restore exports. The Delta Flood Emergency Management Plan has been extensively coordinated with state, federal and local emergency response agencies. DWR, in conjunction with local agencies, the Corps and Cal OES, regularly conduct simulated and field exercises to test and revise the plan under real time conditions.

DWR and the Corps provide vital Delta region response to flood and earthquake emergencies, complementary to an overall Cal OES structure. Cal OES is preparing its Northern California Catastrophic Flood Response Plan that incorporates the DWR Delta Flood Emergency Management Plan. These agencies utilize a unified command structure and response and recovery framework. DWR and the Corps, through a Draft Delta Emergency Operations Integration Plan (2015), would integrate personnel and resources during emergency operations.

8.8.1.2 Scenario 2: Complete Disruption of the California Aqueduct in the San Joaquin Valley

The 1995 flood event at Arroyo Pasajero demonstrated vulnerabilities of the California Aqueduct (the portion that traverses the San Joaquin Valley from San Luis Reservoir to Edmonston Pumping Plant). Should a similar flood event or an earthquake damage this portion of the aqueduct, deliveries from San Luis Reservoir could be interrupted for a period of time. DWR has informed the SWP contractors that a four-month outage could be expected in such an event. The PWD's assumption is a six-month outage.

Arroyo Pasajero is located downstream of San Luis Reservoir and upstream of the primary groundwater banking programs in the San Joaquin Valley. Assuming an outage at a location near Arroyo Pasajero that resulted in the California Aqueduct being out of service for six months, supplies from San Luis Reservoir would not be available to those SWP contractors located downstream of that point. This would include the PWD.

8.8.1.3 Scenario 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 Edmonston Pumping Plant, which pumps SWP water through and across the Tehachapi Mountains. From the point of bifurcation, the East Branch is an open canal. Water is conveyed through the canal to the Pearblossom Pumping Plant, where the first of four turnouts to the PWD service area is located at the Sheep Creek (mile marker 346.98 in Reach 20B), which is essentially a stub out in Phelan area and not used at this time.

If a major earthquake were to damage a portion of the East Branch, deliveries could be interrupted. The exact location of such damage along the East Branch would be key to

determining emergency operations by DWR and the East Branch SWP contractors. It should be noted that the East Branch is bounded by and in some places traverses the San Andreas Fault Zone. For this scenario, it was assumed that the East Branch would suffer a single-location break and deliveries of SWP water from north of the Tehachapi Mountains or of contractor water stored in groundwater banking programs in the San Joaquin Valley would not be available. It was also assumed that Silverwood and Perris dams would not be damaged by the event and that water in Silverwood and Perris Lakes would be available to the three East Branch SWP contractors that have capacity rights in them.

In any of these three SWP emergency outage scenarios, DWR and the SWP contractors would coordinate operations to minimize supply disruptions. Depending on the particular outage scenario or outage location, some or all of the SWP contractors south of the Delta might be affected. But even among those contractors, potential impacts would differ given each contractor's specific mix of other supplies and available storage. During past SWP outages, the SWP contractors have worked cooperatively to minimize supply impacts among all contractors. Past examples of such cooperation have included certain SWP contractors agreeing to rely more heavily on alternate supplies, allowing more of the outage-limited SWP supply to be delivered to other contractors; and exchanges among SWP contractors, allowing delivery of one contractor's SWP or other water to another contractor, with that water being returned after the outage was over.

Of these three SWP outage scenarios, the East Branch outage scenario presents the worst-case scenario for the PWD. In this scenario, the PWD would rely solely on local supplies. An assessment of the supplies available to meet demands in the PWD's service area during a six-month East Branch outage and the additional levels of conservation projected to be needed are presented in Table 8-6 for 2020 through 2040.

During an outage, the local supplies available would consist of groundwater and surface water. It was assumed that local well production would be unimpaired by the outage and that the outage would occur during a year when average/normal supplies would be available. Note that adequate well and aquifer capacity exists to pump at levels higher than those assumed in this assessment, particularly during a temporary period such as an outage. However, to be conservative, groundwater production was assumed to be one-half of annual supplies.

Table 8-6 shows that, for a six-month emergency outage, the PWD will be in a good position to handle the emergency outage due to the planned GRRP program and the long term buffering capacity of local aquifers. Additionally, it is likely that potential cooperation among SWP contractors and/or temporarily increased groundwater production during such an outage could increase supplies so that lower amounts, or even no amount, of additional conservation would be needed and the banked water could be saved for future emergency. In an emergency such as this, these levels of additional conservation would likely be achieved through voluntary conservation, but mandatory measures would be enacted by the PWD if needed.

TABLE 8-6: PROJECTED SUPPLIES AND DEMANDS DURING SIX-MONTH DISRUPTION OF IMPORTED SUPPLY SYSTEM (AF)

Source	2020	2025	2030	2035	2040
Imported SWP Supply[(a)]	0	0	0	0	0
Local Groundwater[(b)]	3,140	2,070	1,385	1,385	1,385
Groundwater Return Flow Credits[(b)]	2,500	2,500	2,500	2,500	2,500
Local Surface Water[(c)]	2,000	2,000	2,000	2,000	2,000
Recycled Water[(d)]	1,250	2,500	2,750	3,000	3,000
Palmdale Regional GRRP[(e)]	7,500	7,500	7,500	7,500	7,500
Total Supplies	**16,390**	**16,570**	**16,135**	**16,385**	**16,385**
Total Estimated Demands[(f)]	**11,650**	**13,450**	**14,200**	**14,950**	**15,500**

Notes:
(a) Assumes complete disruption in SWP supplies and in deliveries through the California Aqueduct for six months; inclusive of Butte Transfer Agreement.
(b) See Table 3-1. Projected annual groundwater supplies, including return flow credits, have been divided by 2 to represent 6 months of supply.
(c) See Table 3-1. Projected surface water supplies have been divided by 2 to represent 6 months of supply.
(d) Projected recycled water supplies have been divided by 2 to represent 6 months of supply.
(e) It is assumed that the GRRP will be in operation and will make 7,500 AFY available from recharged supplies.
(f) Total demands include potable and recycled water demands. Demands are assumed to be one-half of average/normal year demands.

8.8.2 Regional Power Outage Scenarios

For a major emergency such as an earthquake, Southern California Edison (Edison) has declared that in the event of an outage, power would be restored within a 24 hour period. For example, following the 1994 Northridge earthquake, Edison was able to restore power within 19 hours. Edison experienced extensive damage to several key power stations, yet was still able to recover within a 24-hour timeframe.

The PWD has developed alternatives for providing its own electrical generation using portable and fixed emergency generation units to respond to potential outages. PWD utilizes wind, solar, and hydro generation to offset power costs. The PWD also works closely with electricity and natural gas providers to ensure energy efficiency and the best possible rates.

8.9 Minimum Supply Next Three Years

The minimum water supply available during the next three years would occur during a three-year multiple-dry year event between the years 2016 and 2018. As shown in Table 8-7, the total water supply available during each of the next three years is around 20,000 AFY.

TABLE 8-7: ESTIMATE OF MINIMUM SUPPLY FOR THE NEXT THREE YEARS

	2016	2017	2018
Source			
Local Groundwater[(a)]	10,500	9,200	8,100
Groundwater Return Flow Credits[(b)]	5,000	5,000	5,000
Local Surface Water[(c)]	4,000	4,000	4,000
Imported SWP Water[(d)]	1,100	1,100	1,100
Butte Transfer Agreement[(d)]	500	500	500
Recycled Water	100	100	100
Total Supplies	**21,200**	**19,900**	**18,800**

Notes: Values are rounded.

(a) Assumes rampdown of historic groundwater rights (12,000 AFY) will occur.
(b) Assumes return flow credits are available in all hydrologic year types.
(c) Based on full availability of projected surface water supplies. See Table 3-1.
(d) Imported supplies, including PWD's Table A amount of 21,300 AF and Butte Transfer agreement of 10,000 AFY, were multiplied by 5% based on the worst-case historic four-year drought (current conditions). See Table 3-8.
(e) Assumes 2015 recycled water deliveries.

References

American Water Works Association (AWWA). M36 Water Audits and Loss Control Programs, Fourth Edition.

Antelope Valley Integrated Regional Water Management Plan 2013 Update. Available at: http://www.avwaterplan.org/

California Department of Water Resources. 2015. The State Water Project Final Delivery Capability Report 2015. July.

California Department of Water Resources. 2014a. Draft Delta Emergency Operations Integration Plan. April.

California Department of Water Resources. 2014b. Final California Water Plan Update 2013. October.

California Department of Water Resources. 2010. 20x2020 Water Conservation Plan. February.

California Department of Water Resources. 2003. Bulletin 118 Update 2003: California's Groundwater. October.

California Department of Water Resources.1980. Bulletin 118: California's Groundwater. January.

California Department of Water Resources and United States Environmental Protection Agency. 2011. Climate Change Handbook for Regional Water Planning. November.

California Irrigation Management Information System (CIMIS). Station No. 220, Los Angeles Region. Data used from March 2011 to October 2015. Accessed at: http://wwwcimis.water.ca.gov/cimis/welcome.jsp

Carollo Engineers. 2015. Palmdale Recycled Water Authority Recycled Water Facilities Master Plan. January.

Carollo Engineers. 2005. Palmdale Water District 2005 Urban Water Management Plan. December.

County Sanitation Districts of Los Angeles County. 2016. Palmdale Water Reclamation Plan Annual Monitoring Report 2015. February.

Environmental Science Associated (ESA). 2014. Palmdale Recycled Water Authority Recycled Water Facilities Plan. Initial Study/Mitigated Negative Declaration. October.

Kennedy/Jenks Consultants. 2016. Palmdale Regional Groundwater Recharge and Recovery Project Title 22 Engineering Report. March.

Kennedy/Jenks Consultants. 2015. Palmdale Water District Littlerock Creek Groundwater Recharge and Recovery Project Feasibility Study. February.

Kennedy/Jenks Consultants. 2006. Final Facilities Planning Report, Antelope Valley Recycled Water Project. August

Los Angele Department of Public Works Waterworks District No. 40, Los Angeles County. 2014. Salt and Nutrient Management Plan for the Antelope Valley. May.

MWH. 2016. Water Master Plan Draft Report. Prepared for Palmdale Water District. March.

Palmdale Water District. 2014a Consumer Confidence Report.

Palmdale Water District 2014b. Strategic Water Plan. Summer.

Palmdale Water District. 2004 Public Water System Statistics.

Palmdale Water District. 2003 Public Water System Statistics.

Palmdale Water District. 2001 Public Water System Statistics.

Palmdale Water District. 1996 Public Water System Statistics.

Palmdale Water District. 1993 Public Water System Statistics.

Palmdale Water District. 1992 Public Water System Statistics.

Palmdale Water District. 1991 Public Water System Statistics

RMC Water and Environment. 2010. Palmdale Water District Recycled Water Facilities Plan. February

RMC Water and Environment. 2011. Palmdale Water District 2010 Urban Water Management Plan. June

P A L M D A L E W A T E R D I S T R I C T

B O A R D M E M O R A N D U M

DATE: May 25, 2016 **June 1, 2016**

TO: BOARD OF DIRECTORS **Special Meeting**

FROM: Mr. Peter Thompson II, Deputy Water and Energy Resources Dir.

VIA: Mr. Dennis D. LaMoreaux, General Manager
Mr. Jon M. Pernula, Water and Energy Resources Director

RE: ***AGENDA ITEM NO. 4.2 – CONSIDERATION AND POSSIBLE ACTION ON RESOLUTION NO. 16-7 ADOPTING, DIRECTING FILING OF, AND IMPLEMENTING THE PALMDALE WATER DISTRICT 2015 URBAN WATER MANAGEMENT PLAN AND INCORPORATED WATER SHORTAGE CONTINGENCY PLAN***

Recommendation:

Staff recommends approval of Resolution No. 16-7 Adopting, Directing Filing of, and Implementing the Palmdale Water District 2015 Urban Water Management Plan (UWMP) and Incorporated Water Shortage Contingency Plan.

Background:

The California Water Code (CWC) Section 10620(a) requires an urban water supplier to prepare and adopt a UWMP consistent with CWC Section 10640. All urban water suppliers, either publicly or privately owned, serving municipal water to 3,000 customers or supplying more than 3,000 acre-feet annually are required to prepare an UWMP. The UWMP is required for an urban water supplier to be eligible for Department of Water Resources (DWR) state grants, loans, and drought assistance. The UWMP must be adopted by the District's Board and submitted to DWR by July 1, 2016. The UWMP includes data review and analysis, development of demand projections, analysis of demand management measures, population and demographic analysis, system supplies, water supply reliability, water shortage contingency planning, climate change, and other factors as identified by the Urban Water Management Planning Act.

The purpose of the UWMP is to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during water drought conditions.

This iteration of the UWMP comes in the midst of statewide concerns over the drought and the California Water Fix. Also, the California state legislature passed significant amendments to the UWMP Act in 2014 impacting reporting criteria for the District's Plan update. These issues have played a role in altering the scope and rules for completing the UWMP. On November 9, 2015, the Board of Directors approved entering into a Professional Services Agreement with Kennedy/Jenks Consultants to assist with the development and completion of the District's 2015 UWMP.

Initial amendments to the UWMP required that total projected water use be compared to water supply sources over the next 20 years, in five-year increments. The 2005 update guidelines suggested projecting through a 25-year planning horizon to maintain a 20-year timeframe until the next UWMP update has been completed. Other amendments required that plans include provisions for recycled water use, demand management measures, and a Water Shortage Contingency Plan. Recycled water is included in the reporting requirements for water usage and figures prominently in the requirements for evaluation of alternative water supplies when future projections predict the need for additional water supplies. Each urban water purveyor must coordinate the preparation of the Water Shortage Contingency Plan with other urban water purveyors in the area to the extent practicable. Each water supplier must also describe their water demand management measures that are being implemented or are scheduled for implementation. Provisions for the UWMP Act of 2009 and SB7, which requires a 20% reduction of water demand per capita per day by the year 2020, were included in this 2015 update.

Strategic Plan Initiative:

This work is part of Strategic Initiative No. 1 – Strategic Water Management.

Budget:

$99,380.00 was budgeted for completion of the 2015 UWMP under Project No. 15-408.

Supporting Documents:

- Resolution No. 16-7 Adopting, Directing Filing of, and Implementing the Palmdale Water District 2015 Urban Water Management Plan and Incorporated Water Shortage Contingency Plan

PALMDALE WATER DISTRICT
RESOLUTION NO. 16-7

RESOLUTION ADOPTING, DIRECTING FILING OF, AND IMPLEMENTING THE PALMDALE WATER DISTRICT 2015 URBAN WATER MANAGEMENT PLAN AND INCORPORATED WATER SHORTAGE CONTINGENCY PLAN

WHEREAS, the California Legislature enacted Assembly Bill 797 during the 1983-1984 Regular Session of the California Legislature (Water Code Section 10610 et.seq.) known as the Urban Water Management Plan Act (the Act).

WHEREAS, California Water Code section 10632 requires water agencies to plan for water shortages of up to 50 percent as part of their Urban Water Management Plan; and

WHEREAS, PWD has prepared an update to its Water Shortage Contingency Plan (WSCP); and

WHEREAS, the WSCP is consistent with the California Water Code sections 350 through 359 and section 10632, and guidance provided by the California Department of Water Resources Urban Drought Guidebook 2008 Updated Edition; and

WHEREAS, the Act mandates that every urban water supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, prepare, and every five (5) years thereafter update, its Urban Water Management Plan, (UWMP), the primary objective of which is to plan for the conservation and efficient use of water.

WHEREAS, the latest update of the Plan was due at the end of 2015, but a six-month extension was granted by the Legislature for submittals of the 2015 Urban Water Management plan to provide time for urban water suppliers to address Senate Bill X7-7 (SB X7-7), which requires water retailers like the Palmdale Water District to develop plans to reduce per capita water use by 20 percent by the year 2020, with an interim target of a 10 percent reduction by 2015; and

WHEREAS, the Palmdale Water District prepared and filed a UWMP with the California Department of Water Resources in December 1985, December 1990, December 1995, December 2000, December 2005, and December 2010; and

WHEREAS, considering the six (6) month extension granted by the Legislature, the 2015 Plan should be adopted by June 30, 2016 and filed with the California Department of Water Resources, the California State Library and the City of Palmdale within thirty days of adoption; and

WHEREAS, the Act further requires that the adopted UWMP and WSCP be available for public review during normal business hours for thirty (30) days following its submission to the Department of Water Resources; and

WHEREAS, as an urban water supplier providing water service to over 109,000 customers, Palmdale Water District is subject to the Act and has, therefore, prepared and circulated for public view a Draft 2015 Urban Water Management Plan in compliance with the requirements of the Act, and a properly noticed public hearing regarding the proposed UWMP and WSCP was duly held by the Palmdale Water District on June 1, 2016.

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

1. The 2015 Urban Water Management Plan and incorporated Water Shortage Contingency Plan are hereby approved and adopted.

2. The General Manager is hereby authorized and directed to file the UWMP and WSCP with the California Department of Water Resources, the California State Library and the City of Palmdale within thirty days of adoption in accordance with the Act.

3. When required by conditions contained in the Plan, the General Manager is authorized to declare a Water Shortage Emergency and to implement water conservation programs as detailed in the WSCP, including recommendations to the Board of Directors regarding necessary procedures, rules and regulations to carry out effective and equitable water conservation programs.

4. The General Manager and staff are hereby further authorized and directed to take such other and further actions as may be reasonably necessary to carry out the purposes and intent of the Plan.

PASSED AND ADOPTED at the regular meeting of the Board of Directors held on June 1, 2016.

_____

ROBERT ALVARADO, President,
Palmdale Water District Board of Directors

ATTEST:

_____

JOE ESTES, Secretary,
Palmdale Water District Board of Directors