Public Draft

2015 Urban Water Management Plan

for the

Victorville Water District

Prepared by

WSC

WATER SYSTEMS CONSULTING, INC.

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LIST OF ABBREVIATIONS

Abbreviation	Definition
AB	Assembly Bill
ADD	Average Day Demand
Af	Acre Feet
Afy	Acre Feet per Year
AWAC	Alliance for Water Awareness and Conservation
BMP	Best Management Practices
BAP	Base Annual Production
BMWD	Baldy Mesa Water District
BPS	Booster Pumping Station
CDPH	California Department of Public Health
CDR	Center for Demographic Research
CIMIS	California Irrigation Management Information System
CMAS	Complete-mix activated Sludge
COM	Commercial Land Use
CRWQCB	California Regional Water Quality Control Board
DMMs	Demand Management Measures
DOF	Department of Finance
DPH	Department of Public Health
Du/ac	Dwelling Units per Acre
DWR	Department of Water Resources
EPA	Environmental Protection Agency
ETo	Evapotranspiration
°F	Degrees Farenheit
FAR	Floor Area Ratio
FY	Fiscal Year
FPA	Free Production Allowance
GAFB	George Air Force Base
GHG	Greenhouse Gas
Gpcd	Gallons per Capita per Day
Gpm	Gallons per Minute
GWMP	Groundwater Management Plan
HDPP	High Desert Power Plant
HDR	High Density Residential
HGL	Hydraulic Grade Line
HOA	Home Owners' Association
ID1	Improvement District 1
ID2	Improvement District 2
IND	Industrial Land Use
IRWMP	Mojave Water Agency Integrated Regional Water Management Plan
kWh	Kilowatt-Hour
LCER	Lewis Center for Educational Research
LDR	Low Density Residential
MAF	Million Acre Feet
MBR	Membrane Bioreactor

Abbreviation	Definition
MCL	Maximum Contaminant Level
MDR	Medium Density Residential
MFR	Multi-Family Residential
Mg	Million Gallons
Mgd	Million Gallons per Day
Mg/l	Milligrams per Liter
MOU	Memorandum of Understanding
MWA	Mojave Water Agency
MWDSC	Metropolitan Water District of Southern California
MXDR	Mixed Density Residential
NOAA	National Oceanic and Atmospheric Administration
R^3	Regional Recharge and Recovery Project
RUWMP	Regional Urban Water Management Plan
RW	Recycled Water
RWA	Replacement Water Assessment
RWMP	Regional Water Management Plan
RWQCB	Regional Water Quality Control Board
Plan	2015 Urban Water Management Plan
PWS	Public Water System
RHNA	Regional Housing Needs Assessment
SB	Senate Bill
SB X7-7	Home Water Use Efficiency Senate Bill 7
SCAG	Southern California Association of Governments
SCLA	Southern California Logistics Airport
SDWA	Safe Drinking Water Act
SFR	Single Family Residential
SOI	Sphere of Influence
SWP	State Water Project
TDS	Total Dissolved Solids
TZ	Transition Zone
ULF	Ultra Low Flush
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
UWMP Act	Urban Water Management Planning Act
UWMP Guidebook	Department of Water Resources 2015 Urban Water Management Plan Guidebook
UV	Ultra-Violet
VLDR	Very Low Density Residential
VWD	Victorville Water District
VWTF	Victorville Wastewater Treatment Facility
VVWD	Victor Valley Water District
VVWRA	Victor Valley Wastewater Reclamation Authority
WCS	Water Code Section
WMP	Water Master Plan
WRF	Water Reclamation Facility
WRCC	Western Regional Climate Center
WSA	Water Supply Assessment
WSCP	Water Shortage Contingency Plan

Abbreviation	Definition
WSSCP	Water Supply Shortage Contingency Plan
WSDM	Water Surplus and Drought Management
WSRP	Water Shortage Response Plan
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

1 EXECUTIVE SUMMARY

This executive summary provides an overview of the Victorville Water District's (VWD) 2015 Urban Water Management Plan (UWMP). The purpose of the UWMP is for water suppliers to evaluate their long-term resource planning and establish management measures to ensure adequate water supplies are available to meet existing and future demands. The UWMP provides a framework to help water suppliers 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 plan was prepared in compliance with the California Water Code, and the guidelines and format established by the California Department of Water Resources (DWR). This UWMP includes a 25-year planning period from 2015 to 2040.

As required by the Urban Water Management Plan Act (UWMP Act), this UWMP has been prepared with the participation of the public and in coordination with appropriate agencies. Specific coordination and participation details are included in Chapter 3.

VWD's service area is located in the southwest region of San Bernardino County and encompasses approximately 85 square miles. Throughout the planning period, VWD's population is anticipated to grow at about 1.6 to 2.3 percent annually, reaching over 200,000 by 2040.

VWD's potable water system supplies water solely from groundwater, pumped from the Mojave River Basin (Basin). The Basin is adjudicated and Mojave Water Agency (MWA) serves as the Watermaster. Per the Mojave Basin Area Judgment, producers in the Mojave Basin Area are allocated a Free Production Allowance (FPA). Producers may pump more than their FPA, provided they purchase Replacement Water. Funds collected for Replacement Water are then used by MWA to purchase imported water supplies in wet years and recharge them into the Basin for use in dry years.

VWD's 2015 demands were 20,569 acre feet (AF), which are substantially reduced from prior years due to ongoing conservation efforts and a severe multi-year drought that resulted in a series of executive orders from the governor mandating 25% statewide conservation.

Senate Bill x 7-7 (SBX7-7), also known as the Water Conservation Bill of 2009, requires all water suppliers to increase water use efficiency with the overall goal to decrease per-capita water consumption within the state by 20 percent by the year 2020. SBX7-7 specified methodologies for determining the baseline water demand, 2015 interim urban water use target and the 2020 urban water use targets. The baseline and targets were required to be reported in the 2010 UWMP for each urban retail water supplier. This Plan is required to assess compliance with the 2015 interim urban water use target and monitor progress toward compliance with the 2020 urban water use target. The VWD baseline per capita demand is 253 gallons per capita per day (gpcd), the 2015 Interim Target is 227 GPCD, and the 2020 Target is 202 gpcd. VWD's actual 2015 GPCD was 143, which surpasses the 2020 Target. The development of the per-capita demand targets is discussed in further detail in Chapter 5.

This Plan concludes that VWD has adequate supplies to meet demands during average, single dry and multiple dry years throughout the 25-year planning period. VWD will continue aggressive water conservation efforts, increased use of recycled water to offset potable water demand, and participation in new water supply projects with MWA to ensure that supplies continue to meet current and projected demands.

2 INTRODUCTION

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

The purpose of the UWMP is for water suppliers to evaluate their long-term resource planning and establish management measures to ensure adequate water supplies are available to meet existing and future demands. The UWMP provides a framework to help water suppliers 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.

The UWMP is a valuable planning tool used for multiple purposes including:

- Serves as a valuable resource to the community and other interested parties regarding water supply and demand, conservation and other water related information
- Meets a statutory requirement of the California Water Code
- Provides a key source of information for Water Supply Assessments (WSAs) and Written Verifications of Water Supply
- Supports regional long-range planning documents including City and County General Plans
- Provides a standardized methodology for water utilities to assess their water resource needs and availability
- Serves as a critical component of developing Integrated Regional Water Management Plans (IRWMPs)
- Provides a resource for regional involvement in the California Water Plan

This plan, which was prepared in compliance with the California Water Code, and as set forth in the 2015 guidelines and format established by the DWR, constitutes the 2015 Urban Water Management Plan 2015 (Plan) for the Victorville Water District.

Throughout this report, water volume is represented in units of acre-feet (AF). Data have been compiled on a calendar year basis.

2.1 BACKGROUND

The California Urban Water Management Planning Act (UWMP Act) requires preparation of a plan that:

- Accomplishes water supply planning over a minimum 20-year period in five year increments. Recent DWR guidelines also suggest projecting through a 25-year planning horizon to maintain a 20-year timeframe until the next UWMP update has been completed and for use in developing Water Supply Assessments.
- Identifies and quantifies adequate water supplies, including recycled water, for existing and future demands, in normal, single-dry, and multiple-dry years.
- Documents conservation programs to encourage efficient use of urban water supplies.

Senate Bill x 7-7 (SBX7-7), also known as the Water Conservation Bill of 2009, which was incorporated into the UWMP Act in 2009, requires all water suppliers to increase water use efficiency with the overall

goal to decrease per-capita water consumption within the state by 20 percent by the year 2020. SBX7-7 required DWR to develop certain criteria, methods, and standard reporting forms through a public process that could be used by water suppliers to establish their baseline water use and determine their water conservation targets. SBX7-7 and the SBX7-7 Guidebook specify methodologies for determining the baseline water demand, 2015 interim urban water use target and the 2020 urban water use targets. The baseline and targets were required to be reported in the 2010 UWMP for each urban retail water supplier. This Plan is required to assess compliance with the 2015 interim urban water use target and monitor progress toward compliance with the 2020 urban water use target.

A DWR Review Sheet checklist is provided in Appendix A as a reference for the various sections within this UWMP that address the requirements of the UWMP Act. Table 2-1 summarizes changes to the UWMP Act since 2010 that have been addressed in this UWMP.

Table 2-1. Summary of Changes in the UWMP Act Since 2010

Change	CWC Section	Legislative Bill	Summary
Demand Management Measures	10631 (f)(1) and (2)	AB 2067, 2014	Requires water suppliers to provide narratives describing their water demand management measures, as provided. Requires retail water suppliers to address the nature and extent of each water demand management measure implemented over the past 5 years and describe the water demand management measures that the supplier plans to implement to achieve its water use targets.
Submittal Date	10621 (d)	AB 2067, 2014	Requires each urban water supplier to submit its 2015 plan to the Department of Water Resources by July 1, 2016.
Electronic Submittal	10644 (a) (2)	SB 1420, 2014	Requires the plan, or amendments to the plan, to include any standardized forms, tables, or displays specified by the department.
Updates to Baseline and Target GPCD using Census Data	10608.20		Allows urban retail water suppliers to update their 2020 urban water use target in the 2015 UWMP. DWR's 2015 UWMP Guidebook requires water suppliers to recalculate their 10 and 5-year baseline populations using 2000 and 2010 Census data. This may affect the baseline and target GPCD values calculated in the 2010 UWMP, which must be modified accordingly in the 2015 UWMP.
Standardized Forms	10644 (a) (2)	SB 1420, 2014	Requires the plan, or amendments to the plan, to include any standardized forms, tables, or displays specified by the department.
Water Loss	10631 (e) (1) (J) and (e) (3) (A) and (B)	SB 1420, 2014	Requires a plan to quantify and report on distribution system water loss.

Change	CWC Section	Legislative Bill	Summary
Estimating Future Water Savings	10631 (e) (4)	SB 1420, 2014	Provides for water use projections to display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans, when that information is available and applicable to an urban water supplier.
Voluntary Reporting of Energy Intensity	10631.2 (a) and (b)	SB 1036, 2014	Provides for an urban water supplier to include certain energy related information, including, but not limited to, an estimate of the amount of energy used to extract or divert water supplies.

The 2015 UWMPs must be submitted to DWR by the water purveyors by July 1, 2016. Typically, UWMPs are due on December 31 of years ending in '0' and '5', but a six-month extension has been granted for submittal of the 2015 UWMPs to provide additional time for water suppliers to demonstrate compliance with their established water use target for the year 2015 per SBX7-7. The draft 2015 UWMP Guidebook became available in November 2015 and was finalized in March 2016. DWR's 2015 UWMP schedule is summarized in Table 2-2.

Table 2-2. DWR Schedule

Date	Event/Task
November, 2015	Draft Guidebook released
December , 2015	Workshops
January, 2016	Final Draft Guidebook released
March, 2016	Final Guidebook, materials and tools released
July 1, 2016	UWMPs due to DWR

2.2 PREVIOUS URBAN WATER MANAGEMENT PLAN

Pursuant to the UWMP Act, VWD previously prepared and adopted an UWMP in 2010. This Plan serves as an update to the 2010 UWMP.

2.3 UWMPS AND GRANT OR LOAN ELIGIBILITY

In order for an urban water supplier to be eligible for any water management grant or loan administered by DWR, the agency must have a current UWMP on file that has been determined by DWR to address the requirements of the Water Conservation Act of 2009. A current UWMP must also be maintained by the water supplier throughout the term of any grant or loan administered by DWR. An UWMP may also be required in order to be eligible for other State funding, depending on the conditions that are specified in the funding guidelines.

As documented in Chapter 5, VWD has met its 2015 Interim Urban Water Use Target and is in compliance with the water conservation requirements established by the Water Conservation Act of 2009.

2.4 UWMP ORGANIZATION

This plan is structured to follow the organization recommended by DWR and contains nine chapters, followed by appendices that provide supporting documentation for the information presented in the report. The chapters are briefly described below:

Chapter 1 – Executive Summary.

Chapter 2 - Introduction. This chapter presents the purpose of this UWMP.

Chapter 3 - Plan Preparation, Adoption, and Submittal. This chapter describes the efforts of the VWD to coordinate the preparation of the UWMP with appropriate nearby agencies, discusses the measures used to solicit public participation in the UWMP, and the submittal process for the UWMP.

Chapter 4 - System Description. This chapter presents a description of VWD's water service area and various characteristics of the area served including climate, population, and other demographic factors.

Chapter 5 - System Water Use and SB X7-7 Requirements. This chapter addresses the calculation and methodology for VWD's baseline and target GPCD's, as well as VWD's current and 2015 interim target GPCD to assess progress toward meeting the 2020 SB X7-7 Target GPCD. This chapter also presents the quantity of water supplied to the agency's customers including a breakdown of demands and demand projections by user classification.

Chapter 6 - System Supplies. This chapter presents a description of the agency's existing and future water supply sources for the next 25 years. The description of water supplies includes information on the groundwater usage such as water rights, determination if the basin is in overdraft, adjudication decree, and other relevant information.

Chapter 7 - Water Supply Reliability Assessment. In this chapter, the UWMP addresses the reliability of the agency's water supplies. This includes supplies that are vulnerable to seasonal or climatic variations. In addition, there is an analysis of supply availability in a single dry year and in multiple dry years.

Chapter 8 - Water Shortage Contingency Planning. This chapter includes an urban water shortage contingency analysis that includes stages of action to be undertaken in the event of water supply shortages; a water shortage contingency ordinance; prohibitions, consumption reduction methods and penalties; an analysis of revenue and expenditure impacts and measures to overcome these impacts; actions to be taken during a catastrophic interruption; and a mechanism for measuring water use reduction.

Chapter 9 - Demand Management Measures. This chapter includes a description of VWD's DMMs. This includes programs which are currently implemented or scheduled for implementation.

3 PLAN PREPARATION, ADOPTION, AND SUBMITTAL

This plan was prepared based on guidance from DWR's *Guidebook to Assist Water Suppliers in the Preparation of a 2015 Urban Water Management Plan* (UWMP Guidebook) (1), DWR Urban Water Management Plans Public Workshops and Webinars, *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (SB7 Guidebook) (2), and the 2015 DWR Review Sheet Checklist (Appendix A).

3.1 BASIS FOR PREPARING A PLAN

VWD provides water to a service area that includes most of the City of Victorville as well as areas of unincorporated San Bernardino County. VWD operates a single Public Water System (PWS). Relevant statistics about VWD's PWS are presented in the table below.

Table 3-1. Public Water Systems

Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015
3610052	Victorville Water District	34,779	19,092

3.2 COORDINATION

To prepare this UWMP, VWD coordinated with multiple neighboring and stakeholder agencies. The coordinated efforts were conducted to: 1) inform the agencies of VWD's efforts and activities; 2) gather high quality data for use in developing this UWMP; and 3) coordinate planning activities with other related regional plans and initiatives. The coordination activities conducted by VWD are summarized in Table 3-2.

Table 3-2. Agency Coordination

Agency / Organization	Participated in developing the plan	Commented on the draft	Attended public meetings	Was contacted for assistance	Was sent a copy of the draft plan[1]	Was sent a notice of intention to adopt
Mojave Water Agency	X					X
Town of Apple Valley						X
City of Adelanto						X
County of San Bernardino						X
Victor Valley Wastewater Reclamation Authority						X

Agency / Organization	Participated in developing the plan	Commented on the draft	Attended public meetings	Was contacted for assistance	Was sent a copy of the draft plan[1]	Was sent a notice of intention to adopt
City of Hesperia						X
City of Barstow						X
Table to be updated upon completion of each notification.						

As a regional water planning and management agency, Mojave Water Agency (MWA) has engaged the retail water agencies in their service area in a cooperative approach to developing the 2015 UWMPs. MWA developed a customized and robust methodology for population and demand forecasts that can be applied uniformly to the retail water agencies in their service area to ensure the regional consistency of this 2015 UWMP cycle. VWD worked cooperatively with MWA through the development of this UWMP to share historic water use data and apply this regional methodology. The projections presented in this plan have been integrated into MWA's UWMP to be rolled up into their regional forecast.

3.3 PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

To fulfill the requirements of Water Code Section 10621(c), VWD sent letters of notification of preparation of the 2015 UWMP to all neighboring cities and San Bernardino County 60 days prior to the public hearing. Copies of the 60-day notification letters are attached as Appendix B.

To fulfill the requirements of Water Code Section 10642 of the UWMP Act, VWD made the draft 2015 UWMP available for public review and held a public hearing on June 21, 2016. The time and place of the public review hearing was noticed on June 3, 2016 and June 10, 2016 and the hearing notice is attached in Appendix C.

VWD encouraged public participation in the UWMP adoption process through the notifications to the public through the newspaper and publicizing the UWMP through its website. VWD also made the 2015 UWMP available for public review in its offices during normal hours prior to the public hearing and 30 days after.

The Final 2015 UWMP was formally adopted by the VWD Board of Directors on June X, 2016. A copy of the Adoption Resolution is included in Appendix D. A copy of the Final 2015 UWMP was sent to the California State Library, DWR (electronically using the WUEdata reporting tool), and other appropriate agencies within 30 days of adoption. The adopted UWMP will be available for public review at the VWD's offices during normal business hours for 30 days following submission to DWR and will be posted on VWD's website.

The implementation of this plan shall be carried out as described unless significant changes occur between the adoption of this plan and the 2020 plan. If such significant changes do occur, VWD will amend and readopt the plan as required by the California Water Code.

4 SYSTEM DESCRIPTION

4.1 LOCATION

VWD is located in the southwest region of San Bernardino County, California. VWD lies north of the San Bernardino Mountains in the Mojave Desert approximately 90 miles northeast of Los Angeles.

4.2 SERVICE AREA

VWD's service area, shown in Figure 4-1 encompasses the entire City of Victorville as well as areas within the City's sphere of influence. VWD is bounded by the City of Adelanto to the west and the City of Hesperia to the south. The City of Apple Valley, Spring Valley Lake, and the Mojave Narrows Regional Park lie to the east.

In July of 2007, both Victor Valley Water District (VVWD) and Baldy Mesa Water District (BMWD) were absorbed by VWD, and formed Improvement District 1 (ID1) and Improvement District 2 (ID2), respectively, of VWD. VWD ID1 encompasses approximately 58 square miles, including the Southern California Logistics Airport (SCLA), comprising approximately 14 square miles. VWD ID2 coincides with the former BMWD service area and encompasses approximately 27 square miles. The entire VWD service area encompasses about 85 square miles.

4.2.1 Mojave Water Agency

The VWD service area lies within the service area of MWA, which was established in 1960 due to concerns over declining groundwater levels in the Mojave Basin, El Mirage Basin, Lucerne Valley, Johnson Valley, and Morongo Basin areas. MWA was created to ensure that sufficient water is available to meet current and future needs in their service area. MWA is one of 29 State Water SWP Contractors and imports water from the State Water Project (SWP) as a supplemental supply source for their service area. MWA is also responsible for implementing the Mojave Basin Area Judgment, which adjudicated the rights to produce water from the available natural water supply to better manage groundwater supplies. VWD's water supply in the Mojave Basin is discussed further in Section 6.2.

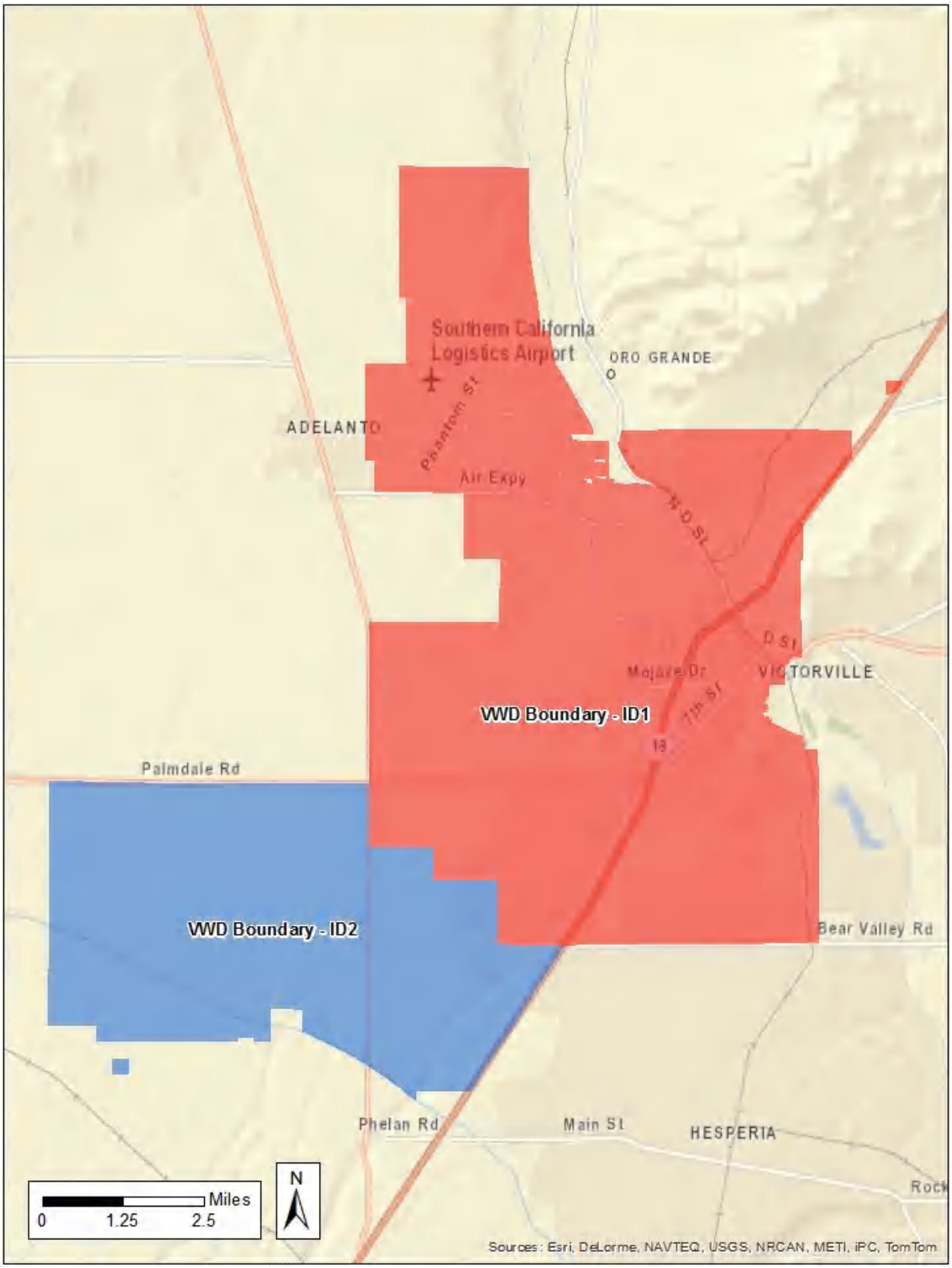

Figure 4-1. Service Area Boundary Map

4.3 SERVICE AREA POPULATION

For the 2015 UWMP cycle, MWA engaged Beacon Economics to develop a customized population forecast through 2060 for the MWA service area and its incorporated cities, subareas, and water purveyors, including the VWD service area. These population forecasts were used for this Plan. The methodology and findings are summarized briefly below and are described in more detail in the *Mojave Water Agency Population Forecast, December 2015*, provided in Appendix E.

Historical data used in the forecast of the incorporated cities were obtained from the California Department of Finance (DOF), which makes estimates available from 1970 forward on an annual basis. Based on this data, Beacon Economics created an econometric time series model to capture the historical correlations with countywide population growth. Future population growth for the incorporated cities of the MWA service area was then estimated using these historic correlations and a long run driver of countywide population growth.

The MWA service area is anticipated to experience population growth rates over the next several decades that are stronger than those anticipated for San Bernardino County overall. The broader Inland Empire region has seen strong economic and employment growth these last few years, and much of that has been due to its affordability advantage it holds over coastal counties of Southern California. In similar fashion, the MWA service area is expected to see this kind of growth as well, relative to other parts of the Inland Empire, due to its affordability advantage relative to the broader region. The current data available for the incorporated cities of the MWA service area shows that the region has not yet transitioned to being one of the growth centers for San Bernardino County, but given its clear advantage in terms of home prices, Beacon Economics expects economic and population growth to pick up in the years to come and over the life of this forecast.

Beacon Economics' analysis showed that, compared to other cities in the region, the City of Victorville experienced one of the strongest average annual population growth rates from 1990 to 2010 and the 2011 to 2015 estimates indicate similar relative growth. The current forecast calls for 1.9% average annual population growth for the VWD service area through 2040, slightly higher than the 1.8% for the MWA service area overall. The historical and projected annual growth rates are shown in Table 4-1. The historical, current, and projected service area populations are shown in Table 4-2 and Figure 4-2.

Table 4-1. Historical and Projected Annual Growth Rate

	2005-2010	2010-2015	2015-2020	2021-2025	2026-2030	2031-2035	2036-2040
Growth Rates	5.9%	1.0%	1.7%	2.3%	2.0%	1.9%	1.6%

Table 4-2. Population – Historical, Current, and Projected

	2000	2005	2010	2015	2020	2025	2030	2035	2040
Population Served	69,095	91,832	122,051	128,005	139,151	155,657	172,143	188,896	204,986

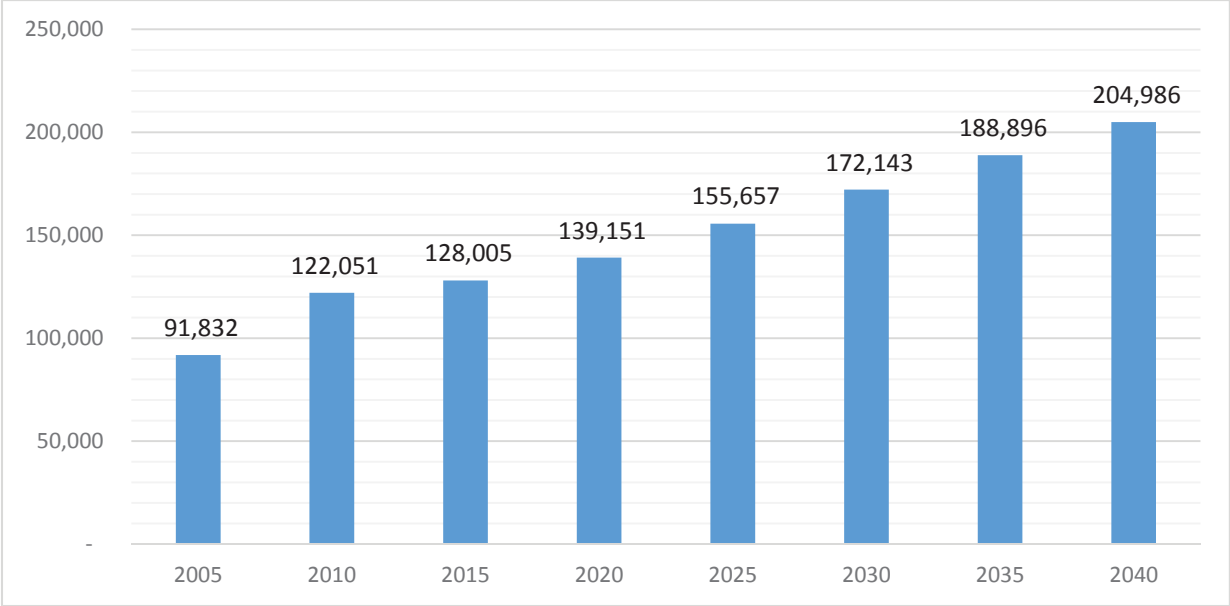

Figure 4-2. Historical, Current, and Projected Population

4.4 CLIMATE

VWD's climate is characterized by warm summers and cool winters. Table 4-3 presents average climate data for the service area, including temperature, rainfall and reference evapotranspiration (ETo). As shown in Table 4-3 the warmest month of the year is July with an average temperature of 80 degrees Fahrenheit (°F), while the coldest months of the year are December and January with an average temperature of 44°F.

The annual average precipitation at VWD is about 6 inches. As shown in Table 4-3 the majority of the rainfall occurs in the months November through March. January and February are the wettest months with an average rainfall of approximately 1 inch.

Table 4-3. Historical Climate Data

Month	Average Temperature (°F)[1]	Average Precipitation (in.)[1]	Average Standard ETo (in.)[2]
January	44.4	0.95	2.02
February	47.8	1.05	3.51
March	52.0	0.80	5.16
April	58.0	0.36	6.55
May	65.2	0.13	7.65
June	73.2	0.04	8.75
July	80.0	0.14	8.68
August	78.8	0.21	9.27
September	72.9	0.23	6.73
October	62.4	0.32	4.26

Month	Average Temperature (°F)[1]	Average Precipitation (in.)[1]	Average Standard ETo (in.)[2]
November	51.0	0.50	2.90
December	44.4	0.79	2.16
Notes: **[1]NOAA weather station 049325 in Victorville; data from 1917 through 2016; http://wrcc.dri.edu;** **[2]CIMIS weather station 117 in Victorville; http://wwwcimis.water.ca.gov/**			

4.4.1 Potential Effects of Global Climate Change

The MWA IRWM Plan (3) performed an assessment of climate change effects throughout their service area, including VWD's service area. Climate change is driven by increasing concentrations of carbon dioxide and other greenhouse gases (GHG) that cause an increase in temperature and stress natural systems, such as oceans and the hydrologic cycle. California faces the prospect of significant water management challenges related to climate change and is already experiencing a wide array of effects. Impacts that are currently occurring and that are projected to continue include increased temperatures, sea level rise, a reduced winter snowpack, and altered precipitation patterns, including more frequent and intense storm events.

While it is clear that actions must be taken to reduce GHG emissions to mitigate impacts on global climate, adaptation to already-occurring impacts is also crucial to continue to effectively manage the State's water resources. Water resource managers and customers can play key roles in improving water and energy efficiency, reducing GHG emissions, and improving stewardship of the State's natural resources. Climate changes that may affect VWD water resources include:

- **Higher temperatures and heat waves** that increase demand for water, especially for agricultural and residential irrigation uses.

- **Water Uncertainty**: A projected overall decrease in precipitation levels coupled with more intense individual storm events may lead to increased flooding. Higher temperatures may cause more precipitation to fall as rain rather than snow, hasten snowmelt and increase runoff, making it more difficult to capture storm water flows for storage. Increased evaporation will create a generally drier climate, with wildfires likely to increase and groundwater basins likely to receive less replenishment.

VWD's expected water supply is groundwater pumped from the Mojave Groundwater Basin, the largest groundwater resource in the MWA service area. Any water quality impacts to groundwater sources due to climate change are expected to be indirect, and primarily due to decreased recharge from lower precipitation and increased use of groundwater to make up loss of imported water. Decreased recharge and increased groundwater pumping may allow concentrations of groundwater contaminants such as arsenic, nitrates, Chromium VI and TDS to increase in local basins, which may trigger additional treatment requirements and increase groundwater treatment costs.

A projected overall decrease in precipitation levels coupled with more intense individual storm events may lead to increased flooding in the region. Flood risks are greatest if flood conveyance channels, storm drains and natural streambeds lack sufficient capacity to convey these intense flows.

4.4.2 Addressing Climate Change

There are two main strategies to deal with climate change – mitigation strategies and adaptation strategies. Mitigation strategies combat climate change by directly reducing GHG emissions or minimize increases in GHG emissions while adaptation strategies generally refer to efforts that deal with the impacts of climate change.

Typically, mitigation or GHG reduction measures are accomplished by implementing specific energy efficiency programs or projects, installing renewable energy projects, implementing waste-to-energy projects at wastewater treatment plants, promoting carbon sequestration, and conducting water efficiency and demand reduction programs. All of these measures either directly create carbon-free energy or reduce the need for generation of electricity from fossil fuel-fired electric plants. The AB 32 Scoping Plan contains the main strategies California will use to reduce GHG emissions that cause climate change. The scoping plan has a range of GHG reduction actions which include: direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system.

Adaptation addresses operational changes that need to be made in order to accommodate the increasing temperatures, the increased possibility for severe flooding and the decreasing precipitation as snow predicted by the climate models.

Large water and wastewater agencies could conduct Energy and GHG Master Plans to assess their energy and carbon footprints, and create an Action Plan of strategies for greater energy efficiency and GHG emission reductions. Fully exploring the Water-Energy-Carbon nexus can identify opportunities for energy savings and GHG emission reductions through water operations, programs, and projects.

Suggested regional adaptation strategies to address potential reductions in water supply include the following (3):

- Establish a climate change adaptation public outreach and education program.
- Build collaborative relationships between regional entities and neighboring communities to promote complementary adaptation strategy development and regional approaches.
- Establish an ongoing monitoring program to track local and regional climate impacts and adaptation strategy effectiveness. Expand water storage and conjunctive management of surface and groundwater resources.
- Address the State policy goal of reducing reliance on the Delta by promoting and investing in projects and programs that allow the Region to meet water demands with alternative sources of supply and/or demand management actions during times when imported supplies from the Delta are reduced or unavailable due to dry years, droughts, system outages, environmental and regulatory restrictions, or other reasons.
- Enhance use of recycled water for appropriate uses as a drought-proof water supply.
- Enhance practices of water exchanges and water banking outside the Region to supplement water supply.
- Encourage local agencies to develop and implement AB 3030 Groundwater Management Plans (GWMPs) as a fundamental component of the IRWM Plan.
- Develop plans for local agencies in the Region to monitor the elevation of their groundwater basins.
- Encourage cities and the county agencies in the Region to adopt local ordinances that protect the natural functioning of groundwater recharge areas.

5 SYSTEM WATER USE AND SBX7-7 REQUIREMENTS

5.1 SB X7-7 BASELINES AND TARGETS

SBX7-7 requires all water suppliers to increase water use efficiency with the overall goal to decrease per-capita water consumption within the state by 20 percent by the year 2020. 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). VWD had previously calculated baseline water use and water use targets as required in the 2010 UWMP. However, for the 2015 UWMP, DWR has required that agencies use 2010 census data in the calculation of service area populations, which was not available when the 2010 UWMP was prepared. In this Plan, VWD has re-calculated its historic service area population using the DWR Population Tool, and this section presents an updated calculation of baseline water use and water use targets. Baseline water use and reduction targets are based on water use in gallons per capita per day (GPCD).

DWR has prepared standardized tables to record and document the calculations required for this section. The standardized tables for VWD's calculations are included in Appendix H.

5.1.1 Baseline Water Use

The first step in developing the baseline water use for VWD is determining the applicable range of years to calculate the baseline average. The UWMP Act stipulates an agency may use either a 10 or 15-year average to determine their baseline. If 10 percent of total urban retail water deliveries in 2008 were from recycled water, then the agency can use a 15-year average baseline if it chooses. Recycled water use in the VWD service area was less than 10 percent in 2008, therefore, a 10-year average was used for baseline determination. The UWMP Act requires the use of a continuous 10-year range with the end of the range falling between December 31, 2004 and December 31, 2010 to determine the baseline. Years 1996 to 2005 have been selected as the 10-year base period. In addition to the 10-year baseline, a 5-year baseline is also used to establish the minimum criteria for VWD's use reduction targets. The UWMP Act requires the use of a continuous 5-year range with the end of the range falling between December 31, 2007 and December 31, 2010 to determine the baseline. Years 2003 to 2007 have been selected for calculation of the 5-year base period.

To calculate water use in GPCD, gross daily water use is divided by the service area population. The calculation of gross water use begins with the total amount of water put into the potable water distribution system by VWD. Water exported to other agencies is subtracted to leave the amount used by VWD retail customers, or gross water use. VWD's historical service area population was calculated using the DWR Population Tool. The tool directly calculated a service area population for 1990, 2000, and 2010. Populations for intermediate years were calculated by assuming a constant growth rate between census years.

VWD's historic population, gross water use and GPCD from 1996 to 2015 is shown in Table 5-1.
As shown in Table 5-1, for the period from 1996 through 2005, the 10-year average Base Daily Per Capita Water Use for VWD is 253 GPCD. For the period from 2003 through 2007, the 5-year average is 252 GPCD.

Tables to document the calculation of gross water use are included with the required SB X7-7 tables in Appendix H.

Table 5-1. Baseline and Target Gallons Per Capita Per Day (GPCD) Data

Year	Population	Gross Water Use, AFY	GPCD
1996	62,529	18,921	270
1997	64,026	18,835	263
1998	65,558	17,455	238
1999	66,914	18,960	253
2000	69,095	20,636	267
2001	73,140	19,859	242
2002	77,422	21,736	251
2003	81,955	22,409	244
2004	86,753	24,245	249
2005	91,832	25,923	252
2006	97,208	28,317	260
2007	102,899	29,256	254
2008	108,924	25,234	207
2009	115,301	24,073	186
2010	122,051	22,729	166
2011	123,448	22,793	165
2012	125,231	23,260	165
2013	126,763	23,443	165
2014	127,283	23,420	164
2015	128,005	20,569	143
10-Year Average Baseline (1996-2005)			**253**
5-Year Average Baseline (2003-2007)			**252**
95% of 5-Year Baseline			**239**

5.1.2 2015 and 2020 Targets

DWR allows agencies to select from four potential methods for calculating the Compliance and Interim Water Use Targets as set forth by Water Code section 10608.20(b). VWD has selected Method 1, which defines the 2020 Compliance Water Use Target as a 20 percent reduction of average per-capita from the 10-year average baseline period. A 20 percent reduction from VWD's 10-year average baseline water use of 253 GPCD is 202 GPCD; this is the VWD 2020 Compliance Water Use Target. The 2015 interim water use target is simply the midpoint of the baseline and the 2020 Compliance Water Use Target, which is 227 GPCD.

5.1.3 Minimum Water Use Reduction Requirement

The final step in determining the applicability of the water use target for VWD is to confirm the water use targets meet the minimum reduction requirements as defined by DWR. The chosen Compliance

Water Use Target must be less than 95 percent of the 5-year baseline, which is 239 GPCD, as shown in Table 5-1. VWD's calculated Compliance Water Use Target of 227 GPCD meets this requirement.

5.1.4 Summary of Baseline and Target Water Use

A summary of the baseline and target water use calculations, as well as a comparison to the prior values calculated in the 2010 UWMP are summarized in Table 5-2.

Table 5-2. Baselines and Targets Summary

	Baseline Period	Start Year	End Year	Average Baseline GPCD	2015 Interim Target	Confirmed 2020 Target
2010 UWMP	10-year	1996	2005	260	234	208
	5-year	2003	2007	249		
2015 UWMP	10-year	1996	2005	253	227	202
	5-year	2003	2007	252		

For the 2015 UWMP, DWR has required that agencies use 2010 census data in the calculation of service area populations, which was not available when the 2010 UWMP was prepared. DWR developed a population tool that utilizes 1990, 2000, and 2010 census data, the agency's service area, and connections data to calculate historical populations. VWD historical populations using this DWR population tool, were higher than the population estimates used in the 2010 UWMP, which resulted in a lower baseline GPCD and lower Compliance and Interim Water Use Targets.

The VWD Compliance Water Use Target is 202 GPCD and the 2015 Interim Target is 227 GPCD. VWD's calculated GPCD for 2015 and Interim Water Use Targets are summarized in Table 5-3. As shown, VWD has achieved and surpassed the 2015 Interim Water Use Target.

Table 5-3. 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Did Supplier Achieve Targeted Reduction for 2015?
143	227	YES

5.1.5 Future GPCD Projections

For the purposes of projecting water use, VWD used the methodology proposed by MWA, which uses a logarithmic best fit curve on historical GPCD data from 2010 through 2015 to project GPCD through 2040, as shown in Figure 5-1. Projected GPCD values obtained from this graph are shown in Table 5-4. The logarithmic regression analysis allows for recognition of reductions in per capita water use over the last several years, while also allowing for future reductions in per capita water use, although at a slower rate of change. Future reduction in per capita water demand will be realized through ongoing conservation programs and passive savings from laws and ordinances requiring utilization of low-flow housing fixtures and water-efficient landscaping.

Table 5-4. Projected GPCD Based on Logarithmic Curve in Figure 5-1

	2020	2025	2030	2035	2040
GPCD	155	154	153.3	152.5	151.7

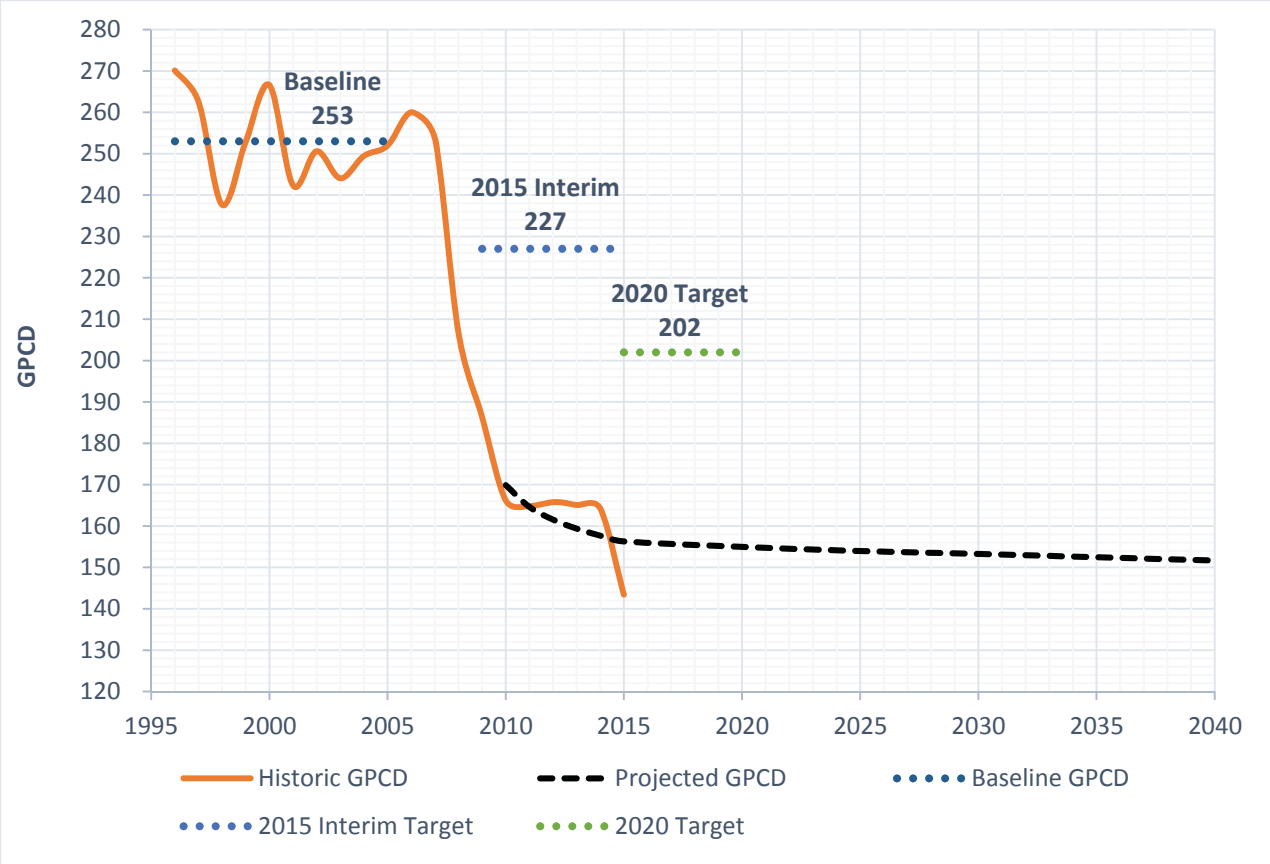

Figure 5-1. Baseline, Historic, and Projected GPCD

5.2 WATER DEMANDS

5.2.1 Potable Retail Water Demands

VWD categorizes its water use customers as single family residential, multi-family residential, commercial/institutional, industrial, landscape/irrigation, other and schools. Currently, some water sales to construction meters, government agencies, schools, churches, prisons, and some institutional entities fall under the "other" category. VWD's historical retail water use by customer type for the years from 2011 through 2015 is summarized in Table 5-5.

Table 5-5. Historical and Current Water Demand by Use Type, AFY

Use Type	2011	2012	2013	2014	2015
Single Family	16,766	16,961	16,949	15,113	14,119
Multi-Family	1,437	1,874	1,870	1,806	1,692
Commercial / Institutional	2,152	2,807	1,528	1,316	1,233
Industrial	0	0	0	778	729
Landscape / Irrigation	347	453	1,580	1,445	1,354
Other	5	7	7	7	18
Losses	2,086	1,159	1,509	2,955	1,437
Exported Water	0	4	308	109	262
Total Demand	**22,793**	**23,264**	**23,751**	**23,529**	**20,843**

Future water demand projections are calculated by multiplying the projected GPCD in Table 5-4 and the projected population in Table 4-2.

Table 5-6. Potable Water Demand Projections, AFY

	2015	2020	2025	2030	2035	2040
GPCD	143.5	155	154	153.3	152.5	151.7
Population	128,005	139,151	155,657	172,143	188,896	204,986
Projected Water Demand	**20,843**	**24,226**	**26,767**	**29,560**	**32,268**	**34,928**

Future water use by type is projected by applying ratios of water use by customer type in 2015 to the total water use from 2020 through 2040, as shown in Table 5-7. Water losses are assumed to remain at the 2015 value of 7.4% of total water use. Water losses are discussed in more detail in Section 5.2.5.

Table 5-7. Projected Water Demand by Use Type, AFY

Use Type	2020	2025	2030	2035	2040
Single Family	16,554	18,291	20,199	22,049	23,867
Multi-Family	1,984	2,192	2,420	2,642	2,860
Commercial / Institutional	1,446	1,598	1,764	1,926	2,085
Industrial	855	945	1,043	1,139	1,233
Landscape / Irrigation	1,587	1,754	1,937	2,114	2,289
Other	7	8	8	9	10
Water Losses	1,793	1,981	2,188	2,388	2,585
Total Water Demand	24,226	26,767	29,560	32,268	34,928

The number of total future connections is projected by dividing the projected population by the number of persons per connection. In 2015, there were 3.75 persons per connection in the VWD service area and it is assumed that this ratio will remain constant through 2040. The number of future connections by type is projected by applying the ratios of connections by customer type in 2015 to the total number of projected connections in each year. The projected number of future connections by type is shown in Table 5-8.

Table 5-8.Projected Connections by Use Type

Use Type	2015	2020	2025	2030	2035	2040
Single Family	32,862	35,093	39,256	43,414	47,639	51,696
Multi-Family	596	636	712	787	864	938
Commercial / Institutional	781	834	933	1,032	1,132	1,229
Industrial	258	276	308	341	374	406
Landscape / Irrigation	282	301	337	373	409	444
Other	0	0	0	0	0	0
Total	34,779	37,140	41,546	45,946	50,418	54,712

5.2.2 Sales to Other Water Agencies

VWD has emergency connections with the Phelan/Pinon Hills Community Services District, Adelanto Public Utilities Authority and Liberty Utilities Apple Valley (formerly Apple Valley Ranchos Water Company) to deliver water in emergencies. Water deliveries were made through some of these connections from 2012-2015, as shown in Table 5-9. As these connections are intended for emergency use, VWD does not intend to regularly sell water to these or other agencies in the future.

Table 5-9. Sales to Other Water Agencies, AFY

Use Type	Agency	2011	2012	2013	2014	2015
Sales to other agencies	Liberty Utilities Apple Valley	0	0	0	0	0
Sales to other agencies	Phelan/Pinon Hills Community Services District	0	0	42	60	0
Sales to other agencies	Adelanto Public Utilities Authority	0	4	266	49	262
Total Sales to Other Agencies		**0**	**4**	**308**	**109**	**262**

5.2.3 Recycled Water Demands

Currently, the only user of RW is the High Desert Power Plant (HDPP). HDPP's total cooling water needs are an average of 2,900 AFY through 2040. HDPP has been in operation since 2003 and began using RW for a portion of their cooling water in 2010. The cooling water can be supplied from a combination of sources, including VWD's Victorville Wastewater Treatment Facility (VWTF), VVWRA's WWTP, or imported SWP water. VWD and HDPP signed an agreement in September 2010 whereby the VWD would supply HDPP with up to 4,000 AFY of RW. HDPP's RW demand ranged from 611 to 749 AFY in 2014 and 2015 and is expected to remain in that range over the next three years. By 2019, HDPP's goal is to utilize 100% RW for their cooling water, or 2,900 AFY.

VWD is in the process of expanding their RW distribution system at SCLA to serve RW to additional customers, including Schmidt Park and the nearby ball field. VWD has also installed RW fill stations at SCLA that can be used to fill water trucks for dust control near the SCLA runways or for construction projects at SCLA. VWD is in the process of obtaining regulatory approval for these new RW uses and anticipates providing RW to these users in 2017. Schmidt Park and the ball fields are estimated to need a combined 30 AFY once they are converted to RW. Dust control uses can be variable and are difficult to project, therefore, RW demands for dust control are not included in the projected RW use estimates. Historical, current, and projected recycled water use are shown in Table 5-10. Table 5-11 summarizes the volume of RW used by beneficial use type in 2015. Additionally, VWD applied 165 AF of recycled water to the Westwinds Golf Course as irrigation in 2015. The Westwinds Golf Course is closed and would not otherwise use potable water for irrigation so this is considered a method of disposal, rather than a beneficial use.

Table 5-10. Recycled Water Historical, Current, and Projected Use, AFY

RW User	2010	2015	2020	2025	2030	2035	2040
HDPP	0	611	2,900	2,900	2,900	2,900	2,900
Schmidt Park and Ball Field	0	0	30	30	30	30	30
Total	**0**	**611**	**2,930**	**2,930**	**2,930**	**2,930**	**2,930**

Table 5-11. 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual, AFY

Beneficial Use Type	2010 Projection for 2015	2015 Actual Use
Industrial Reuse	2,700	611
Landscape Irrigation	300	0
Total	**3,000**	**611**

5.2.3.1 Actions to Encourage and Optimize Future Recycled Water Use

VWD plans to continue to pursue opportunities to expand RW use at SCLA. Near term plans are summarized in Table 5-12.

Table 5-12. Methods to Expand Future Recycled Water Use

Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use, AFY
Serve Schmidt Park and the Ball Field	Irrigation using recycled water	2017	30
Require RW for Dust Control at SCLA	VWD will require the use of RW for all dust control water uses at SCLA	2017	Variable
Increase RW deliveries to HDPP	Industrial use	2019	2,289
Expand RW Use at SCLA	Expand RW distribution system to serve additional industrial and irrigation uses	TBD	TBD

5.2.4 Water Use for Lower Income Households

Senate Bill 1087 requires that water use projections of an UWMP include the projected water use for single-family and multi-family residential housing for lower income households.

The Southern California Association of Governments (SCAG) published the Regional Housing Needs Allocation Progress (RHNA) 5th Cycle Regional Housing Needs Assessment Final Allocation Plan (Housing Needs Assessment) assessed the cities in Southern California to determine the percent of individuals living in the community that are: very low income, low income, moderate income, and above moderate income. For the City of Victorville, the RHNA Housing Needs Assessment determined that 23.0 percent are very low income and 16.8 percent are low income for a combined total of 39.8 percent. VWD applied this 39.8 percent to the projected single and multi-family demands to determine projected

demands for very low and low income single and multi-family users, as shown in Table 5-13. These low-income water demand projections are included in the total water demands in Table 5-7.

Table 5-13. Low-Income Household Demands, AFY

Demand	2015	2020	2025	2030	2035	2040
Single Family	5,619	6,589	7,280	8,039	8,776	9,499
Multi-Family	673	789	872	963	1,052	1,138
Total	6,292	7,378	8,152	9,003	9,827	10,637

VWD will not deny or put unreasonable conditions for 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:

- VWD specifically finds that it does not have sufficient water supply
- VWD is subject to a compliance order issued by the State that prohibits new water connections
- The applicant has failed to agree to reasonable terms and conditions relating to the provision of services

The conditions above apply equally to all applicants and developers.

5.2.5 Distribution System Water Losses

VWD has an active water loss control program and has performed a water loss audit using the American Water Works Association (AWWA) Free Water Audit Software in 2015 to perform a water audit for FY 2015, which is attached in Appendix G. The audit results are summarized in Table 5-14.

Table 5-14. Water Loss Summary Most Recent 12 Month Period Available

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss, AFY
01/2015	1,436

VWD's annual losses were calculated based on the percent of losses in 2015 (7.4%) and the projected total water use from 2020 through 2040. In the near term VWD will focus on refining its information and identifying categories of real losses. In addition, VWD will continue its leak detection and water main replacement program as well as upgrades to current distribution system infrastructure. An updated water audit will be performed annually and losses carefully monitored.

5.2.6 Total Water Use

Table 5-15 shows the current and projected water use for VWD. Total water demands include potable, raw, and recycled water use.

Table 5-15. Total Water Use, AFY

Demand	2015	2020	2025	2030	2035	2040
Potable Demand	19,407	22,433	24,786	27,372	29,880	32,343
Water Loss	1,436	1,793	1,981	2,188	2,388	2,585
Total Potable Water Use	24,226	24,226	26,767	29,560	32,268	34,928
Recycled Water	611	2,930	2,930	2,930	2,930	2,930
Total Water Use	**21,454**	**27,156**	**29,697**	**32,490**	**35,198**	**37,858**

6 SYSTEM SUPPLIES

This section describes the existing and projected supplies for VWD. VWD currently pumps potable water supplies from groundwater in Mojave Groundwater Basin and purchases water from MWA's Regional Recharge and Recovery Project (R^3), when available.

6.1 PURCHASED OR IMPORTED WATER

VWD purchases water from the R^3 Project when it is available, but does not rely on purchased or imported water as a future potable water supply. Through R^3, MWA delivers SWP water to recharge sites located along the Mojave River in Hesperia and southern Apple Valley. MWA recovers the recharged water at wells downstream and delivers through pipelines directly to retail water agencies. This project provides an alternate source of supply that allows agencies to reduce pumping and let groundwater water levels in the vicinity of their wells. VWD began receiving water from R^3 when Phase 1 of the project was completed in 2013 and has a contract to purchase up to 6,800 AFY, when available. A copy of the contract is included in Appendix F. The recharge sites, recovery wells, and distribution pipeline are shown in Figure 6-1.

Water supply from R^3 is interruptible because it depends on the amount of SWP available for storage as well as other operational constraints. VWD intends to continue maximizing purchases of water from R^3 when available; however, since this is an interruptible source of supply, VWD does not rely on this source to meet its demands. For the purposes of this Plan, it is assumed that VWD will meet all current and future demands through groundwater so purchased water is not included in future supply projections. The historical, current, and future amounts of purchased water are shown in Table 6-1.

Table 6-1. Historical, Current, and Projected R3 Project Water, AFY

	2010	2015	2020	2025	2030	2035	2040
R^3 Project	0	3,503	0	0	0	0	0

6.1.1 High Desert Power Plant Imported Water Supply

The City of Victorville also has a connection from the MWA Mojave River Pipeline to provide raw SWP water for cooling for the High Desert Power Plant (HDPP). HDPP also treats SWP water, injects it into the Mojave Groundwater Basin for storage, and later extracts it for use when SWP water is not available to HDPP. VWD operates the pipeline that provides SWP to HDPP as well as the injection and extraction facilities on behalf of HDPP. HDPP has their own water rights and storage account in the groundwater basin so HDPP's imported water supply is not considered as a supply for VWD and is not included in the data presented in this Plan.

VWD also delivers recycled water to HDPP as a supplemental supply for cooling. This is discussed in more detail in Section 6.8.

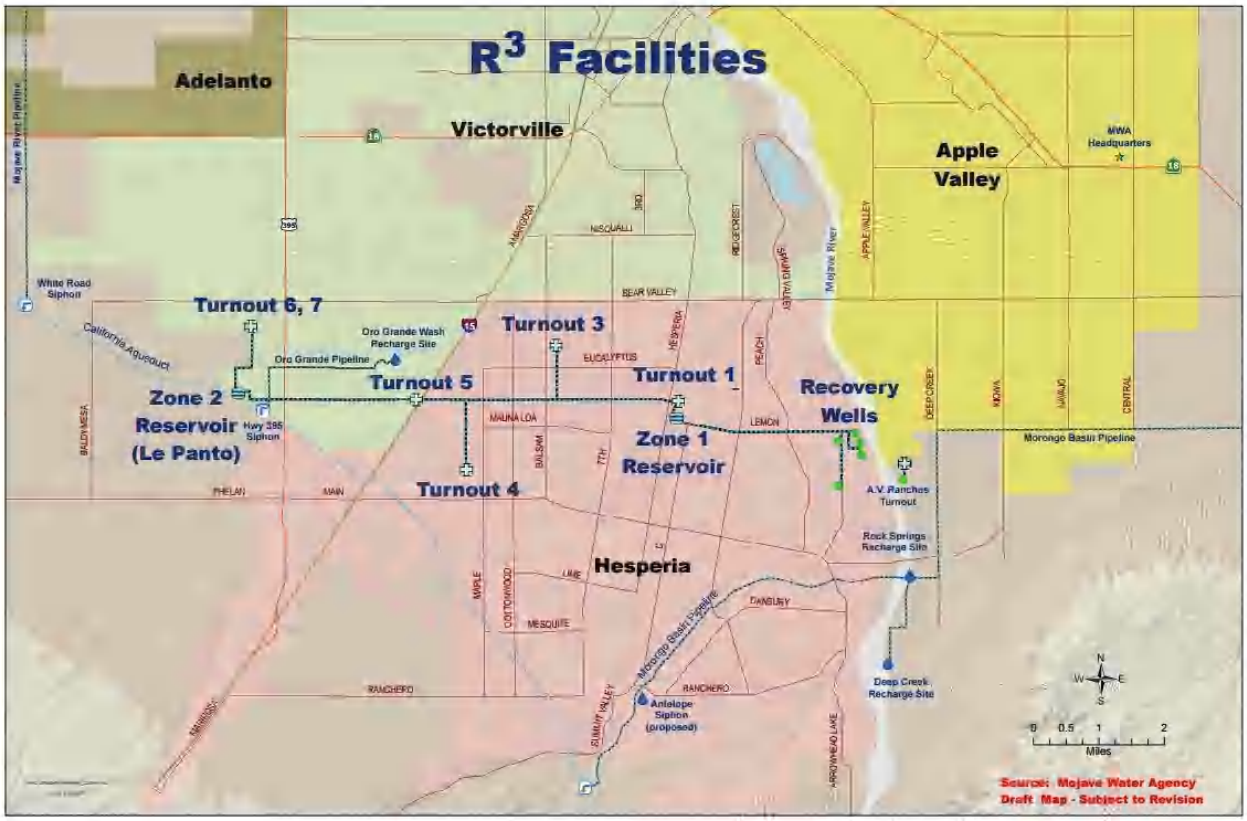

Figure 6-1. R^3 Facilities and Distribution Pipeline

6.2 GROUNDWATER

VWD has 36 active groundwater wells within its distribution system that are actively used to pump groundwater from the Mojave River Groundwater Basin, which lies beneath Victor Valley.

6.2.1 Mojave River Basin

The Mojave River Groundwater Basin, the largest in the Region, encompasses 1,400 square miles, and has an estimated total water storage capacity of nearly 5 million acre-feet (af). The Mojave River Groundwater Basin Area is essentially a closed basin which means that very little groundwater enters or exits the basin. However, within the basin, groundwater moves between the different subareas; groundwater-surface water and groundwater-atmosphere interchanges also occur. Approximately 80 percent of the basin's natural recharge is through infiltration from the Mojave River. Other sources of recharge include infiltration of storm runoff from the mountains and recharge from human activities such as irrigation return flows, wastewater discharge, and enhanced recharge with imported water. Over 90 percent of the basin groundwater recharge originates in the San Gabriel and San Bernardino Mountains. Groundwater is discharged from the basin primarily by well pumping, evaporation through soil, transpiration by plants, seepage into dry lakes where accumulated water evaporates, and seepage into the Mojave River.

Recent investigations by MWA, the US Geological Survey (USGS), and others have resulted in an improved understanding of the geology and hydrogeology of the Mojave Basin Area. Specifically, a more refined examination of the hydrostratigraphy has allowed for differentiation between the more permeable Floodplain Aquifer that has a limited extent along the Mojave River and the more extensive but less permeable Regional Aquifer. In the Mojave Basin Area, Alto, Centro, and Baja subareas contain

both the Floodplain Aquifer and the Regional Aquifer while Oeste and Este subareas only contain the Regional Aquifer.

The MWA IRWM Plan (3) established the framework for managing future water supplies within MWA's service area which encompasses 4,900 square miles. Water rights within the Mojave River Basin have been the subject of litigation since the early 1990's. Riverside County Superior Court's stipulated Mojave Basin Area Judgment (Judgment) (4) for the adjudication of the Mojave River groundwater basin identified MWA as the Watermaster. The Judgment stipulated that MWA has both the authority and obligation to secure supplemental supplies as part of the solution to overdraft within the Mojave River Basin. While the increased groundwater pumping in excess of natural supplies over the last 50 years has resulted in a decline in groundwater elevations, the groundwater basins remain capable of meeting annual water demands through dry years and consecutive multiple dry years. The Judgment and IRWMP are intended to bring all basins into long term hydrologic balance. Projects and water management actions are needed to continue to recharge the groundwater basins to maintain groundwater levels and protect quality. A copy of the Mojave Basin Area Judgment is included in Appendix N.

To maintain proper water balance within each subarea, any producer, such as VWD, who produces in any year an amount of water in excess of that producer's share (Free Production Allowance or FPA) for a subarea must buy replacement water (Replacement Water Assessment or RWA). Replacement obligations can be met by buying additional water rights, buying imported water from MWA, or leasing groundwater rights for one year from other water rights holders. The RWA is equal to the number of AF of excess production by the producer multiplied by the RWA rate per AF as adopted annually by the 2015 Mojave Basin Area Watermaster (5). Based on this year's municipal percentage for the VWD Subarea, the FPA for VWD's is 13,812 AFY within ID1 and 1,760 AFY within ID2. Therefore, VWD's FPA is 15,572 AFY, subject to further ramp down. The 15,572 AFY FPA is used as the available supply for VWD without RWA. Use over this quantity is subject to replacement obligations adopted by the Watermaster and paid to the Watermaster. When available, VWD can also lease water from agencies that pump less than their FPA and this can offset the amount of water in their RWA. In the 2014-2015 water year, VWD leased 1,470 AF of FPA from other parties and will continue to lease groundwater rights from other parties, when available and cost effective. In 2015, VWD pumped approximately 1,800 AFY beyond its FPA.

Producers in the Mojave Basin Area are allowed to produce as much water as they need annually to meet their requirements, according to the Mojave Basin Area Judgment. An underlying assumption of the Judgment is that sufficient water will be made available to meet the needs of the Basin in the future from a combination of natural supply, imported water, water conservation, water reuse and transfers of FPA among parties. MWA is actively operating recharge sites for conjunctive use along the Mojave River Pipeline, Oro Grande Wash Pipeline, Morongo Basin Pipeline and Silverwood Dam. Recharge sites provide MWA with the ability to recharge SWP water into the Subareas where replacement water is purchased. These sites also provide MWA with the ability to bank excess SWP water when available in wet year for storage to be used in dry years. R^3 facilities allow MWA to manage the groundwater basins surrounding VWD by delivering imported SWP water stored in upper Mojave River recharge areas to purveyors that can reduce pumping from their wells when taking R^3 water which allows partial recovery of local pumping depressions.

VWD will continue aggressive water conservation efforts and increased use of recycled water to offset potable water demand in an effort to balance supplies and demands into the future. Pumping beyond the FPA is anticipated to continue as needed to meet water demands, and will require VWD to continue

to pay replenishment fees to support additional water supply projects being implemented by MWA or purchase of water rights from other agencies in the subbasin.

6.2.2 Groundwater Quality

An extensive federal, state, and local regulatory framework has evolved to protect and improve water quality for all beneficial uses. Today, many of these regulations directly influence the water management actions in the Mojave Region. The regulations are designed to support continued, long-term use of the Region's water supplies for drinking water, agricultural, and ecosystem benefits. The Federal Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The SDWA applies to every public water system in the US. SDWA authorizes the USEPA to set national health based standards for drinking water to protect against both naturally-occurring and man-made contaminants that may be found in drinking water. Originally, SDWA focused primarily on treatment as the means of providing safe drinking water at the tap. Amendments in 1996 greatly enhanced the existing law by recognizing source water protection, operator training, funding for water system improvements, and public information as important components of safe drinking water. Under the SDWA, technical and financial aid is available for certain source water protection activities. The State Water Resources Control Board Department of Drinking Water is responsible for enforcing the SDWA and California-specific drinking water regulations as defined in Title 22 of the California Code of Regulations.

The Region's groundwater basins contain numerous areas with water quality issues. Key contaminants include arsenic, nitrates, iron, manganese, Chromium VI, and TDS. Some of these are naturally occurring in desert environments while others are associated with human activities. Measurements in excess of drinking water standards have been found for some of these constituents within the Mojave River Basin. Groundwater in these areas may have to be treated prior to consumption.

Numerous studies have characterized groundwater quality in the Mojave Region. Despite local groundwater quality degradation in Barstow and variability elsewhere, these studies generally confirmed the suitability of groundwater for beneficial uses in the Region. Areas of degraded groundwater quality in terms of TDS occur near Barstow and the Harper Lake area. Arsenic is a naturally occurring element in groundwater. Ingestion of arsenic can result in short term discomfort and long-term health effects such as skin discoloration, circulatory system impacts and increased cancer risks, and in high concentrations, arsenic consumption can lead to death. CDPH has established a primary MCL of 10 ppb for arsenic. Within the Mojave Region arsenic concentrations have been measured at levels above the maximum contaminant level (MCL) in the Transition Zone (TZ) portion of the Alto Subarea, located in northern Alto, Baja and Morongo sub basins. Nitrate in irrigation water helps to stimulate plant growth; an irrigation water quality target for nitrate has not been established. In drinking water, high nitrate levels water can have acute health problems in infants less than six months, causing a condition known as blue baby syndrome. Long term health impacts in adults are not well-known. Nitrate concentrations have been measured at levels far below the primary MCL across the Region.

Many of VWD's groundwater wells meet state and federal drinking water standards without treatment. These wells receive wellhead chlorination for disinfection and pump directly into the distribution system or into storage tanks.

In 2006, the U.S. Environmental Protection Agency (EPA) reduced in the allowable MCL of arsenic from 50 micrograms per liter (µg/L) to 10 µg/L; therefore, additional treatment became necessary as the new requirement affected several existing VWD wells. VWD operates three Arsenic Treatment Plants and an

Arsenic Blending Pipeline. The Balsam and El Evado Arsenic Treatment Plants are coagulation/filtration treatment plants and the La Mesa Arsenic Treatment Plant is an ion exchange plant. The Arsenic Blending Pipeline is located in ID2 and is used to blend water from all of the wells in ID2 to produce a blended water quality that meets the MCL prior to entering the distribution system.

In 2014, DDW established a specific MCL for hexavalent chromium (also referred to as chromium-6) at 10 µg/L. Previously, chromium-6 has been regulated under the 50-µg/L primary drinking water standard for total chromium. Several of VWD's wells were affected by this new requirement and two have been temporarily taken out of service because they do not meet the MCL. VWD does not currently intent to install blending or treatment facilities for these wells because the total production capacity is sufficient to meet demands with these wells offline. VWD will continue to monitor the water quality of these wells and may be able to restore them to service if chromium-6 levels decline or if blending or treatment is added. Additionally, several wells in ID2, which pump into the Arsenic Blending Line, have levels of chromium-6 that exceed the MCL. VWD has adapted the operation of the Arsenic Blending Pipeline such that blended water quality meets the MCL for both arsenic and Chromium-6.

6.2.3 Overdraft Conditions

MWA and VWD consider it a high priority to maintain stability in previously over drafted groundwater basins and reduce overdraft in groundwater basins experiencing ongoing water table declines. Overdraft is not only considered a challenge for reliability in quantity of supply but also in quality of supply. One way to reduce overdraft throughout the Mojave Basin is through artificial recharge. Further discussion of artificial recharge within the Mojave Basin is in Section 6.2.1.

6.3 SURFACE WATER

VWD does not utilize surface water supplies.

6.4 STORMWATER

The Adjudication of the Mojave Basin Area included an injunction against diverting stormwater flow away from downstream users of the Mojave River, therefore, no storm water capture projects are planned to increase water supplies.

6.5 DESALINATED WATER OPPORTUNITIES

Desalination refers to treatment processes that remove salts from water to achieve salinity concentrations that are acceptable for municipal and agricultural uses. The desalination strategy covers treatment of seawater as well as brackish water. Desalination technologies may also be used to treat wastewater to produce high quality recycled water. In California, the principal method for desalination is reverse osmosis. This process can be used to remove salt as well as specific contaminants in water such as disinfection byproduct precursors, volatile organic compounds, nitrates, and pathogens. As summarized below, there is no opportunity for desalination of any kind by VWD.

6.5.1 Brackish Water and/or Groundwater Desalination

The groundwater basins located under or near the VWD are not brackish and do not require desalination. Therefore, there is no water of this nature available to VWD for direct use.

6.5.2 Seawater Desalination

Because VWD is not located in a coastal area, it is neither practical nor economically feasible for VWD to implement a seawater desalination program.

6.6 EXCHANGES OR TRANSFERS

Regional water transfer and exchange opportunities are described in MWA's 2015 UWMP.

VWD frequently executes temporary transfers of FPA or carryover water from other parties in the Alto subarea to offset a portion of excess groundwater production.

6.7 FUTURE WATER SUPPLY PROJECTS

In order to further increase water supply available from the Mojave Groundwater Basin, VWD is also participating in MWA projects to implement groundwater recharge through surface spreading.

VWD currently receives water from phase one of the R^3 project through MWA when it is made available. Quantity and reliability of supply from R^3 is expected to increase upon completion of phase two. VWD does not rely on anticipated supply from the R^3 project to meet future demands because it is not a guaranteed supply. When supply is made available, VWD will use this water to offset groundwater pumping, but plans on meeting all future demands with groundwater.

VWD is also cooperating with MWA on the development of the Oro Grande Wash Recharge Project. The Oro Grande Wash project is a regional supply project that will deliver State Water Project water to recharge basins in the Oro Grande Wash, west of I-15 and south of Bear Valley Road in Victorville. When complete, the project will recharge up to 8,000 acre-feet per year to support groundwater in the western part of the Alto Subarea of the Mojave Groundwater Basin. Recharge in this portion of the basin benefits the VWD wells the most due to their close proximity to the recharge areas. While the Oro Grande Wash project will enhance the sustainability of the Alto Subarea, it will not be a direct addition to the VWD supply, therefore, is not identified as a source for future supply for VWD. Table 6-2 shows future water supply projects within the VWD service area and the expected increase in supply to the Mojave Basin area.

Table 6-2. Future Water Supply Projects

Name of Project	Capacity, AFY	Agencies Served	Date Supply Available
Regional Recharge and Recovery Project (R^3)	Phase 1 – 15,000 Phase 2 – 40,000 total	AVRWC, Adelanto, Hesperia Water District, CSA 64, Golden State Water Company, VWD	Phase 1 – Completed Phase 2 - 2019
Oro Grande Wash Recharge	Phase 1 – 4,000 Phase 2 – 8,000 total	VWD	Phase 1 - 2016 Phase 2 - TBD

6.8 RECYCLED WATER

6.8.1 Wastewater Collection and Treatment Systems

The wastewater that is generated within the service boundary of VWD is collected via a gravity sewer system owned and operated by the City of Victorville. A portion of the collection system conveys wastewater to the VWTF that is owned and operated by VWD. A portion of the collection system discharges to a regional interceptor, which conveys the wastewater flows to a regional wastewater treatment plant (WWTP) that is owned and operated by the VVWRA.

In 2010, VWD began operation of the VWTF, a domestic and industrial wastewater treatment plant at the SCLA with a capacity of 2.5 MGD. The VWTF is designed to treat wastewater using anaerobic (for high strength industrial wastewater) and aerobic (for sanitary wastewater) treatment processes. The combined flows undergo complete-mix activated-sludge (CMAS) and clarification in a membrane bioreactor (MBR) in the next treatment steps. The final process is ultraviolet (UV) disinfection, resulting in tertiary treated RW that meets Title 22 requirements. Sludge from the facility is discharged to the VVWRA's WWTP for treatment and disposal. The 2015 annual average flow treated at the VWTF was 1.49 MGD, or 1671 AF; all of this water is available as a RW supply to VWD. Recycled water from the VWTF is currently distributed to HDPP for cooling water and applied at the Westwinds Golf Course as irrigation, although this is not required as the golf course is closed. The portion of treated effluent that is not reused at SCLA is conveyed to the VVWRA WWTP site for disposal at Percolation Pond 14, which is owned and operated by VWD.

VVWRA is a Joint Powers Authority consisting of the Town of Apple Valley, City of Hesperia, City of Victorville, City of Adelanto, and County Service Areas of Oro Grande (Number 42) and Spring Valley Lake (Number 64). The regional plant has a current capacity of 14 mgd, and is located approximately 7 miles north of the City of Victorville, between SCLA and the Mojave River. VVWRA's regional WWTP discharges disinfected tertiary effluent to the Mojave River and supplies recycled water to VWD. In 2003, VVWRA executed a Memorandum of Understanding (MOU) with the California Department of Fish and Game (now California Department of Fish and Wildlife or "CDFW") which requires VVWRA to discharge 9,000 AFY of available recycled water to the Mojave River. The MOU includes a provision to allow reduced discharges as long as a minimum flow of 15,000 AFY is measured at the Lower Narrows gage. In 2005, VVWRA and the City of Victorville executed a Second Amended and Restated Agreement for Reclaimed Water Service with a perpetual term that entitles the City to take delivery of all of the treated effluent from VVWRA's WWTP in excess of the amount required to be discharged under the MOU. Treated effluent which is not discharged to the Mojave River or purchased by the City is disposed of via onsite percolation ponds. In 2015, the average treated flow at the VVWRA WWTP was 10.72 mgd or approximately 12,000 AF, and 6,480 AF was discharged to the Mojave River.

The annual volume of recycled water supply available to VWD from VVWRA is equal to the total treated effluent less the volume required to be discharged to the Mojave River under the MOU with CDFW. VVWRA is currently constructing two subregional treatment plants in Hesperia and Apple Valley that will have an initial capacity of 1.0 mgd each. The sub-regionals are expected to begin operation in 2017 and will reduce the flows received at the Shay Road WWTP. VWD, VVWRA, HDPP, and CDFW are in ongoing discussions regarding changes in available recycled water at the Shay Road WWTP and increased recycled water use by HDPP. Future projections of the available recycled water supply from the Shay Road WWTP are not currently available. For the purposes of this UWMP, it is assumed that VWD's recycled water demands will be met by recycled water supplies from the VWTF and the Shay Road WWTP. HDPP will retain their own imported water supply and storage account in the groundwater basin as supplemental cooling water supplies.

Some areas within VWD's service area are not connected to the sewer system, especially within ID2. The customers in these areas are currently connected to septic tanks for wastewater disposal, but are likely to be connected to the collection system in the future as facilities are extended into these areas.

Table 6-3. Wastewater Collected within Service Area in 2015

Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2015, AF	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located within UWMP Area?	Is WWTP Operation Contracted to a Third Party?
The City of Victorville	Metered	1,671	Victorville Water District	Victorville Wastewater Treatment Facility	Yes	Yes
The City of Victorville	Metered	7,328	Victor Valley Wastewater Reclamation Authority	Victor Valley Wastewater Reclamation Authority WWTP	No	No
	Total Wastewater Collected from Service Area in 2015	8,999				

6.9 SUMMARY OF EXISTING AND PLANNED SOURCES OF WATER

VWD's historical, current, and projected water supplies are summarized in Table 6-4. These quantities are based on projected demands in Table 5-6.

Table 6-4. Water Supplies – Historical, Current, and Projected, AFY

Water Supply	Additional Detail on Water Supply	2010	2015	2020	2025	2030	2035	2040
Groundwater	Mojave Basin	22,729	17,340	27,156	29,697	32,490	35,198	37,858
Imported Water	R3 Project	0	3,503	0	0	0	0	0
Recycled Water		0	611	2,930	2,930	2,930	2,930	2,930
Total		**22,729**	**21,454**	**30,086**	**32,627**	**35,420**	**38,128**	**40,788**

6.10 ENERGY INTENSITY OF WATER SUPPLIES

VWD elected to report the energy intensity of their supplies for this Plan, which optional for the 2015 UWMP. Water energy intensity is the total amount of energy, calculated on a whole-system basis, required for the use of a given amount of water in a given location. This calculation is intended to report energy usage for facilities within VWD's operational control for extraction, diversion, conveyance, placement into storage, treatment, and distribution for the entirety of 2015. Energy used to produce and deliver water from the R^3 project is not included. Reporting water energy intensity has many benefits for water utilities and their customers including:

- Identifying energy saving opportunities as energy consumption is often a large portion of the cost of delivering water.
- Calculating energy savings and greenhouse gas (GHGs) emissions reductions associated with water conservation programs.
- Potential opportunities for receiving energy efficiency funding for water conservation programs.
- Informing climate change mitigation strategies.
- Benchmarking of energy use at each water acquisition and delivery step and the ability to compare energy use among similar agencies.

The complete energy intensity report is attached in Appendix K and the summary of the results is shown in Table 6-5.

Table 6-5. Energy Intensity Summary

	Extract and Divert	Place into Storage	Conveyance	Treatment	Distribution	Total Utility
Volume of Water Entering Process (AF)	17,340	0	0	1,823	20,843	20,843
Energy Consumed (kWh)	15,132,908	0	0	153,431	10,846	15,297,185
Energy Intensity (kWh/AF)	872.7	0.0	0.0	84.2	0.5	733.9

7 WATER SUPPLY RELIABILITY ASSESSMENT

7.1 CONSTRAINTS ON WATER SOURCES

Per the Mojave Basin Area Judgment, producers in the Mojave Basin Area are allowed to produce as much water as they need annually to meet their requirements. An underlying assumption of the Judgment is that sufficient water will be made available to meet the needs of the Basin in the future from a combination of natural supply, imported water, water conservation, water reuse and transfers of FPA among parties.

Portions of the Mojave Basin Area contain numerous, naturally occurring contaminants including arsenic, nitrates, iron, manganese, chromium-6, and excess TDS. VWD operates several treatment and blending facilities to ensure that water delivered to its customers meets the drinking water standards. VWD will continue to monitor groundwater quality and implement additiaonal treatment and blending as needed to maintain the quality of the water supply.

Climate change impacts that may have a long term affect on water supplies include increased temperatures, sea level rise, a reduced winter snowpack, and altered precipitation patterns, including more frequent and intense storm events. Mitigation and adaptation strategies are being investigated and implemented by VWD and MWA to address the effects that climate change will have on their future water supply.

Additional details on the water quality of the Mojave Basin Area as it pertains to VWD and climate change's effect on VWD's supply are provided in Sections 6.2.2 and 4.4, respectively.

7.2 RELIABILITY BY TYPE OF YEAR

In general, groundwater and recycled water supplies are less vulnerable to seasonal and climatic changes than surface water (i.e. local and imported) supplies. Natural groundwater supply estimates are based on the long-term averages, which account for inconsistency in natural supplies (i.e. historic periods of drought are included in the long-term average). Therefore, VWD does not have any inconsistent water sources that result in reduced supplies in dry or multiple dry years. MWA is actively operating recharge sites for conjunctive use along the Mojave River Pipeline, Oro Grande Wash Pipeline, Morongo Basin Pipeline and Silverwood Dam. Recharge sites provide MWA with the ability to recharge SWP water into the Subareas where replacement water is purchased. These sites also provide MWA with the ability to bank excess SWP water when available in wet year for storage to be used in dry years. R^3 facilities allow MWA to manage the groundwater basins surrounding VWD by delivering imported SWP water stored in upper Mojave River recharge areas to purveyors that can reduce pumping from their wells when taking R^3 water which allows partial recovery of local pumping depressions. For these reasons, supplies are considered to be unchanged in normal, dry, and multiple dry years.

The basis for the "year type" is determined from the single-driest and multiple-driest years using precipitation data (1940- 2016) from National Oceanic and Atmospheric Administration (NOAA) Station 049325 in Victorville. However, even though precipitation is variable, groundwater supply estimates are based on the long-term averages, which account for these variabilities so groundwater is assumed to be 100% available in single-dry and multiple-dry year conditions.

Table 7-1. Basis of Water Year Data

Year Type	Base Year[1]	% of Average Supply
Average Year	1970	100
Single-Dry Year	1953	100
Multiple-Dry Years 1st Year	2007	100
Multiple-Dry Years 2nd Year	2008	100
Multiple-Dry Years 3rd Year	2009	100
[1]Based on 1940 – 2016 precipitation data from NOAA Station 049325; http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca9325		

7.2.1 Normal Year

Table 7-1 presents a comparison of supply and demand projections in an Average Year.

Table 7-2. Normal Year Supply and Demand Comparison, AFY

Totals	2020	2025	2030	2035	2040
Supply Totals	27,156	29,697	32,490	35,198	37,858
Demand Totals	27,156	29,697	32,490	35,198	37,858
Difference	0	0	0	0	0

7.2.2 Single Dry Year

Demand during dry years was assumed to remain constant due to ongoing state and local conservation programs. Groundwater supply is assumed to remain 100 percent available because the long-term average of the groundwater basin includes dry periods, and any single or multiple-year dry cycle does not impact the long-term yield of the basin. Supplies are sufficient to meet dry year demands through year 2040 as shown in Table 7-2.

Table 7-3. Single Dry Year Supply and Demand Comparison, AFY

Totals	2020	2025	2030	2035	2040
Supply Totals	27,156	29,697	32,490	35,198	37,858
Demand Totals	27,156	29,697	32,490	35,198	37,858
Difference	0	0	0	0	0

7.2.4 Multiple Dry Years

Multiple dry year supply is addressed in the same way as a single dry year, described in Section 7.2.2. Therefore, supplies sufficient to meet multiple dry year demands through year 2040 as shown in Table 7-4.

Table 7-4. Multiple Dry Year Supply and Demand Comparison, AFY

Year	Totals	2020	2025	2030	2035	2040
First Year	Supply Totals	27,156	29,697	32,490	35,198	37,858
	Demand Totals	27,156	29,697	32,490	35,198	37,858
	Difference	0	0	0	0	0
Second Year	Supply Totals	27,156	29,697	32,490	35,198	37,858
	Demand Totals	27,156	29,697	32,490	35,198	37,858
	Difference	0	0	0	0	0
Third Year	Supply Totals	27,156	29,697	32,490	35,198	37,858
	Demand Totals	27,156	29,697	32,490	35,198	37,858
	Difference	0	0	0	0	0

7.3 MINIMUM SUPPLY NEXT THREE YEARS

The UWMP Act requires a retailer to quantify the minimum water supply available during the years 2016 to 2018, assuming years 2016 to 2018 repeat the driest three-year historic sequence for each water supply source. As shown in Table 7-4, total supplies, given a repeat of historically low conditions on all water supplies, are equal to the projected demands for the three years. As described in Section 6.2.1, producers in the Mojave Basin Area are allowed to produce as much water as they need annually to meet their requirements, according to the Mojave Basin Area Judgment.

Table 7-5. Minimum Supply Next Three Years, AFY

Available Water Supply	2016	2017	2018
Available Water Supply	21,520	22,249	22,970

7.4 REGIONAL SUPPLY RELIABILITY

According to the MWA 2015 UWMP, MWA has adequate supplies to meet demands during average, single dry and multiple dry years throughout the 25-year planning period. The demand projections in the MWA UWMP include VWD demands.

VWD will continue aggressive water conservation efforts, increased use of recycled water to offset potable water demand, and participation in new water supply projects with MWA to ensure they have enough supply to continue to meet their demands.

8 WATER SHORTAGE CONTINGENCY PLANNING

The UWMP Act requires that the UWMP include an urban water shortage contingency analysis that includes stages of action to be undertaken in the event of water supply shortages; a draft water shortage contingency resolution or ordinance; prohibitions, consumption reduction methods and penalties; an analysis of revenue and expenditure impacts and measures to overcome these impacts; actions to be taken during a catastrophic interruption; and a mechanism for measuring water use reduction.

8.1 STAGES OF ACTION

Water agencies relying solely on groundwater sources which are being managed under an adjudication, such as the VWD, are less likely to experience water shortages than those agencies relying primarily on surface water due to the lack of influence of climatic variability on supplies. Nevertheless, it is still important for groundwater agencies to reduce production during drought years to avoid excessive overdraft of the groundwater basin. VWD's rationing plan will be invoked during declared water shortages. Each stage includes a water reduction objective expressed as a percentage of normal demands. The rationing plan is dependent on the cause, severity, and anticipated duration of the water supply shortage.

8.1.1 Stage 1: Year Round Water Conservation

Year-Round Water Conservation Stage 1 (when VWD is able to meet all the water demands of its customers in the immediate future) shall be in effect at all times, unless the VWD Board otherwise declares under the provisions of Section 10.05.070 of VWD-012 that one or more of the District's Water Supply Shortage Contingency Plan ("WSSCP"), attached in Appendix I, stages are in effect. During Conservation Stage 1, it shall be unlawful and a violation of City Ordinance No. VWD-012, attached in Appendix J, for any Water User to make, cause, use or permit the use of water in any manner contrary to the provisions of the prohibitions listed in Table 8-2.

8.1.2 Stage 2: Threatened Water Supply Shortage

Stage 2 shall be in effect when VWD's ability to provide water for ordinary domestic and commercial uses may be adversely impaired or threatened. Shortage Stage 2 will be implemented when a ten percent (10%) to twenty-eight percent (28%) reduction in Total Potable Water Production or water usage must be met. The actual percentage reduction required (based on State conservation mandates and other contributing factors) will be indicated in the VWD resolution enacting Shortage Stage 2. During Shortage Stage 2, it shall be unlawful and a violation of City Ordinance No. VWD-012 for any Water User to make, cause, use or permit the use of water in any manner contrary to the prohibitions listed in Table 8-2.

8.1.3 Stage 3: Critical Water Supply Shortage

Stage 3 shall be in effect when VWD's ability to provide water for ordinary domestic and commercial uses may be critically impaired or threatened. Shortage Stage 3 will be implemented when a twenty-nine percent (29%) to forty percent (40%) reduction in Total Potable Water Production or water usage must be met. The actual percentage reduction required (based on State conservation mandates and other contributing factors) will be indicated in the VWD resolution enacting Shortage Stage 3. During Shortage Stage 3, it shall be unlawful and a violation of City Ordinance No. VWD-012 for any Water User to make, cause, use or permit the use of water in any manner contrary to the prohibitions listed in Table 8-2.

8.1.4 Stage 4: Emergency Water Supply Shortage

Stage 4 shall be in effect when a disaster or other major disruption in the water supply or any emergency that prevents the District from meeting the water demands of water users is threatened or exists. Shortage Stage 4 will be implemented when a Total Potable Water Production or water usage reduction in excess of forty-one percent (41%) and up to fifty percent (50%) is needed. The actual percentage reduction required (based on State conservation mandates and other contributing factors) will be indicated in the VWD resolution enacting Shortage Stage 4.

The City Manager shall promulgate a drought management plan containing regulations setting forth the criteria for implementation and termination of various water use reduction stages. The City Manager is authorized to declare a drought, and to implement a drought management plan, in response to events including, but not limited to, the following: reductions in supply from any water purveyor, or when an insufficient supply appears likely due to water system limitations or structural failure. Such declaration may designate the entire area of the city or a portion of it if the shortage is not citywide.

Table 8-1. Potable Water Production Reduction Stages

Stage	Percent Production Reduction	Water Supply Condition
1	10	Normal Water Supply
2	28	Threatened Water Supply Shortage
3	40	Critical Water Supply Shortage
4	41-50	Emergency Water Supply Shortage

8.2 PROHIBITIONS ON END USES

Mandatory compliance measures enacted during a water shortage are more severe than voluntary measures, produce greater savings, and are less costly to the utility. The principal drawback to these measures could result from customer resentment if the measures are not seen as equitable. Therefore, such measures need to be accompanied by a good public relations campaign.

The water use prohibitions for each stage are shown in Table 8-2.

Table 8-2. Restrictions and Prohibitions on End Uses

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1	CII - Restaurants may only serve water upon request	Providing glasses of drinking water (except upon request) to customers in restaurants or other public places where food is routinely served is prohibited.	Yes
1	Landscape - Limit landscape irrigation to specific times	Summer Outdoor Sprinkler Restrictions: From June 1 through September 30, irrigation/watering is permitted only between the hours of 10:00 p.m. and 6:00 a.m. Winter Outdoor Sprinkler Restrictions: From October 1 through May 31, irrigation/watering is permitted only between the hours of 9:00 a.m. and 3:00 p.m.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
		Summer Outdoor Sprinkler Restrictions (Large Systems): From June 1, through September 30, irrigation/watering for facilities with Large Systems is only permitted between the hours of 10:00 p.m. and 9:00 a.m. Winter Outdoor Sprinkler Restrictions (Large Systems): From October 1, through May 31, irrigation/watering for facilities with Large Systems is only permitted between the hours of 9:00 a.m. and 3:00 p.m.	
1	Landscape - Other landscape restriction or prohibition	Irrigation with potable water of ornamental turf on public street medians is prohibited.	Yes
1	Landscape - Other landscape restriction or prohibition	Irrigation/watering is permitted at any time if a handheld hose fitted with a positive shut-off nozzle is used or a Low-Volume Irrigation System is used, provided that the Low-Volume Irrigation System is not on an irrigation Station which operates at the same time as a sprinkler system.	Yes
1	Landscape - Other landscape restriction or prohibition	Application of potable water to outdoor landscapes during and within forty-eight (48) hours after measurable rainfall is prohibited.	Yes
1	Landscape - Other landscape restriction or prohibition	It is prohibited to plant any Water-intensive Landscape or Turf: a. In any Right-of-Way, narrow pathway, parking strip, roadway median, or along foundations of buildings. b. Having a width of less than five (5) feet, unless adjacent to a planter bed or other landscaped area which will catch Overspray.	Yes
1	Landscape - Restrict or prohibit runoff from landscape irrigation	Water Users are prohibited from causing or permitting any water furnished to their properties/premises by the District to run or to escape from any hose, pipe, valve, faucet, sprinkler or irrigation device onto any sidewalk, parking lot, adjacent property, street or gutter or to otherwise escape, if such running or escaping can be prevented.	Yes
1	Landscape - Restrict or prohibit runoff from landscape irrigation	Watering of turf, ground cover, open ground, shrubbery, crops, gardens and trees, including agricultural irrigation, or any outdoor dispensing of water in a manner or to an extent which allows Excess Runoff is prohibited. However, a minimum amount of runoff, which is a natural consequence of conservative watering, either by hand or by mechanical or automated sprinkling facilities, is permitted, so long as such runoff does not amount to Excess Runoff.	Yes
1	Other	Irrigation with potable water of landscapes outside of newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
		California Building Standards Commission and the Department of Housing and Community Development.	
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Excessive use, loss or escape of water through breaks, leaks or other malfunctions in the Water User's plumbing or distribution system for any period of time after such escape of water should have reasonably been discovered and corrected is prohibited. Upon receiving notice from the District of the existence of any such break, leak or other malfunction, Water Users shall identify the source of the water and within 48 hours, stop the source, by turning off the valve that supplies the water, and within 7 days, evaluate the extent of the problem and repair or correct same.	Yes
1	Other - Prohibit use of potable water for washing hard surfaces	Washing down of impervious surfaces, including but not limited to: walkways, patios, tennis courts, driveways, sidewalks or other paved surfaces (except in emergencies to remove spills of hazardous materials or eliminate dangerous conditions) is prohibited.	Yes
1	Other - Require automatic shut of hoses	Using a hose that dispenses potable water for any outside purpose (including the washing of a motor vehicle), except where the hose is fitted with a positive shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use, is prohibited.	Yes
1	Other water feature or swimming pool restriction	Use of potable water in fountains or other decorative water features, except where the water is part of a recirculating system, is prohibited.	Yes
2	Landscape - Limit landscape irrigation to specific days	Summer Outdoor Sprinkler Restrictions - From June 1, through September 30, it shall be prohibited to: a. Apply potable water to any outdoor landscape at properties with street addresses ending in an even number (0,2,4,6, or 8) except on Tuesdays, Thursdays, or Saturdays between the hours of 10:00 pm and 6:00 am. b. Apply potable water to any outdoor landscape at properties with street addresses ending in an odd number (1,3,5,7, or 9) except on Wednesdays, Fridays, and Sundays between the hours of 10:00 pm and 6:00 am. c. Apply potable water to any outdoor landscape at facilities such as schools, parks, cemeteries, golf courses or industrial sites and areas without street address numbers, such as landscape maintenance assessment districts (“LMADS”), except on Mondays, Tuesdays, Thursdays, Fridays and Sundays, between the hours of 10:00 p.m. and 9:00 a.m., unless such facilities have Large Systems with approved Reduction Plans. Water Users at facilities with approved Reduction Plans may water in accordance with the provisions of those Reduction Plans so long as the Water	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
		Users maintain full compliance with the provisions of such Reduction Plans. Water Users which fail to meet the minimum required Reduction Plan percentage during any one (1) billing cycle more than two (2) times in one twelve-month period, shall not be considered in full compliance and must immediately resume watering in accordance with the first sentence of this Subsection. Failure to immediately resume watering in accordance therewith shall constitute a violation of this Ordinance. Winter Outdoor Sprinkler Restrictions - from October 1 through May 31, it shall be prohibited to: a. Apply potable water to any outdoor landscape at properties with street addresses ending in an even number (0,2,4,6, or 8) except on Tuesdays, Thursdays, or Saturdays between the hours of 9:00 a.m. and 3:00 p.m. b. Apply potable water to any outdoor landscape at properties with street addresses ending in an odd number (1,3,5,7, or 9) except on Wednesdays, Fridays, and Sundays between the hours of 9:00 a.m. and 3:00 p.m. c. Apply potable water to any outdoor landscape at facilities such as schools, parks, cemeteries, golf courses or industrial sites and areas without street address numbers, such as landscape maintenance assessment districts (“LMADS”) except on Mondays, Tuesdays, Thursdays, Fridays and Sundays, between the hours of 9:00 a.m. and 3:00 p.m., unless such facilities have Large Systems with approved Reduction Plans. Water Users at facilities with approved Reduction Plans may water in accordance with the provisions of those Reduction Plans so long as the Water Users maintain full compliance with the provisions of such Reduction Plans. Water Users which fail to meet the minimum required Reduction Plan percentage during any one (1) billing cycle more than two (2) times in one twelve-month period, shall not be considered in full compliance and must immediately resume watering in accordance with the first sentence of this Subsection c. Failure to immediately resume watering in accordance therewith shall constitute a violation of this Ordinance.	
2	Landscape - Other landscape restriction or prohibition	Fall overseeding of Turf areas, unless irrigated with Reclaimed Water for non-residential water intensive landscape, shall be prohibited.	Yes
2	Landscape - Other landscape restriction or prohibition	Exterior landscape plans for all new multi-family, commercial and industrial development must be presented to and approved by the District prior to issuance of a will serve letter.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
2	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Using water for washing of motor vehicles is prohibited, except when done by commercial car wash facilities equipped with a recirculation system.	Yes
2	Pools and Spas - Require covers for pools and spas	All swimming pools, spas and hot tubs must be covered when not in use.	Yes
3	Landscape - Other landscape restriction or prohibition	It shall be unlawful to use a sprinkler system in the irrigation of outdoor landscaping of any kind.	Yes
3	Other	Use of water from fire hydrants shall be limited to firefighting or other authorized or approved water uses that are necessary to maintain health, safety, and welfare.	Yes
3	Other - Prohibit use of potable water for construction and dust control	All existing construction meters shall be removed and no installation of or new construction meters shall be permitted.	Yes
4	Prohibit all landscape irrigation	The watering of turf, lawns, grass, shrubbery, ground cover or other outdoor landscaping with potable water at any time is prohibited; the watering of parks, school grounds and golf courses with potable water is also prohibited.	Yes
4	Other water feature or swimming pool restriction	The use, filling or adding water to swimming pools or spas of any size, fountains, ponds, water courses, waterfalls and other artificial water structures filled or refilled with water from any source is prohibited.	Yes
4	Other	The washing of vehicles, trucks, trailers, boats, airplanes, and other types of mobile equipment with potable water, is prohibited unless such washing is necessary for the immediate interest of the public health or safety, and such washing occurs upon the immediate premises of commercial vehicle washes using recirculated water.	Yes
4	CII – Other prohibition or restriction	All existing nurseries shall discontinue all potable irrigation watering.	Yes

8.3 PENALTIES, CHARGES, OTHER ENFORCEMENT OF PROHIBITIONS

Section 10 of Ordinance No. VWD-012, attached in Appendix J, sets forth the four-stage water shortage contingency plan, where violations to all mandatory provisions are a misdemeanor and violators may be punished by imprisonment, fine or both. In addition to these criminal penalties, the following civil actions can be initiated by VWD:

- For a first violation of any provision of the water shortage contingency plan, attached in Appendix I, the enforcement officer shall issue a written notice of first violation and provide the violator with educational materials on landscape water conservation, including a copy of this

chapter. The notice shall give the designated water user a reasonable period of time to correct the violation. Failure to correct the violation within a reasonable period of time shall constitute a second violation.

- For a second violation of any provision of this chapter, the City shall issue a written notice of second violation to the designated water user imposing a fine in an amount not to exceed one hundred dollars and requiring immediate correction of the violation.
- For a third violation of any provision of this section, the City shall issue a written notice of third violation to the designated water user imposing a fine in an amount not to exceed two hundred dollars, and requiring immediate correction of the violation.
- For a fourth or subsequent violation of this section, the City shall impose a fine in an amount not to exceed five hundred dollars. The fourth and each subsequent violation of this chapter shall be deemed a public nuisance, which may be abated pursuant to the procedures provided in chapter 13.02 "nuisances" of this Code.

Any citations issued and fines imposed on designated water users for violations of the chapter shall be served, administered, collected, and appealed in accordance with the procedures of chapter 1.05 "administrative remedies" of this Code.

8.4 CONSUMPTION REDUCTION METHODS

VWD offers various rebates to encourage conservation (i.e. ultra-low flush toilet replacements, home water audits, etc.). VWD has a water rate structure that promotes water efficiency. The reduction goal is to balance supply and demand. A more thorough discussion on the programs and rebates that VWD has in place is described in Section 9.1.

Table 8-3. Stages of WSCP - Consumption Reduction Methods

Stage	Consumption Reduction Methods by Water Supplier
All	Expand public information campaign
All	Offer Water Use Surveys
All	Provide Rebates on Plumbing Fixtures and Devices
All	Reduce System Water Loss

8.5 DETERMINING WATER SHORTAGE REDUCTIONS

The City Manager may terminate the drought declaration when it is determined that the events that triggered the drought no longer exist. The administration of a water shortage program involves coordination among a number of local agencies and a water shortage response team including: VWD staff, water, fire, planning, health, and other emergency City personnel. If a shortage was declared, an individual working for VWD would be identified as the Program Manager and be the primary coordinator of water shortage activities. An appropriate organizational structure for a water shortage management team would be determined based on the actual situation. Specific individuals would be designated to fill the identified roles.

Percent water reduction targets would be implemented in times of water shortage and the percent reduction will be indicated in the VWD resolution enacting the shortage stage (2, 3, or 4). VWD's water system currently has water meters on all connections. These meters record the amount of water consumed at each location. Additionally, each well includes a flow monitoring device that records the amount of water entering VWD's distribution system. VWD will use these meters in concert with the well monitoring and percent water reduction targets to monitor district-wide reductions in water use.

8.6 REVENUE AND EXPENDITURE IMPACTS

In January 2015, VWD began a comprehensive water rate study for a number of reasons, including meeting long-term revenue requirements, providing revenue stability and adequate funding for capital improvements, and complying with certain legal requirements, including Proposition 218 and recent court rulings affecting how the cost basis for water rates should be established. The rate study specifically addressed several key issues, including:

- ***Revenue Requirements and Financial Planning*** – The longer-range financial plan for VWD was closely examined and adjusted to best meet annual operating expenses, capital improvement costs, annual benefit funding requirements, and broader financial management concerns.
- ***Rate Structure*** – VWD's rate structure was evaluated with the intent of re-structuring it to be more consistent with industry standards. The new fixed monthly charge is based on meter size, which will provide greater revenue stability for VWD. A number of tiered a volumetric rate alternatives were also developed and evaluated. The rate study recommended using a uniform volumetric rate for all customers and does not include a tiered rate.
- ***Fixed vs. Variable Charges*** – The amount of revenue collected from fixed charges vs. volumetric rates was carefully examined. The proposed rate design will collect the projected water supply costs from volumetric charges (consumption rate) and the remaining revenue requirement from fixed (meter) charges.
- ***Statewide Conservation*** – The State of California has imposed recent drought-related conservation levels (25% Statewide) and VWD was mandated to reduce water consumption by 28% beginning in April 2015. Current and projected future consumption levels and their impact on fiscal sustainability were closely evaluated.
- ***Long-Term Conservation*** – The assumptions and recommendations contained in the rate study are not a short term response to the drought. They assume that water supplies will continue to be limited in the future and that, in the long run, customers will reduce consumption accordingly. Therefore, the drought rates developed in this study will allow VWD to meet its annual revenue requirements at various stages of conservation, even if drought conditions worsen over the next five years.

The new volumetric rate recommended by the rate study is set to the marginal cost of water, meaning that changes in consumption would cause matching changes in revenue and expenses. Under this structure, a reduction in water sales due to conservation would not have a negative fiscal impact on VWD. The rate study showed that this rate structure effectively balances revenue and expenditures for VWD until conservation exceeds 35%. Once conservation exceeds 35%, VWD's entire production would be within the Free Production Allowance, so that VWD would not be required to pay a fee to MWA for replacement water and the marginal cost changes and revenue no longer meets expenses. Beyond this point, the rate study recommends implementation of drought rates to ensure VWD collects sufficient revenue to cover costs if water sales continue to decline. Drought rates were developed in 5% increments that VWD can implement for 40% through 60% conservation levels.

The new rates are subject to the substantive and procedural requirements of Proposition 218 (Cal. Const. Art. XIIID). Section 6 of Article XIIID sets forth standards for setting rates that reflect the proportional cost of providing water services, as well as requirements for providing notice, a public hearing, and the ability to protest such proposed revisions to and increases in charges and fees for water service. The VWD Board of Directors conducted a Public Hearing at their regular meeting on May 17th, 2016 and adopted Resolution No. VWD 16-002 the recommended rate structure, which took effect upon adoption. A copy of Resolution No. VWD 16-002 is included in Appendix M.

8.7 RESOLUTION OR ORDINANCE

The City Water Code 13.60 addresses water conservation and establishes wastewater prohibitions. This section of the City Water Code is adopted through Ordinances 2114, 2133, and 2135. VWD also has adopted Ordinance Number VWD-012 which defines and prohibits water waste, which was adopted on May 19, 2015, attached in Appendix J.

8.8 CATASTROPHIC SUPPLY INTERRUPTION

Shortage Stage 4 shall be in effect when a disaster or other major disruption in the water supply or any emergency that prevents VWD from meeting the water demands of water users is threatened or exists. The percentage reduction required (based on State conservation mandates and other contributing factors) will be indicated in the VWD resolution enacting Stage 4. Prohibitions during stage 4 are provided in Table 8-2.

During declared shortages, or when a shortage declaration appears imminent, the City Manager will activate a water shortage response team. The team includes: VWD staff, water, fire, planning, health, and other emergency City personnel. Other actions and procedures to follow during catastrophic events will be developed.

9 DEMAND MANAGEMENT MEASURES

The Demand Management Measures (DMM) section provides a comprehensive description of the water conservation programs that VWD has implemented for the past five years, is currently implementing, and plans to implement in the future. The section of the CWC addressing DMMs was significantly modified in 2014, based on recommendations from the Independent Technical Panel (ITP) to the legislature. The ITP was formed by DWR to provide information and recommendations to DWR and the Legislature on new DMMs, technologies and approaches to water use efficiency. The ITP recommended, and the legislature enacted, streamlining the requirements from the 14 specific measures reported on in the 2010 UWMP to six more general requirements plus an "other" category for measures agencies implemented in addition to the required elements. The required measures are summarized in Table 9-1.

Table 9-1. Demand Management Measures

	Measure
	Water waste prevention ordinances
	Metering
	Conservation pricing
	Public education and outreach
	Programs to assess and manage distribution system real loss
	Water conservation program coordination and staffing
	Other demand management measures

9.1 DEMAND MANAGEMENT MEASURES FOR RETAIL AGENCIES

9.1.1 Water waste prevention ordinances

VWD Ordinance Number A-101-89 adopts a program of voluntary water conservation and restrictions of water use during water supply shortages and emergencies. VWD promotes and advertises a water waste hot-line reporting number for anyone to call to report water waste in the neighborhood of the boundaries of the City of Victorville (1-866-955-4H2O). Staff rearrange hours to conduct nightly, after hours and weekend canvassing of the entire water system: surveying for violations of the Ordinance. Door tag flyers have been made to proactively notify of the watering restrictions, including bill inserts, envelope sniping , etc.

On May 19, 2015, Ordinance No. VWD-012 ("VWD-012") was adopted, establishing Chapter 10.05 of the Municipal code, which revised and updated Municipal Code Section 13.60, established the Victorville Water District (VWD) standards, guidelines and procedures for year-round water conservation to prevent the waste or unreasonable use of water; and specified restrictions, prohibitions and limitations on water use pursuant to the State Water Resources Control Board ("SWRCB") final regulations implemented in response to the Governor's Executive Order B-29-15. This order calls for action to address the State's escalating drought and water shortage conditions. Upon its adoption, VWD-012 immediately activated a number of water conservation measures and prohibitions on water waste as part of its "Conservation Stage 1."

To promote flexibility and provide for increasingly more stringent water use prohibitions and conservation requirements when drought and water supply shortage conditions intensify; VWD-012

contains one year round conservation stage and three Water Supply Shortage Stages (Shortage Stages 2, 3 and 4) which can be activated by resolutions adopted by the VWD Board of Directors (VWD Board) when the VWD General Manager so recommends (following noticed public hearings). These Shortage Stages can likewise be deactivated in the same fashion when drought and water supply shortage conditions cease or become less severe. Because of the current drought state of emergency and the final emergency water conservation regulations adopted by the SWRCB on May 5, 2015 ("Final Regs."); the District was required to reduce its total potable water production by twenty-eight percent (28%) each month (over 2013 water usage figures for the same months) beginning as of June 1, 2015. As of March 2016, this demand percentage reduction has been reduced to 24%. Although Conservation Stage 1 measures are always in effect, the General Manager and District staff knew additional water use restrictions were needed to reach the 28% reduction required by the Final Regulations. The District adopted Resolution No. VWD 15-006 which both: (1) declares a water shortage emergency; and (2) immediately implements Water Supply Shortage Stage 2. Shortage Stage 2 prohibitions are shown in Table 8-2.

Through drought mandates, VWD posted and mailed 753 Notices of Violations (NOV's). Rechecks were conducted for these violations for compliance. Second NOV's were issued to 44 accounts, via certified mailing to resolve the remaining 81 violations not resolved. As of the writing of this plan, half of these accounts are now in compliance. The Conservation Division utilized 500 staff hours (rotating shifts to accommodate nights, early mornings, and weekends) specifically dedicated to observe approximately 1900 locations per month and notify those in violation of the Water Conservation Ordinance and Stage 2 drought restrictions. Over 200 site visits were scheduled to assist those out of compliance with the restrictions, by programming sprinkler times, analyzing water use, and locating and/or isolating leaks. During the summer months, the staff processed over 20 to 50 calls a day directly related to the Governors drought mandates and the Water Conservation Ordinance; responding to over 100 complaints by concerned residents either on the phone, walk-in, or email; reporting wasteful water run-off occurring throughout the City.

9.1.2 Metering

100% of existing accounts are metered and billed by volume of use. VWD performs meter reading on a monthly basis and bills customers on a monthly basis. All customers are billed a meter charge and a consumption charge for each unit of water consumed. More details on rate structures are provided Section 8.6.

VWD began installing automatic meter-reading systems, allowing meter readers to collect data from their moving vehicles while traveling. This is faster, more accurate, and more cost-effective than hand reading. The meter reading system also archives consumption information. The data is used to identify leaks, address customer consumption concerns, and monitor water conservation efforts.

9.1.3 Conservation pricing

VWD adopted new water rates on May 17, 2016. The new rate structure collects the projected water supply costs from volumetric charges (consumption rate) and the remaining revenue requirement from fixed (meter) charges. The volumetric rate is uniform for all customers and does not include a tiered rate.

The new volumetric rate is set to the marginal cost of water, meaning that changes in consumption would cause matching changes in revenue and expenses. The rate structures includes drought rates to

ensure VWD collects sufficient revenue to cover costs if water sales continue to decline. Drought rates were developed in 5% increments that VWD can implement for 40% through 60% conservation levels. A copy of Resolution No. VWD 16-002, which adopts the new rates, is included in Appendix M.

9.1.4 Public education and outreach

9.1.4.1 Public Information Programs

Public information programs consists of distributing water use efficiency information to the public through a variety of methods including brochures, radio, television, school presentations and videos, and websites. VWD uses online media: Twitter and Facebook to promote articles and feature water conservation. VWD has promoted water conservation by using its website as a source of conservation tips, which include indoor and outdoor usage, water-smart landscaping, guides to high desert gardening, and locations of local water-wise nurseries. VWD's Desert Friendly Plant Data Base went online in 2015. The plant data base allows users to sort through about 410 plants by plant type, sun and water requirements, flower color, flowering season, and mature height and width. The plant data base has the capability for users to print plant lists and informational text in a user friendly format. This data base is also instructional as it relates to learning resources and water conservation indoor savings and valuable links. VWD actively participates in conservation efforts through support of AWAC, adoption of a computerized billing format, an active advertising campaign and production of a water-wise plant list. Workshops and tours of VWD's water system are provided on a periodic basis.

VWD's Conservation Division staff provides residential and commercial customers with help reducing water waste and saving money on water bills through on-site visits to residents and businesses as well as distributing Conservation Kits to eligible homeowners. Division staff conducted approximately 700 on-site visits and installed and distributed over 350 water efficient low flow shower heads and 300 water efficient low flow faucet aerators.

The Conservation Division staff also participated in a variety of events throughout 2015; such as: Desert Community Water Awareness 3-day expo events in the Spring and Fall, Spice of Life, Adelanto Conservation Festival, Spring Egg Hunt, National Night Out, and the Apple Valley Ranchos Conservation Festival.

9.1.4.2 School Education Program

Each year for the past 10 years, the Conservation Division staff has conducted a program for grade school classes – reaching thousands of students; the past three years concentrating on mainly 5th grade students, in observance of May "Water Awareness Month." Conservation staff decided to forego the in-class presentations in 2015, in order to concentrate labor and efforts into the toilet and Weather Based Irrigation Controller Programs. However, for May, 2016, "Water Awareness Month," staff anticipates offering these in-class presentations for 5th grade students once again and will be visiting about 34 classes with the opportunity to reach over 1,000 students. The Conservation staff will be presenting two different one-hour lesson plans: "The Incredible, Edible Aquifer" and the "Water Cycle Bracelet."

The Conservation Division also arranged for "Shows That Teach" to visit five elementary schools for the 2014-2015 school year. This professional ensemble presented a 45-minute assembly program entitled "H_2O, Where Did You Go?" and also another program titled, "Waterology," that featured vaudeville songs and dances to educate kids about water and how to conserve it. The assembly program was presented to about 2,488 students in six elementary schools.

9.1.5 Programs to assess and manage distribution system real loss

VWD staff performs the following steps to minimize water losses from the distribution system:

- Regularly inspect for leaks in pipeline, and production/distribution facilities.
- Provides adequate staff on duty to respond quickly to pipe ruptures, leaks, and repairs, including service laterals inspections.
- Supports an ongoing valve exercising program by regularly exercising all control/shut off valves, such that leaks can be corrected in a timely manner

VWD also actively monitors their water distribution system through annual completion of water audits, providing water audit training, and annual calibration and testing of 40 source production meters. VWD maintains an annual budget of $10,000 to contract with a meter calibration service to test and calibrate source production meters. VWD allocates $50,000 annually from the Water Distribution Expense Budget for completion of the water audit and water audit training. The 2015 AWWA Water Audit has been completed and is attached in Appendix G.

9.1.6 Water conservation program coordination and staffing support

Program funding is provided through water rates and includes the budget for a Water Conservation Supervisor and two Water Conservation Specialists. These three positions can be reached by calling the Conservation Hot line number at 1-866-955-4426. The Cash for Grass Program for commercial and residential including the large turf removal program is funded through the Mojave Water Agency and grant funding from the Department of Water Resources. Additionally, the water conservation program lead workshops that were held pre and post installation for 100 weather based irrigation controllers, funded through Mojave Water Agency. VWD continues to offer indoor and outdoor water audits to CII accounts through their Free Water Audit program.

9.1.7 Other demand management measures

9.1.7.1 High-efficiency washing machine rebate programs

This program generally provides financial incentives (rebate offers) to qualifying customers who install high-efficiency washing machines in their homes. In 2007/08, VWD implemented this measure by partnering financially through the WCIP program sponsored by MWA through AWAC by offering an $80 rebate in conjunction with program assistance and in kind staff support

9.1.7.2 Cash for Grass

The Cash for Grass program gave VWD customers the opportunity to convert their grass lawns into desert-adaptive and water-smart landscaping, and receive a rebate for doing so. Conducted in partnership with MWA through grant funding, Cash for Grass conserved potable water that was being used for landscape irrigation. The program was open to residences, businesses, non-profit organizations, and public agencies. Throughout the program, VWD staff inspected 470 properties which lead to removal of 323,120.5 square feet of turf removal and 283 acre feet per year water savings. This program ended on March 31, 2016, due to lack of funding.

9.1.7.3 Toilet Replacement Program

VWD Conservation Division staff coordinated a toilet exchange program to replace six hundred (600) 3.0 gallons per flush or greater toilets with 1.28 gallons per flush high efficiency water saving toilets for Multi-family and Single-Family residences. Division staff received funding for the toilets from Mojave Water Agency and conducted the pre and post inspections for these toilets for program participation.

9.1.7.4 Weather Based Irrigation Controller Program (WIBIC)

VWD Conservation Division staff partnered with MWA to host two workshops to supply 100 controllers to Victorville home owners. The purpose of these controllers is to reduce irrigation times based on recent rainfall. Conservation staff conducted and coordinated the installation pre and post inspections for these controllers. Funding for the WIBIC's was provided by MWA.

9.2 IMPLEMENTATION OVER THE PAST FIVE YEARS

VWD maintains records of each of the programs described above, including the extent of each program, the expenditures, and the anticipated water savings. VWD estimates that these programs have contributed significantly to the 8% total water demand reduction and 14% gallons per capita per day reduction from 2010 to 2015. Conservation efforts are expected to increase as the drought continues.

9.3 PLANNED IMPLEMENTATION TO ACHIEVE WATER USE TARGETS

VWD's current per-capita consumption is less than its 2020 compliance target shown in Table 9-2. VWD expects to continue to implement its current conservation programs to encourage conservation and maintain per-capita consumption below the compliance target.

Table 9-2. Actual and Target GPCD

	2015 Actual	2015 Target	2020 Target
GPCD	143	227	202

9.4 MEMBERS OF THE CALIFORNIA URBAN WATER CONSERVATION COUNCIL

Victorville is not a signatory to the CUWCC's MOU; however, Victorville is committed to implementing water conservation programs within its Service Area.

APPENDIX A. DWR REVIEW SHEET CHECKLIST

VWD Checklist Arranged by Subject

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location *(Optional Column for Agency Use)*
10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1	**Chapter 2**
10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.5.2	**Sections 3.2 and 4.2**
10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	Plan Preparation	Section 2.5.2	**Section 4.3**
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	**Section 4.2**
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	**Section 4.4**
10631(a)	Provide population projections for 2020, 2025, 2030, and 2035.	System Description	Section 3.4	**Section 4.3**
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	**Section 5.2.1**
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4	**Section 4.3**
10631(e)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2	**Section 5.2.1**
10631(e)(3)(A)	Report the distribution system water loss for the most recent 12-month period available.	System Water Use	Section 4.3	**Section 5.2.5**
10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.5	**Section 5.2.4**
10608.20(b)	Retail suppliers shall adopt a 2020 water use target using one of four methods.	Baselines and Targets	Section 5.7 and App E	**Section 5.1.2**

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location *(Optional Column for Agency Use)*
10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Chapter 5 and App E	**Section 5.1.4**
10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.7.2	**Section 5.1.3**
10608.24(a)	Retail suppliers shall meet their interim target by December 31, 2015.	Baselines and Targets	Section 5.8 and App E	**Section 5.1.4**
10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Section 5.8.2	**Section 5.1.4**
10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	Section 5.1	**NA**
10608.40	Retail suppliers shall report on their progress in meeting their water use targets. The data shall be reported using a standardized form.	Baselines and Targets	Section 5.8 and App E	**Section 5.1.4**
10631(b)	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, 2030, and 2035.	System Supplies	Chapter 6	**Section 6.9**
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	**Section 6.2**
10631(b)(1)	Indicate whether a groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	Section 6.2.2	**Section 6.2.1**
10631(b)(2)	Describe the groundwater basin.	System Supplies	Section 6.2.1	**Section 6.2.1**
10631(b)(2)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2.2	**Section 6.2.1**
10631(b)(2)	For unadjudicated basins, indicate whether or not the department has identified the basin as overdrafted, or projected to become overdrafted. Describe efforts by the supplier to eliminate the long-term overdraft condition.	System Supplies	Section 6.2.3	**NA**

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location *(Optional Column for Agency Use)*
10631(b)(3)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	Section 6.2.4	**Section 6.2.1, 6.2.2, 6.2.3**
10631(b)(4)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Sections 6.2 and 6.9	**Section 6.9**
10631(d)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	System Supplies	Section 6.7	**Section 6.6**
10631(g)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years.	System Supplies	Section 6.8	**Section 6.7**
10631(h)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6	**Section 6.5**
10631(j)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) – if any - with water use projections from that source.	System Supplies	Section 2.5.1	**NA**
10631(j)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	Section 2.5.1	**NA**
10633	For wastewater and recycled water, coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.1	**Section 6.8.1**
10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area. Include quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	System Supplies (Recycled Water)	Section 6.5.2	**Section 6.8.1**
10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	Section 6.5.2.2	**Section 6.8.1**
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3 and 6.5.4	**Section 6.8.1**
10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.5.4	**Section 6.8.1**

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location *(Optional Column for Agency Use)*
10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 6.5.4	**Section 6.9**
10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	Section 6.5.5	**Section 6.8.1**
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.5	**Section 6.8.1**
10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.4	**Sections 6.2, 6.3, and 6.8**
10631(c)(1)	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage.	Water Supply Reliability Assessment	Section 7.1	**Section 7.2**
10631(c)(1)	Provide data for an average water year, a single dry water year, and multiple dry water years	Water Supply Reliability Assessment	Section 7.2	**Section 7.2**
10631(c)(2)	For any water source that may not be available at a consistent level of use, describe plans to supplement or replace that source.	Water Supply Reliability Assessment	Section 7.1	**Section 7.2**
10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 7.1	**Section 6.2.2**
10635(a)	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.3	**Section 7.2**
10632(a) and 10632(a)(1)	Provide an urban water shortage contingency analysis that specifies stages of action and an outline of specific water supply conditions at each stage.	Water Shortage Contingency Planning	Section 8.1	**Section 8.1**
10632(a)(2)	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency.	Water Shortage Contingency Planning	Section 8.9	**Section 7.3**
10632(a)(3)	Identify actions to be undertaken by the urban water supplier in case of a catastrophic interruption of water supplies.	Water Shortage Contingency Planning	Section 8.8	**Section 8.8**
10632(a)(4)	Identify mandatory prohibitions against specific water use practices during water shortages.	Water Shortage Contingency Planning	Section 8.2	**Section 8.2**

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location *(Optional Column for Agency Use)*
10632(a)(5)	Specify consumption reduction methods in the most restrictive stages.	Water Shortage Contingency Planning	Section 8.4	**Section 8.4**
10632(a)(6)	Indicated penalties or charges for excessive use, where applicable.	Water Shortage Contingency Planning	Section 8.3	**Section 8.3**
10632(a)(7)	Provide an analysis of the impacts of each of the actions and conditions in the water shortage contingency analysis on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts.	Water Shortage Contingency Planning	Section 8.6	**Section 8.6**
10632(a)(8)	Provide a draft water shortage contingency resolution or ordinance.	Water Shortage Contingency Planning	Section 8.7	**Section 8.7**
10632(a)(9)	Indicate a mechanism for determining actual reductions in water use pursuant to the water shortage contingency analysis.	Water Shortage Contingency Planning	Section 8.5	**Section 8.5**
10631(f)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Sections 9.2 and 9.3	**Section 9.1**
10631(f)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Sections 9.1 and 9.3	**Section 9.1**
10631(i)	CUWCC members may submit their 2013-2014 CUWCC BMP annual reports in lieu of, or in addition to, describing the DMM implementation in their UWMPs. This option is only allowable if the supplier has been found to be in full compliance with the CUWCC MOU.	Demand Management Measures	Section 9.5	**Section 9.4**
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Plan Adoption, Submittal, and Implementation	Section 10.3	**Section 3.3**
10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.	Plan Adoption, Submittal, and Implementation	Section 10.2.1	**Section 3.3**
10621(d)	Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.	Plan Adoption, Submittal, and Implementation	Sections 10.3.1 and 10.4	**Section 3.3**
10635(b)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which	Plan Adoption, Submittal, and Implementation	Section 10.4.4	**Appendix I**

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location *(Optional Column for Agency Use)*
	it provides water, no later than 60 days after the submission of the plan to DWR.			
10642	Provide supporting documentation that the urban water supplier made the plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan.	Plan Adoption, Submittal, and Implementation	Sections 10.2.2, 10.3, and 10.5	
10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Sections 10.2.1	**Section 3.3**
10642	Provide supporting documentation that the plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.1	
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4.3	
10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4.4	
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2	
10645	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5	

APPENDIX B. 60-DAY NOTIFICATION LETTERS

VICTORVILLE
WATER DISTRICT

1-866-955-4426
FAX 760.269-0024
www.victorvilleca.gov

14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

April 4, 2016

Kirby Brill, General Manager
Mojave Water Agency
13846 Conference Center Drive,
Apple Valley, CA 92307

Subject: **Notice of Preparation of the 2015 Victorville Water District Urban Water Management Plan (UWMP)**

Dear Mr. Brill:

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

This letter is intended to notify your agency that Victorville Water District is in the process of preparing the 2015 UWMP and expects to have a draft available for review June 6th, 2016. Comments can be submitted prior to or at the public hearing for the 2015 UWMP which will take place on June 21, 2016, at 7:00 p.m. at the Victorville City Council Chambers, 14343 Civic Drive, Victorville, CA 92392.

Until that time, if you have any questions or comments regarding the District's UWMP please contact Donna McCormick at:

Donna McCormick
Conservation Supervisor
Conservation Division
dmccormick@victorvilleca.gov
(760) 955-2016

Sincerely,

Donna McCormick

Donna McCormick
Conservation Supervisor

cc: Doug Robertson, City Manager
Doug Mathews, Public Works & Water Division

VICTORVILLE
WATER DISTRICT

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14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

April 4, 2016

Logan Olds, General Manager
Victor Valley Wastewater Reclamation Authority
15776 Main Street, Suite 3
Hesperia, Ca 92345

Subject: **Notice of Preparation of the 2015 Victorville Water District Urban Water Management Plan (UWMP)**

Dear Mr. Olds:

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

This letter is intended to notify your agency that Victorville Water District is in the process of preparing the 2015 UWMP and expects to have a draft available for review June 6th, 2016. Comments can be submitted prior to or at the public hearing for the 2015 UWMP which will take place on June 21, 2016, at 7:00 p.m. at the Victorville City Council Chambers, 14343 Civic Drive, Victorville, CA 92392.

Until that time, if you have any questions or comments regarding the District's UWMP please contact Donna McCormick at:

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Conservation Supervisor
Conservation Division
dmccormick@victorvilleca.gov
(760) 955-2016

Sincerely,

Donna McCormick

Donna McCormick
Conservation Supervisor

cc: Doug Robertson, City Manager
Doug Mathews, Public Works & Water Division

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WATER DISTRICT

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14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

April 4, 2016

David Wert, Public Information
Officer County of San Bernardino
County Administrative Office 385 N.
Arrowhead Ave, San Bernardino, CA
92415-0120

Subject: **Notice of Preparation of the 2015 Victorville Water District Urban Water Management Plan (UWMP)**

Dear Mr. Wert:

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

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Conservation Division
dmccormick@victorvilleca.gov
(760) 955-2016

Sincerely,

Donna McCormick

Donna McCormick
Conservation Supervisor

cc: Doug Robertson, City Manager
Doug Mathews, Public Works & Water Division

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WATER DISTRICT

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14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

April 4, 2016

Frank W. Robinson, Town Manager
Town of Apple Valley
14955 Dale Evans Parkway
Apple Valley, CA 92307

Subject: **Notice of Preparation of the 2015 Victorville Water District Urban Water Management Plan (UWMP)**

Dear Mr. Robinson:

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

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Conservation Supervisor
Conservation Division
dmccormick@victorvilleca.gov
(760) 955-2016

Sincerely,

Donna McCormick

Donna McCormick
Conservation Supervisor

cc: Doug Robertson, City Manager
Doug Mathews, Public Works & Water Division

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WATER DISTRICT

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14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

April 4, 2016

Cindy Herrera, City Manager
Master City Clerk,
City of Adelanto
11600 Air Expressway
Adelanto, CA 92301

Subject: **Notice of Preparation of the 2015 Victorville Water District Urban Water Management Plan (UWMP)**

Dear Ms. Herrera:

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

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Donna McCormick
Conservation Supervisor
Conservation Division
dmccormick@victorvilleca.gov
(760) 955-2016

Sincerely,

Donna McCormick

Donna McCormick
Conservation Supervisor

cc: Doug Robertson, City Manager
Doug Mathews, Public Works & Water Division

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WATER DISTRICT

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14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

April 4, 2016

Gregory C. Devereaux,
Chief Executive Officer
County of San Bernardino County
Administrative Office 385 N. Arrowhead Ave.
San Bernardino, CA 92415-0120

Subject: **Notice of Preparation of the 2015 Victorville Water District Urban Water Management Plan (UWMP)**

Dear Mr Devereaux:

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

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Conservation Supervisor
Conservation Division
dmccormick@victorvilleca.gov
(760) 955-2016

Sincerely,

Donna McCormick

Donna McCormick
Conservation Supervisor

cc: Doug Robertson, City Manager
Doug Mathews, Public Works & Water Division

VICTORVILLE
WATER DISTRICT

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14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

April 4, 2016

Nils Bentsen, City Manager
City of Hesperia
9700 Seventh Avenue
Hesperia, CA 92345

Subject: **Notice of Preparation of the 2015 Victorville Water District Urban Water Management Plan (UWMP)**

Dear Mr. Bentsen:

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

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Conservation Supervisor
Conservation Division
dmccormick@victorvilleca.gov
(760) 955-2016

Sincerely,

Donna McCormick

Donna McCormick
Conservation Supervisor

cc: Doug Robertson, City Manager
Doug Mathews, Public Works & Water Division

VICTORVILLE
WATER DISTRICT

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14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

April 4, 2016

Curt Mitchell, City Manager
City of Barstow
220 East Mountain View Street, Suite A
Barstow, CA 92311

Subject: **Notice of Preparation of the 2015 Victorville Water District Urban Water Management Plan (UWMP)**

Dear Mr. Mitchell:

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

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Conservation Supervisor
Conservation Division
dmccormick@victorvilleca.gov
(760) 955-2016

Sincerely,

Donna McCormick

Donna McCormick
Conservation Supervisor

cc: Doug Robertson, City Manager
Doug Mathews, Public Works & Water Division

APPENDIX C. PUBLIC HEARING NOTICES

CITY OF
VICTORVILLE

(760) 955-5035
FAX (760) 269-0014
E-mail: vville@ci.victorville.ca.us

14343 Civic Drive
P.O. Box 5001
Victorville, CA 92393-5001

June 1, 2016

COUNTY LEGAL REPORTER
VALLEYWIDE NEWSPAPER
Victorville, CA 92392

Re: REQUEST FOR LEGAL PUBLICATION: CC 16-28

Please publish the attached legal advertisement(s) as indicated below. We will require proof of publication, at which time you may bill us for the publication charges.

NOTICE OF PUBLIC HEARING: Notice of Public Hearing – 2015 UWMP

FREQUENCY AND DATES: Twice – Fridays – June 3, 2016 and June 10, 2016

TYPE OF ADVERTISEMENT: Regular columnar advertisement

Please advise this office if, for some reason, you will be unable to publish as requested above.

Thank you for your assistance.

Sincerely,

Heidi Roche, Deputy for

Carolee Bates
City Clerk

CB/hr

Attachments

NOTICE OF PUBLIC HEARING

2015 URBAN WATER MANAGEMENT PLAN

Pursuant to California Water Code Section 10640, etc., a public hearing will be held to receive public comments on the 2015 Urban Water Management Plan (UWMP) for the Victorville Water District.

The Victorville Water District will conduct a public hearing on June 21, 2016 at 6:00 p.m. in the Victorville City Council Chambers, located at 14343 Civic Drive, Victorville, California to receive public comments relative to the 2015 UWMP. The CA Water Code requires all urban water suppliers within the State serving more than 3,000 connections to prepare an Urban Water Management Plan and update them every five years.

A copy of the 2015 UWMP is available during normal business hours at the Victorville Water District, Water Conservation Office, located in the Community Services Department on the second floor of Victorville City Hall, 14343 Civic Drive, Victorville, CA. A copy of the plan may also be accessed on the City of Victorville website: www.ci.victorville.ca.us

For questions regarding this document, please call 760-955-4426. Written comments are requested by the close of business on June 20, 2016.

Send written comments to:

Victorville Water District
Attn: 2015 Urban Water Management Plan
P.O. Box 5001
Victorville, CA 92393-5001

Dated: June 3, 2016

June 10, 2016

Heidi Roche, Deputy for

Carolee Bates, City Clerk

APPENDIX D. 2015 UWMP ADOPTION RESOLUTION

APPENDIX E. MOJAVE WATER AGENCY POPULATION PROJECTION

Mojave Water Agency Population Forecast

Mojave Water Agency

December 2015

BEACON ECONOMICS

Mojave Water Agency Population Forecast

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Mojave Water Agency

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Executive Summary

Having a good sense of population growth trends is a crucial part of urban development planning, especially when it comes to water. Food and other resources can be readily imported, but developing and managing water infrastructure and resources is best done over the long run with a keen eye on the future. Population forecasting then becomes an integral part of that planning process, and to that end this report has been commissioned by the Mojave Water Agency (MWA) in order to get a better sense of future population growth, as well as the magnitude of that growth.

San Bernardino County and the broader Inland Empire region are anticipated to see more population growth in the near term than the coastal regions of Southern California, and in the longer run, Beacon Economics expects the MWA service area to see even stronger population growth. Affordability is the name of the game here. As housing has become more unaffordable in the coastal counties of Los Angeles, Orange, and San Diego, the Inland Empire has been a destination of choice for many residents willing to commute to the coast.

This has boosted economic activity within the Inland Empire as these commuters spend their wages locally, creating a positive feedback effect which drives further growth and attracts more residents to the area. The MWA service area is, in terms of housing prices, even more affordable than other parts of San Bernardino County, and we expect these dynamics to help drive future population growth above and beyond growth in the County overall.

This forecast uses historical trends primarily to drive future results. Areas that have grown the fastest in the past are projected to see population growth rates above and beyond what is projected for the MWA service area as a whole. Similarly, areas that have grown slower in the past are projected to see slower population growth over the life of the forecast. The forecasts for the incorporated cities have a large influence on the forecasts for the unincorporated regions of the MWA service area (which will be discussed in the subsequent section). Some of the incorporated areas worthy of mention include:

- Victorville: This city experienced one of the strongest average annual population growth rates from 1990 to 2010 – and the 2011 to 2015 estimates indicate similar relative growth. The current forecast calls for 2.0% average annual population growth, slightly higher than the 1.8% for the MWA service area overall.

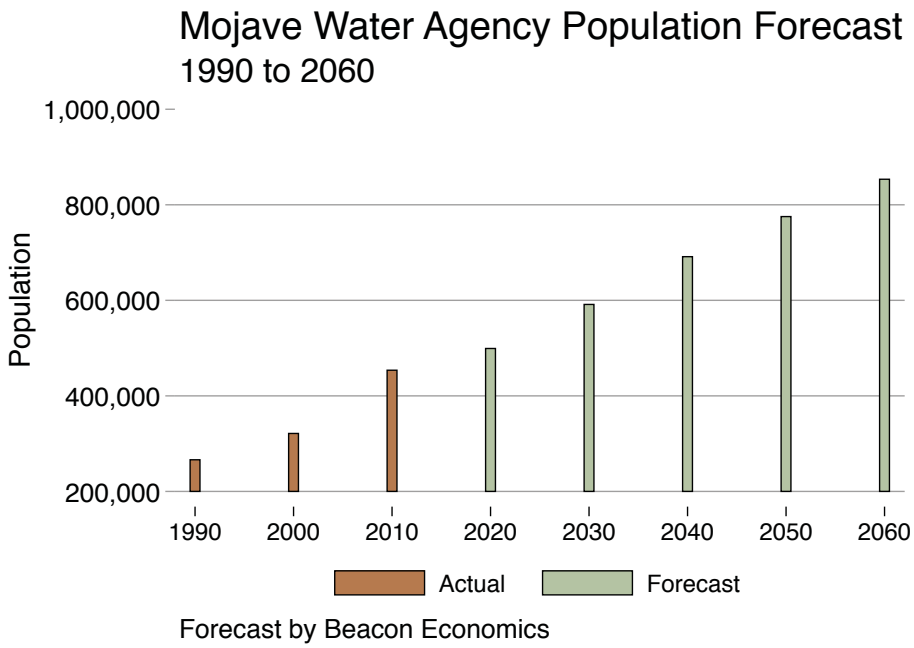
- Barstow: Out of the incorporated cities Barstow experienced some of the slowest growth from 1990 to 2010 – and the 2011 to 2015 estimates indicate the same trend. As such, this city is expected to be one of the slower growing over the life of the forecast.

This report is divided into three sections. In the first section we provide a broad overview of the methodology used to arrive at the current forecast. The affordability dynamics that have helped drive growth in the broader Inland Empire region are examined in the second part of this report, and in the third part, the similar dynamics are examined for the MWA service area specifically. The detailed forecasts of the MWA service area and it's various regions can be found in the appendices at the end of the report.

Forecast Methodology

Beacon Economics forecast of the MWA service area and its incorporated cities, sub areas, and water purveyors is based on historic correlations with population trends in their surrounding area. A long run driver of future population in the surrounding area was used to forecast population growth out to the year 2060. In the case of the incorporated portions of the MWA service area, historic population trends were correlated with population growth in San Bernardino County overall. In the case of the sub areas and water purveyors in unincorporated regions of the MWA service area, the historical population data was correlated with the nearest incorporated city.

Historical data used in the forecast of the incorporated cities were obtained from the California Department of Finance (DOF), which makes estimates available from 1970 forward on an annual basis. With this data in hand, an econometric time series model was created to capture the historical correlations with countywide population growth. Future population growth for the incorporated cities of the MWA service area was then estimated using these historic correlations and a long run driver of countywide population growth.



Population projections for San Bernardino County from the DOF were used as the long run driver for the forecasts of incorporated cities. The DOF uses a baseline cohort-component method to produce their population projections out to the calendar year 2060. This method traces people born in a given year throughout their lives. As each year passes, cohorts change due to mortality and migration assumptions. Applying fertility assumptions to women of childbearing age forms new cohorts.[1]

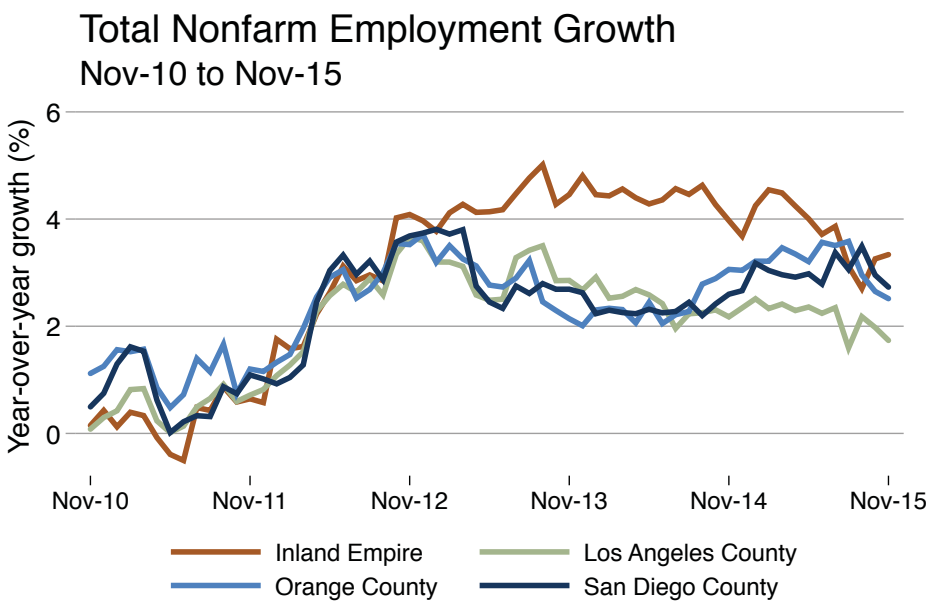
[1]For a more detailed description of the DOF methodology see State of California, Department of Finance, State and County Population Projections by Race/Ethnicity, Sex, and Age 2010-2060, Sacramento, California, December 2014.

Several sub areas and water purveyors in the MWA service area are closely associated with the boundaries of one or more incorporated cities. In these cases the forecasted population growth rates from the incorporated cities were applied to historical population counts for these areas to produce a forecast of future population. For sub areas or water purveyors in an unincorporated portion of the MWA service area, the historical correlations between the respective area and the nearest incorporated city were used to project future population growth. Due to the long run nature of this forecast, DOF countywide population estimates were the primary driver of the estimates for future population in the MWA service area. Other factors, such as building permits or planned developments, were not used as they represent a very short term outlook and are not a driver of population growth in of themselves. A forecast of long run population growth carries with it the assumption that there will be sufficient residential development to accommodate future population growth.

It should be noted that long run forecasts of any nature have a greater margin of error the longer the forecast time frame. Forecasts of one to two years can be quite accurate, whereas forecasts of five to ten years into the future are less likely to be as accurate. Several factors, most notably business cycle effects, can have strong impacts on population or other socioeconomic indicators, over the long run. Forecasts are a ultimately a "best guess" given current data and assumptions, and forecasts far into the future, such as a ten years plus, can be subject to very large forecast errors.

San Bernardino County / Inland Empire Economic and Demographic Trends

In order to put population growth of the Mojave Water Agency regions in proper context, it is important to consider the broader San Bernardino and Inland Empire economy. The various regions of California experience population and economic growth differently, which in turn impacts sub-regional performance over time. The inland regions of California, for example, are expected to grow quite differently than coastal areas, and San Bernardino is no exception to this.



Source: California Employment Development Department

Historically, economic growth has been concentrated in the coastal regions of California, particularly in Southern California. This has resulted in the coastal regions of Los Angeles, Orange, and San Diego counties becoming the major job centers in Southern California. With economic and employment growth concentrated along the coast, real estate prices, on both the residential and commercial sides of the market, remain higher in coastal counties. This has in turn resulted in inland areas having a considerable

affordability advantage, which has and will continue to attract residents and businesses to regions like the Inland Empire.

In recent years, we have already begun to see the Inland Empire region begin to separate itself from the major job centers along the coast. Total nonfarm employment growth in the Inland Empire has drastically outpaced its coastal neighbors. Since the beginning of 2012, the Inland Empire has seen year-over-year nonfarm job growth average 3.8%, noticeably higher than Los Angeles County (2.5%), Orange County (2.8%), and San Diego County (2.7%).

California Taxable Sales Growth (%)

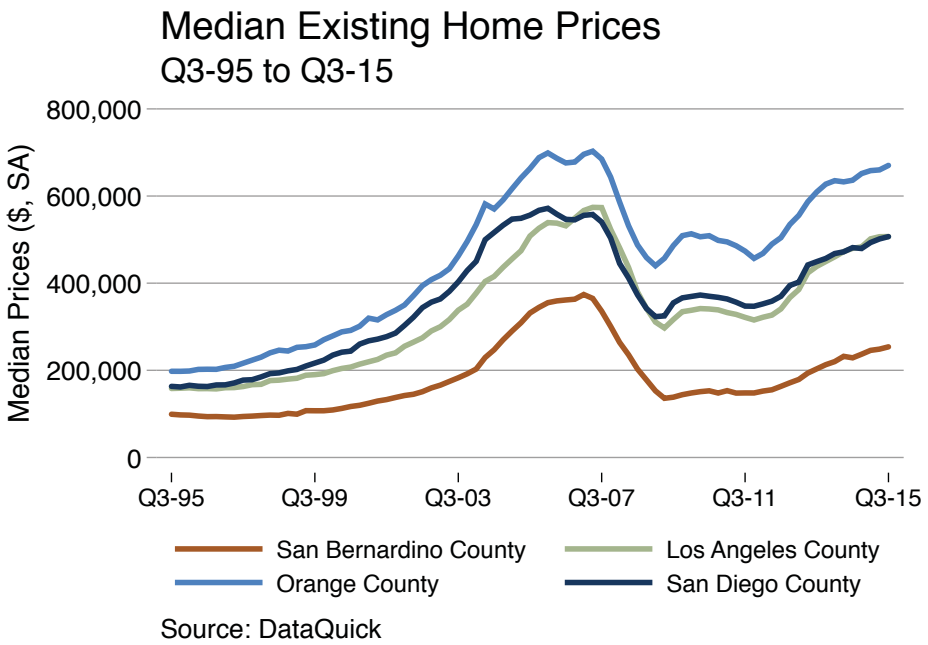
County	2009 to 2014	2015 YTD
Los Angeles	31.0	4.0
Orange	31.1	2.3
San Bernardino	38.7	7.6
San Diego	32.6	3.6

Source: California Board of Equalization

Many workers in the coastal job centers choose to take advantage of more affordable housing in the Inland Empire region. According to the American Community Survey, 29.1% of workers age 16 and over in San Bernardino County in 2014 commuted outside of the County for work.

These commuters spend most of their wages locally, which in turn fosters "internal" driven economic growth. Indeed, consumer and business spending in San Bernardino County, as measured by taxable sales, has grown faster in recent years compared to its coastal neighbors. From 2009 to 2014 taxable sales in San Bernardino grew by 38.7% over the five-year period, faster than Los Angeles (31.0%), Orange (31.1%), and San Diego (32.6%) counties. During the first three quarters of 2015, growth has accelerated as taxable sales in San Bernardino County were 7.6% higher than the same year-to-date period the prior year, vastly outpacing the coastal counties.

Home prices in San Bernardino County in particular present a stark example of just how affordable housing is in the County, relative to the coastal regions. As of the third quarter of 2015, the median price for an existing home in San Bernardino County stood at $254,000 on a seasonally adjusted basis. In contrast, median prices in Los Angeles and San Diego counties were both $507,000, double the median price in San Bernardino County. The price differential was even greater in Orange County where the median price was $670,000 in the third quarter.



On the commercial side of the market we see very similar affordability dynamics at work. For both office and retail properties, the average rent per square foot in the Inland Empire is more than 25% lower compared to the coastal counties. So not only does the

Inland empire region attract new residents through housing affordability, but businesses have an incentive to start up or relocate to the region as well.

The affordability advantage of the Inland Empire region, coupled with the strong post-recession growth of the region's economy, has succeeded in drawing residents to the region, even more than the coastal counties of Southern California. In fact, net migration to the Inland Empire has been greater than the coastal regions in both 2014 and 2015. In 2014 there were 14,256 more residents that moved into the Inland Empire than those that left the Inland Empire, and net migration was 9,418 in 2015. In contrast, Los Angeles County experienced negative net migration for both years (-4,183 in 2014; -3,651 in 2015), and both San Diego County (13,818 in 2014; 2,977 in 2015) and Orange County (6,697 in 2014; 5,128 in 2015) had lower net migration in absolute terms.

California Commercial Rents ($/Sq. Ft.)

Region	Office	Retail
Los Angeles County	35.12	31.24
Inland Empire	21.79	21.48
Orange County	30.07	32.25
San Diego County	30.61	30.13

Source: REIS

The higher net migration in the Inland Empire has resulted in faster rates of population growth in recent years compared to these coastal counties. The latest data from the California Department of Finance shows that the Inland Empire population increased 1% from July 2014 to July 2015, which had faster population growth than Los Angeles County (0.7%), Orange County (0.8%), and San Diego County (0.9%).

Looking forward, Beacon Economics expects these affordability advantages to continue to promote economic and population growth in the Inland Empire region. The Inland Empire is home to many commuters working in the coastal job centers, but they spend much of their wages locally. This in turn generates positive feedback within the region's economy and helps to promote further business and employment growth. Compared to the coastal regions of Southern California, the Inland Empire is expected to experience higher growth rates for the foreseeable future due to its affordability advantage, much like we have seen in the last few years.

Mojave Water Agency Population Forecast

The service area of the MWA has vast potential for future growth over the next several decades. In much the same way that San Bernardino County and the broader Inland Empire region hold an affordability advantage over coastal counties, making the area more attractive to residents and businesses, the MWA area holds an affordability advantage within San Bernardino County. This will allow the population within the MWA service area to increase at a faster rate than the County overall for the life of this forecast.

MWA Incorporated City Median Home Prices

City	Oct-2015 ($)	YoY (%)
Adelanto	156,500	1.0
Apple Valley	189,000	-0.8
Barstow	76,750	-4.1
Hesperia	220,000	16.4
Victorville	185,000	5.0
Yucca Valley	142,500	10.5
San Bernardino County	260,000	7.0

Source: DataQuick

Looking at median home prices in the incorporated parts of the MWA service area provides the clearest example of this affordability advantage. As of October 2015, all six of the incorporated cities within the MWA service areas have median home prices that are lower than the countywide median of $260,000. Hespe-

ria comes the closest with a median price of $220,000, and Barstow is on the lower end of the spectrum with a median price of $76,750.

The lower home prices in the incorporated cities within the MWA service areas indicate that demand for housing is currently not as strong as in other parts of the county, but as population grows in other cities this will drive up prices in those parts and the MWA areas will become that much more attractive. This is the same dynamic that has been at work for the larger Inland Empire region as coastal parts of Southern California become increasingly unaffordable.

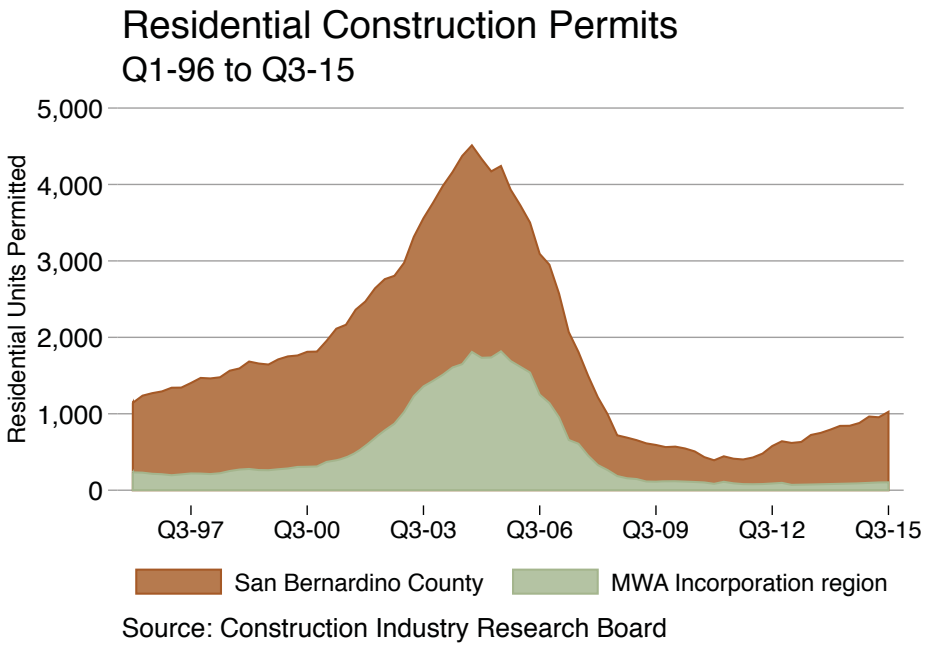
MWA IncorporatedTaxable Sales Growth (%)

City	2009 to 2014	2015 YTD
Adelanto	40.1	-17.4
Apple Valley	15.8	-0.1
Barstow	31.2	-5.5
Hesperia	54.0	-1.1
Victorville	28.0	3.6
Yucca Valley	6.2	5.5
San Bernardino County	38.7	7.6

Source: California Board of Equalization

Overall economic growth in the incorporated cities of the MWA service area, as measured by taxable sales, indicates that these cities have yet to transition towards the growth centers of San Bernardino County. Five-year growth trends show that most of the incorporated cities grew slower than the County overall. During the first three quarters of 2015, all six incorporated cities witnessed lower growth than the County overall compared to the same year-to-date period the year prior. In the coming years, we expect this trend to reverse as more residents choose to live in the more affordable areas within the MWA service area and these cities, as well as the unincorporated parts of the MWA area, and taxable sales growth in these regions overtakes the countywide average growth.

Residential construction is another area where the MWA service areas has lagged behind the rest of the County, however we expect this trend to reverse as well in the coming years. Since 2012, the incorporated region of the MWA service area has seen slower growth in permitting for new residential structures on an annual basis. For the first three quarters of 2015, however, residential permitting growth was slightly stronger in the MWA area. We should see more of that in the years to come as affordability continues to attract more residents and fuel population growth.



Summary

The MWA service area is anticipated to experience population growth rates over the next several decades that are stronger than those anticipated for San Bernardino County overall. The broader Inland Empire region has seen strong economic and employment growth these last few years, and much of that has been due to its affordability advantage it holds over coastal counties of Southern California.

In similar fashion, the MWA service area is expected to see this kind of growth as well, relative to other parts of the Inland Empire, due to its affordability advantage relative to the broader region. The current data available for the incorporated cities of the MWA service area shows that the region has not yet transitioned to being one of the growth centers for San Bernardino County, but given its clear advantage in terms of home prices, Beacon Economics expects economic and population growth to pick up in the years to come and over the life of this forecast.

Appendix 1: MWA Incorporated City Forecasts

Year	Adelanto	Apple Valley	Barstow	Hesperia	Victorville	Yucca Valley
1990	6,751	46,159	24,260	50,705	50,579	16,442
2000	17,895	54,240	22,699	62,740	64,165	16,855
2010	31,760	69,144	22,757	90,170	115,913	20,656
2011	31,609	69,484	23,010	90,539	117,239	20,727
2012	30,918	69,769	23,161	90,739	118,933	20,783
2013	31,178	70,261	23,340	91,221	120,388	20,922
2014	32,472	70,743	23,517	91,541	120,882	20,992
2015	33,080	71,453	23,661	92,302	121,568	21,317
2020	35,476	75,731	24,239	99,716	132,153	22,211
2025	38,453	81,566	24,858	108,659	147,364	23,395
2030	42,221	87,767	25,475	118,976	163,486	24,720
2035	46,311	93,862	26,059	129,739	179,396	26,028
2040	50,182	99,189	26,604	139,849	194,677	27,190
2045	53,560	103,816	27,122	148,888	209,137	28,189
2050	56,555	108,352	27,648	157,422	222,675	29,123
2055	59,573	112,685	28,163	165,674	235,240	30,012
2060	62,482	116,772	28,674	173,574	246,817	30,846

Forecast by Beacon Economics

Appendix 2: MWA Sub Area Forecasts

Year	Alto	Alto Transition Zone	Baja	Centro	Este	Morongo	Oeste
1990	165,100	17,468	5,782	35,046	5,167	31,001	5,501
2000	222,012	14,636	5,035	33,392	5,822	31,375	7,838
2010	334,862	23,366	4,729	34,167	7,370	38,177	10,595
2011	337,146	23,305	4,735	34,546	7,422	38,297	10,727
2012	339,478	22,909	4,739	34,774	7,454	38,391	10,807
2013	342,261	23,113	4,746	35,043	7,512	38,625	10,955
2014	343,913	23,957	4,753	35,308	7,568	38,744	11,098
2015	346,665	24,364	4,762	35,524	7,646	39,291	11,299
2020	371,356	26,132	4,812	36,393	8,073	40,795	12,406
2025	407,344	28,465	4,872	37,322	8,615	42,783	13,864
2030	449,520	31,413	4,933	38,248	9,196	44,995	15,504
2035	493,686	34,616	4,989	39,125	9,753	47,168	17,152
2040	535,002	37,663	5,036	39,943	10,244	49,092	18,667
2045	571,913	40,342	5,076	40,720	10,672	50,739	20,033
2050	607,027	42,744	5,112	41,510	11,086	52,273	21,398
2055	641,206	45,158	5,146	42,284	11,479	53,731	22,727
2060	674,042	47,489	5,177	43,050	11,851	55,094	24,018

Forecast by Beacon Economics

Appendix 3: MWA Water Purveyor Forecasts

Year	Apple Valley Ranchos Water Company	Bighorn-Desert View Water Agency	City of Adelanto Water District	County Service Area 64	County Service Area 70 J	Golden State Water Company - Barstow System
1990	37,228	1,200	6,751	5,353	3,328	29,905
2000	45,207	2,892	17,895	7,595	5,652	29,337
2010	57,847	3,839	31,760	9,075	9,467	30,173
2011	58,132	3,891	31,609	9,163	9,609	30,479
2012	58,370	3,922	30,918	9,216	9,695	30,662
2013	58,781	3,981	31,178	9,314	9,855	30,878
2014	59,185	4,037	32,472	9,408	10,009	31,090
2015	59,779	4,116	33,080	9,541	10,227	31,261
2020	63,357	4,554	35,476	10,267	11,433	31,951
2025	68,240	5,135	38,453	11,205	13,049	32,684
2030	73,427	5,794	42,221	12,236	14,906	33,412
2035	78,526	6,463	46,311	13,246	16,811	34,096
2040	82,983	7,082	50,182	14,156	18,597	34,732
2045	86,854	7,644	53,560	14,961	20,233	35,333
2050	90,649	8,209	56,555	15,753	21,891	35,940
2055	94,274	8,763	59,573	16,514	23,528	36,533
2060	97,693	9,303	62,482	17,243	25,135	37,116

Forecast by Beacon Economics

Year	Helendale Community Services District	Hesperia Water District	Hi-Desert Water District	Joshua Basin County Water District	PPHC East	PPHC West	Victorville Water District
1990	3,273	50,976	19,060	7,515	4,766	4,922	54,539
2000	4,704	62,592	19,198	8,062	7,004	6,766	69,095
2010	6,180	89,742	23,760	9,534	9,877	9,546	122,051
2011	6,247	90,110	23,842	9,590	10,016	9,666	122,551
2012	6,287	90,308	23,906	9,624	10,098	9,743	122,821
2013	6,362	90,788	24,065	9,687	10,253	9,881	123,474
2014	6,434	91,106	24,147	9,746	10,401	10,015	123,907
2015	6,535	91,864	24,520	9,830	10,611	10,203	124,937
2020	7,090	99,242	25,548	10,287	11,767	11,242	139,151
2025	7,812	108,143	26,911	10,860	13,306	12,614	155,167
2030	8,613	118,411	28,435	11,469	15,056	14,163	172,144
2035	9,407	129,123	29,939	12,047	16,836	15,725	188,896
2040	10,127	139,185	31,276	12,551	18,489	17,166	204,986
2045	10,769	148,181	32,425	12,986	19,993	18,469	220,211
2050	11,406	156,675	33,499	13,406	21,507	19,775	234,466
2055	12,020	164,888	34,522	13,801	22,993	21,050	247,697
2060	12,612	172,750	35,481	14,172	24,445	22,291	259,887

Forecast by Beacon Economics

About Beacon Economics

Beacon Economics, LLC is a leading provider of economic research, forecasting, industry analysis, and data services. By delivering independent, rigorous analysis we give our clients the knowledge they need to make the right strategic decisions about investment, growth, revenue, and policy. Learn more at **www.BeaconEcon.com**.

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- EB-5 Economic analysis
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- Expert Testimony

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APPENDIX F. MWA REGIONAL RECHARGE AND RECOVERY AGREEMENT

WATER SUPPLY CONNECTION AGREEMENT
REGIONAL RECHARGE AND RECOVERY PROJECT (R^3)

AGREEMENT made this 19th day of April, 2013, between the MOJAVE WATER AGENCY ("Agency") and the CITY OF VICTORVILLE ("Customer").

WITNESSETH:

IT IS HEREBY AGREED, in consideration of the mutual covenants of the parties, as follows:

1. Definitions. When used in this Agreement, the following terms shall have the meanings hereinafter set forth:

a. "Agency" as used herein shall mean Mojave Water Agency.

b. "Agency Law" shall mean the Mojave Water Agency Law, Chapter 97 of the Water Code Appendix, Statutes of 1959 of the State of California, as amended and as the same may be hereafter amended, supplemented re-enacted, or codified.

c. "Agreement" as used herein shall mean this agreement for a water connection between Agency and Customer.

d. "Contract" shall mean the contract entitled "Water supply Contract between the State of California Department of Water Resources and the Mojave Water Agency," dated June 22, 1963 as heretofore or hereafter amended.

e. "Customer" as used herein shall mean the City of Victorville.

f. "Connection Improvements" shall mean those facilities necessary to connect the Customer's water system to Turnouts 3 and 6 of the Regional Recharge and Recovery Project, as depicted and described in Exhibits One, Two, Three, Four and Five.

g. "General Manager" shall mean the General Manager of the Mojave Water Agency.

h. "Judgment" shall mean the Judgment in City of Barstow, et al. v. City of Adelanto, et al., Superior Court, Riverside County, Case No. 208568.

i. "Ordinance No. 9" as used herein shall mean the Ordinance of the Mojave Water Agency Establishing the Rules and Regulations for the Sale and Delivery of State Project Water.

j. "Points of Connection" as used herein shall mean the outlet flange of the magnetic flow meter shown as item 4 on Exhibit Five, Details 1 and 2.

k. "Potable Water" as used herein shall mean water from any source which has been investigated by the California Department of Public Health, and which has been approved for human consumption.

l. "R^3 Project" as used herein shall mean the Mojave Water Agency Regional Recharge and Recovery Project, including the Connection Improvements as described herein.

m. "State Water Project" shall mean water made available to the Agency by the State of California pursuant to the terms of the Contract.

n. "Year" means a calendar year.

2. General Purpose and Requirements.

2.1 Customer Connection. The Connection Improvements shall be constructed and paid for by the Agency for use solely for the Customer. Connections will be provided at Turnout 3 at Victorville Water District's Plant 10 on Pinon Avenue, as shown on Exhibits One and Three, and at Turnout 6 on Mesa View Drive, as shown on Exhibits Two and Four ("Points of Connection").

2.2 Environmental Requirements. The Agency is a public agency and is aware of the requirements of the California Environmental Quality Act ("CEQA") and its implementing guidelines, and will comply with the CEQA and its implementing guidelines.

3. Financial Considerations.

3.1 All costs for design, construction and startup of the Connection Improvements will be paid in full by the Agency and there will be no cost to the Customer.

4. Facility Ownership.

4.1 Facilities Included; Ownership by Agency and Customer. The Connection Improvements shall include the facilities for delivery of potable water from the Agency's R^3 Project to the Points of Connection described in paragraph 2.1 herein.

The Agency will own, operate and maintain all portions of the Connection Improvements up to the Points of Connection, as defined herein, including the main turnout structure in its entirety, and will have full un-restricted access to these facilities. The Customer will own, operate and maintain all piping, equipment and ancillary facilities related to the turnout on the Customer's side of the Points of Connection.

5. Design Considerations.

5.1 Design and Operating Criteria. The Agency's facilities have been designed and planned in close coordination with the Customer's staff to meet Customer's water service requirements to the maximum extent feasible and to allow for maximum flexibility for use in different modes of operation. The Agency's facilities have been designed to deliver potable water to the Customer's Points of Connection at a reasonably constant minimum water pressure of approximately 40 psi. All deliveries to the Customer will meet the applicable standards of the State of California Department of Public Health Drinking Water Services Division.

5.2 Measurement. All water furnished pursuant to this Agreement shall be measured by the Agency at the Points of Connection.

5.3 Back-Flow. Back-flow prevention is not required by the Department of Public Health when connecting two potable water systems with valid domestic water supply permits, however, the Connection Improvements have been designed and constructed to provide a "check feature" at the Cla-Val electronic control valve (Exhibit Five, Details 1 and 2, Item 6) on the Customer's side of the Points of Connection. The Customer shall maintain the control valve such that the check feature remains operable during the life of this Agreement.

5.4 Flow Control Devices and Delivery Rates. The Connection Improvements include an electronic control valve to allow the Customer to control the rate of flow at the Points of Connection. Deliveries of R^3 Project water will be made at flow rates as determined by the Customer, but should not exceed the nominal flow rate shown on Exhibit Six, Schedule of Delivery Capacities for Project Participants, unless approved in advance by the Agency's Director of Operations.

5.5 Pressure Surges (Water Hammer). The R^3 Project has been designed to withstand the effects of pressure surge, however, the Customer shall make every effort to minimize sudden fluctuations in flow rates at the Points of Connection.

6. Operation and Maintenance.

6.1 Maintenance of Connection Improvements. Maintenance of the Connection Improvements will be as described in paragraph 4.1 herein.

6.2 Limits on Agency Responsibility. The Agency has no responsibility in the maintenance and operation of Customer's water system beyond the Points of

Connection. Customer shall be responsible and liable for its own water system. Customer agrees to accept and consent to such conditions of pressure and service as may from time to time exist under current operating practices prevailing within the Agency, at the location of the Points of Connection, and Customer agrees to hold Agency harmless from any and all damages caused by or arising out of low, high, or fluctuating pressures or interruption of service which are beyond Agency's reasonable control. Delivery of water pursuant to this Agreement, except as may be specifically provided herein, shall be in accordance with the rules, regulations and charges of the Agency as they may from time to time exist and apply to all the customers of the Agency. This Agreement and the rights and obligations of the parties hereunder shall be subject to the Agency Law as it now exists and as it may be hereafter amended or codified by the Legislature of the State of California.

6.3 Delivery of Water. All facilities in the Connection Improvements up until the Points of Connection necessary to accommodate water delivery are the responsibility of the Agency and shall be operated by Agency employees only.

6.4 Limitations on Service. Due to the nature of the Agency's facilities and the potential modes of service required, the Agency cannot guarantee any specific level of pressure; however, the R^3 Project has been designed to deliver potable water to the Customer's Points of Connection at a reasonably constant minimum water pressure of approximately 40 psi. There are no limits regarding time-of-use, either by time of year or time of day.

6.5 Coordination of Water Deliveries. Water orders must be placed with the Agency Director of Operations a minimum of one week in advance of actual delivery. Delivery of water shall continue until the Customer requests the Agency to terminate the flow, and gives the Agency a minimum of one hour in which to do so.

7. Agreement Administration

7.1 General Terms of Service. All water deliveries made pursuant to Ordinance No. 9 shall be subject to all of the terms and conditions of the Agency's Contract. **CUSTOMER SHOULD USE CAUTION IN THE ISSUANCE OF CAN OR WILL SERVE LETTERS FOR ANY LAND USE ENTITLEMENT BASED UPON STATE WATER PROJECT WATER.**

7.2 Water Flow Measurement and Meter Accuracy. All determinations relative to the measuring of water shall be made by the Agency and, upon request by the Customer, the accuracy of such measurement shall be investigated by the Agency in the manner set forth in Ordinance No. 9. The Customer has a right to audit the Agency's measurement determinations. Any error appearing therein will be adjusted pursuant to conditions set forth in Ordinance No. 9. In the event of a disagreement, the Agency and Customer agree to submit the Agency's accuracy tests to a mutually agreed upon third party and to abide by its determination. Customer will ensure that all end-users of water provided under this Agreement are properly metered.

7.3 Water Delivery Subject to Annual Approval and is Interruptible. All water supplied by the Agency is annually determined and shall be served upon an interruptible basis.

7.4 No Rights to Water Vested with Customer. The Customer shall not obtain any vested rights upon the sale and delivery of water apportioned in accordance with Ordinance No. 9, nor are any such rights inferred by virtue of an Agency decision to provide water to Customer in a specific year.

7.5 Water Deliveries required by the Mojave Basin Area Judgment and ID-M Contract. Customer acknowledges that contractual requirements under the Judgment and contractual requirements between the Agency and the Improvement District "M" have priority over the sale of water pursuant to Ordinance 9.

7.6 Water Rates. All water rates for water service made by the Agency shall be established by resolution of the Board of Directors of the Agency pursuant to Ordinance No. 9 and the Mojave Water Agency Act. Such rates for water service may not exceed the estimated cost of providing the service for which the water rate is charged. Such rate will be reasonable, fair and equitable in nature and proportionately representative of the costs incurred by the Agency.

7.7 Payment of Water Charges. Water charges are due and payable at the Agency office on the date a bill is mailed to the Customer and shall be delinquent 30 days thereafter. Service may be discontinued without further notice if payment of the water charge is not made prior to the date such charge becomes delinquent.

8. Agreement Term.

8.1 Termination Date. This Agreement shall be for a term of one (1) year, and shall automatically renew each year, if Customer is in compliance with its terms, for a period of thirty (30) years from the date hereof. If Agency reasonably determines Customer is not in compliance, Customer must be given a reasonable opportunity to comply before the Agreement terminates. This Agreement may be terminated by the Customer earlier by providing a written notice at least 30 days prior to the desired date of termination. Upon any termination, the Connection Improvements will remain the property of the Agency, and Customer will have no further responsibility under this Agreement, or for ongoing operations and maintenance of the Connection Improvements.

8.2 Change in Party Status. In the event of dissolution, consolidation or merger of the Customer or the Agency, all of the terms and conditions of this Agreement shall bind the surviving entity or successor.

9. Indemnity.

9.1 Defense of Agreement. The Customer shall defend, indemnify, and hold harmless Agency and its agents, officers, and employees from any claim, action, or proceeding against Agency or its agents, officers, or employees relating to efforts to attack, set aside, void, or annul this Agreement, including without limitation a CEQA claim. To the extent that Agency uses any of its resources, with the prior approval in writing of Customer, in responding to such claim, action, or proceeding, Customer will reimburse Agency upon demand. Such resources include, but are not limited to staff time, court costs, Agency counsel's time at their regular rate for Agency work, or any other direct or indirect cost associated with responding to the claim, action or proceedings. These obligations shall be binding on Customer's successors and assigns, and Customer shall so obligate all successors and assigns.

9.2 Indemnification for Water Connection and Water Delivery. Except with respect to (1) the Agency's own negligence or willful misconduct and/or (2) an occurrence on the Agency's side of the Points of Connection not resulting from action(s) of the Customer or its agents, contractors or assigns, and which is/are the direct cause of damage or injury, the Customer shall fully indemnify and hold harmless the Agency and its officers, agents and employees against liability for damages of any nature whatsoever, including but not limited to, property damage, personal injury, or death, arising from (3) the action(s) of Customer or any person under Customer's control, including without limitation the Customer's agents, contractors and assigns; (4) claims made by Customer's own customers and other end users of the water provided by Customer, arising out of, or resulting from, or made in connection with this Water Supply Connection Agreement and the Agency's provision of water to Customer for its use and the use of Customer's own customers; (5) the Customer's control of the rate of flow at the delivery point; or (6) an occurrence on the Customer's side of the Points of Connection not resulting from action(s) of the Agency or its agents, contractors or assigns.

9.3 Claim Notification. The Agency will, within a reasonable period of time, notify the Customer of any such claim, action, or proceeding covered by this Section 9. If the Agency should fail to cooperate in the defense, the Customer shall not thereafter be responsible to defend, indemnify, and hold harmless the Agency and its agents, officers, and employees pursuant to this Section 9.

9.4 Settlement Approval. The Customer shall not be required to pay or perform any settlement of such claim, action, or proceeding unless the Customer approves the settlement in writing.

9.5 Notices. All notices to the Customer under this Agreement shall be deemed valid and effective five (5) calendar days following deposit in the United States mail, postage prepaid, be certified and/or registered mail, addressed to:

Doug Robertson, City Manager
City of Victorville
14343 Civic Drive
P O Box 5001
Victorville, CA 92392-5001

Andre de Bortnowsky, Esq.
Green de Bortnowsky & Quintanilla LLP
23801 Calabasas Road, Suite 1015
Calabasas , California 91302-1595

Eric L. Garner
Best Best & Krieger LLP
3750 University Avenue
P O Box 1028
Riverside, California 92502

All notices to the Agency under this Agreement shall be deemed valid and effective when personally served upon Agency Counsel and General Manager or upon deposit in the United States mail, postage prepaid, by certified and/or registered mail, addressed to:

William J. Brunick
Brunick, McElhaney & Kennedy
1839 Commercenter West
P O Box 6425
San Bernardino, California 92412

Kirby Brill
General Manager
Mojave Water Agency
13846 Conference Center Drive
Apple Valley, California 92307

Except as provided otherwise, all notices that are required either expressly or by implication to be given by any party to the other under this Agreement shall be signed for the Agency and for the Customer by such officers and persons as they may from time to time, authorize in writing to so act.

9.6 Remedies Not Exclusive. Remedies provided in this Agreement for enforcement of its terms are intended and shall be construed as cumulative rather than exclusive and shall not be deemed to deprive the party using the same from also using any other remedies provided by this Agreement or by law.

9.7 Amendments. This Agreement may be amended or supplemented at any time by mutual written agreement of the Parties in any manner that may be consistent with the applicable law, subject to Paragraph 9.12 of this Agreement. In amending or supplementing this Agreement, the Agency will bear in mind that substantial uniformity of Agreements between its various customers and the desirability to the main contracting concepts and principles that are to be used. The Agency will, therefore, attempt to maintain uniformity between its various customers' Agreements in such respects.

9.8 Opinions and Determinations. Where the terms of this Agreement provide for action to be based upon opinion, judgment, approval, review, or determination of either party hereto, such terms are not intended to be and shall never be construed as permitting such opinion, judgment, approval, review, or determination to be arbitrary, capricious, or unreasonable. In the event legal action is brought to enforce or determine the rights of either party under this Agreement, the prevailing party in such action shall be entitled to court costs and reasonable attorney's fees.

9.9 Waiver of Rights. Any waiver at any time by either party hereto of its rights with respect to a breach or default, or any other matter arising in connection with this Agreement shall not be deemed to be a waiver with respect to any other breach, default or matter.

9.10 Transfer and Assignments. Except as provided in Section 8.2 hereof, the Customer shall not have the right to sell, assign or transfer this Agreement and any and all of its rights, duties and obligations hereunder, in whole or in part, to any person or entity at any time during the term of this Agreement, without prior written approval of the Agency.

9.11 Inspection of Books and Records. The proper officers or agents of the Customer shall have full and free access at all reasonable times to the account books and official records of the Agency at the Agency address set forth below insofar as the same pertain to the matters and things provided for in this Agreement, with the right at any time during office hours to make copies thereof at the Customer's expense, and the proper representatives of the Agency and designated personnel and agents shall have similar rights to inspect the account books and records of the Customer at the Customer's address set forth below as they pertain to the Agency.

Mojave Water Agency	City of Victorville
13846 Conference Center Drive	P O Box 5001
Apple Valley, CA 92307	Victorville, CA 92393-5001
Telephone: (760) 946-7000	Telephone: (760) 955-5000

9.12 Uniformity of Provisions. It is intended by the parties that this Agreement shall be uniform as to form and content as between the Agency and the Customer and other customers served by the Agency and for this reason any subsequent amendments and supplements hereof that may be entered into will be made to the contracts of all other customers on an equal basis, subject to Customer's approval which shall not be unreasonably withheld. In the event Customer declines to approve subsequent amendments as to the form and content of the Agreement, Agency shall have the right to terminate the Agreement upon giving 30-days written notice to the Customer.

9.13 Controlling Law. If there is any conflict between the provisions of this Agreement and Ordinance No. 9 or the Judgment, Ordinance No. 9 and the Judgment are controlling.

IN WITNESS WHEREOF, this Agreement has been executed to be effective as of the date and year first above written.

CITY OF VICTORVILLE

Date: April 24, 2013

By: James L. Cox

Title: Mayor

MOJAVE WATER AGENCY

Date: April 19, 2013

By: _____

Title: General Manager

APPROVED AS TO FORM:

GREEN, DE BORTNOWSKY & QUINTANILLA, LLP

By: _____
City Attorney

CHUCK BUQUET

By: _____
Risk Manager

EXHIBIT ONE

APN 0406-101-22

EXISTING RESERVOIR

6" THICK CLASS II BASE MATERIAL

MATCH TO EXISTING GRADE (TYP)

EX PL

SITE DRAINAGE FLOW DIRECTION

EX 20" ACP DW

SEE ARCHITECTURAL & STRUCTURAL PLANS FOR TURNOUT BUILDING

SEE SHEET M-1 FOR MECHANICAL PLAN

PER SHEET T3-5 TURNOUT #3 PIPELINE

3149.50 FS

3149.25 FS

1.0% MIN.

3149.8 FG

3149.2 FG

DRAINAGE SUMP

20" STL TO ACP TRANSITION COUPLING

FF= 3149.55

EXISTING ELECTRICAL VAULT

3148.9 FG

17.33'

21.83'

NEW 6' WALK GATE PER SPPWC 600-1

EX CHAIN LINK FENCE

BLOW-OFF

EX R/W

20" STL TO ACP TRANSITION COUPLING

EX 20" ACP DW

EX SWALE

EX EOP

EX STREET ℄

PINON AVENUE

COORDINATE LISTING

1. N 1990735.13 E 6764514.10 — OUTSIDE BLDG CORNER
2. N 1990780.45 E 6764513.45 — OUTSIDE BLDG CORNER
3. N 1990780.71 E 6764531.45 — OUTSIDE BLDG CORNER
4. N 1990735.38 E 6764532.10 — OUTSIDE BLDG CORNER

NOTE:
CONTRACTOR SHALL NOT INTERRUPT ACCESS TO ANY RESIDENCE NOR IMPEDE ACCESS TO ANY EMERGENCY VEHICLE. TRENCH PLATES SHALL BE USED WHERE NECESSARY.

UNDERGROUND SERVICE ALERT CALL: TOLL FREE 811 TWO WORKING DAYS BEFORE YOU DIG

NOTES:
1. CONTACTING DIG ALERT DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF LOCATING THE EXISTING UTILITIES AND SERVICES
2. IF CONSTRUCTION OCCURS MORE THAN ONE YEAR FROM THE DATE OF THE PLANS EXISTING UTILITIES SHALL BE RE-IDENTIFIED BY THE THE CONTRACTOR
3. CONTRACTOR TO LOCATE ALL SERVICE LATERALS PRIOR TO CONSTRUCTION, PROTECT IN PLACE

SCALE: 1"=5'

REV.	DATE	BY	DESCRIPTION	APPROVED	DATE
1	8/31/11	JGW	ADDENDUM 1		

DESIGNED
DRAWN
REVIEWED
JOB NUMBER 65100342

PREPARED UNDER THE SUPERVISION OF:
CINDY L. MILLER RCE 58116 DATE

Mojave Water Agency
22450 HEADQUARTERS DRIVE
APPLE VALLEY, CA 92307
760.946.7000 FAX 760.240.2642
www.MOJAVEWATER.org
APPROVED
GARY MARTIN RCE 31145 DATE

RBF CONSULTING
PLANNING ■ DESIGN ■ CONSTRUCTION
3800 EAST GUASTI ROAD, SUITE 100
ONTARIO, CALIFORNIA 91761
909.974.4900 • FAX 909.974.4904 • www.RBF.com

MOJAVE WATER AGENCY
MWA R³ PROJECT
TURNOUTS 3, 4, 6 & 7
PHASE 1 FACILITIES
SITE/GRADING PLAN
TURNOUT #3

DRAWING C-1

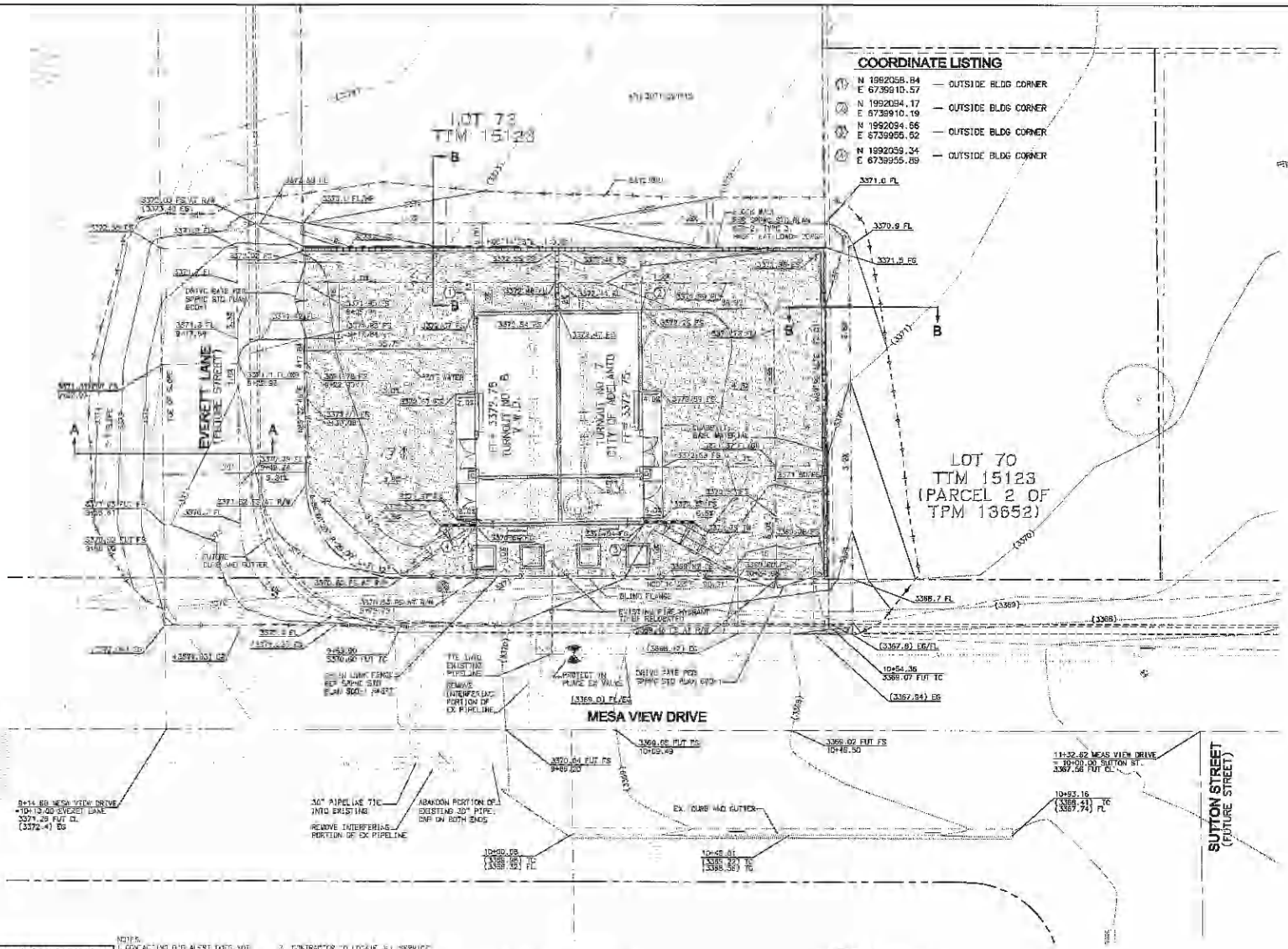
SHEET 19 OF 80

H:\PDATA\65100342\ADD\WALKPOLA\TURNOUT-JUCS\0342 TO C-001.DWG DATAW 8/15/2011 3:36 PM

EXHIBIT TWO

COORDINATE LISTING

1	N 1992058.84 E 6739910.57	— OUTSIDE BLDG CORNER
2	N 1992094.17 E 6739910.19	— OUTSIDE BLDG CORNER
3	N 1992094.66 E 6739955.62	— OUTSIDE BLDG CORNER
4	N 1992059.34 E 6739955.89	— OUTSIDE BLDG CORNER



UNDERGROUND SERVICE ALERT
CALL TOLL FREE
811
TWO WORKING DAYS BEFORE YOU DIG

NOTES:
1. CONTACTING DIG ALERT DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF LOCATING THE EXISTING UTILITIES AND SERVICES.
2. IF CONSTRUCTION OCCURS MORE THAN ONE YEAR FROM THE DATE OF THE PLANS EXISTING UTILITIES SHALL BE RE-IDENTIFIED BY THE RHC CONTRACTOR.
3. CONTRACTOR TO LOCATE ALL SERVICE LATERALS PRIOR TO CONSTRUCTION PROTECT IN PLACE.

NOTE:
ELEVATIONS SHOWN ON THIS PLAN ARE PER SITE SURVEY.
SITE SURVEY ELEVATIONS ARE 0.11' HIGHER THAT STREET IMPROVEMENT PLANS FOR MESA VIEW DRIVE.

SCALE: 1"=10'

REV.	DATE	BY	DESCRIPTION	APPROVED	DATE

DESIGNED
DRAWN
REVIEWED
JOB NUMBER 69300342

PREPARED UNDER THE SUPERVISION OF:
CINDY L. MILLER RCE 58145 DATE

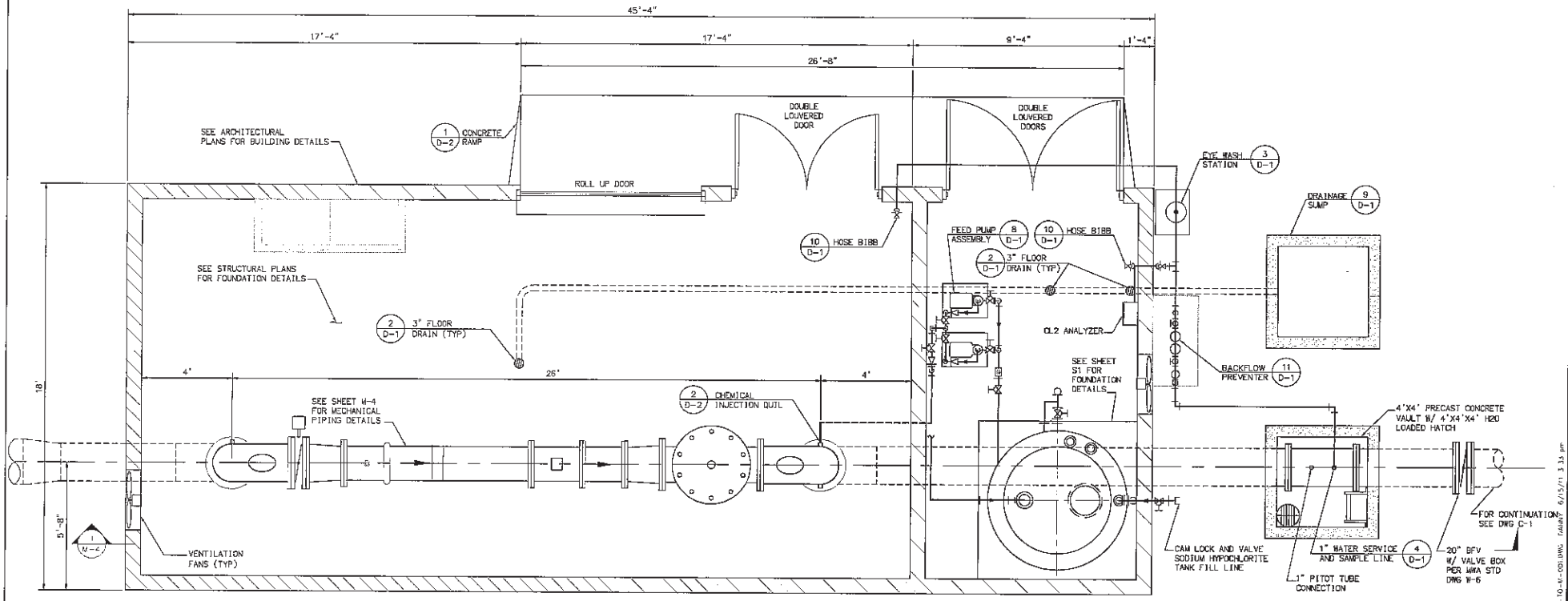
Mojave Water Agency
22450 HEADQUARTERS DRIVE
APPLE VALLEY, CA 92307
760.946.7000 FAX 760.240.2642
www.MOJAVEWATER.org
APPROVED
BARY MARTIN RCE 31145 DATE

RBF CONSULTING
PLANNING • DESIGN • CONSTRUCTION
9583 EAST GARVEY ROAD, SUITE 100
ONTARIO, CALIFORNIA 91762
909.974.4900 • FAX 909.974.4900 • www.RBF.com

MOJAVE WATER AGENCY
MWA R³ PROJECT
TURNOUTS 3, 4, 6 & 7
PHASE 1 FACILITIES
SITE/GRADING PLAN TURNOUT # 6 & 7

DRAWING C-3
SHEET 21 OF 80

H:\P\69300342\CADD\WATER\WTURNOUT-UHS\0342-TO-C-001.DWG JANNF 6/16/11 9:23 AM



PLAN

SCALE: 1/2"=1'-0"

EXHIBIT THREE

UNDERGROUND SERVICE ALERT
CALL: TOLL FREE
811
(NO WORK NO DAYS BEFORE YOU DIG)

NOTES:
1. CONTACTING DIG ALERT DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF LOCATING THE EXISTING UTILITIES AND SERVICES
2. IF CONSTRUCTION OCCURS MORE THAN ONE YEAR FROM THE DATE OF THE PLANS EXISTING UTILITIES SHALL BE RE-IDENTIFIED BY THE THE CONTRACTOR
3. CONTRACTOR TO LOCATE ALL SERVICE LATERALS PRIOR TO CONSTRUCTION, PROTECT IN PLACE

REV.	DATE	BY	DESCRIPTION	APPROVED	DATE

DESIGNED CS
DRAWN CS
REVIEWED SMS
JOB NUMBER 85100342

PREPARED UNDER THE SUPERVISION OF:
CINDY L. MILLER RCE 58116 DATE

Mojave Water Agency
22450 HEADQUARTERS DRIVE
APPLE VALLEY, CA 92307
760.946.7003 FAX 760.240.2642
www.MOJAVEWATER.org
APPROVED
GARY MARTIN RCE 31145 DATE

RBF CONSULTING
PLANNING • DESIGN • CONSTRUCTION
3500 EAST GUASTI ROAD, SUITE 100
ONTARIO, CALIFORNIA 91761
909.974.4900 • FAX 909.974.4904 • www.RBF.com

MOJAVE WATER AGENCY
MWA R³ PROJECT
TURNOUTS 3, 4, 6 & 7
PHASE 1 FACILITIES
MECHANICAL PLAN—TURNOUT 3

DRAWING M-1
SHEET 22 OF 80

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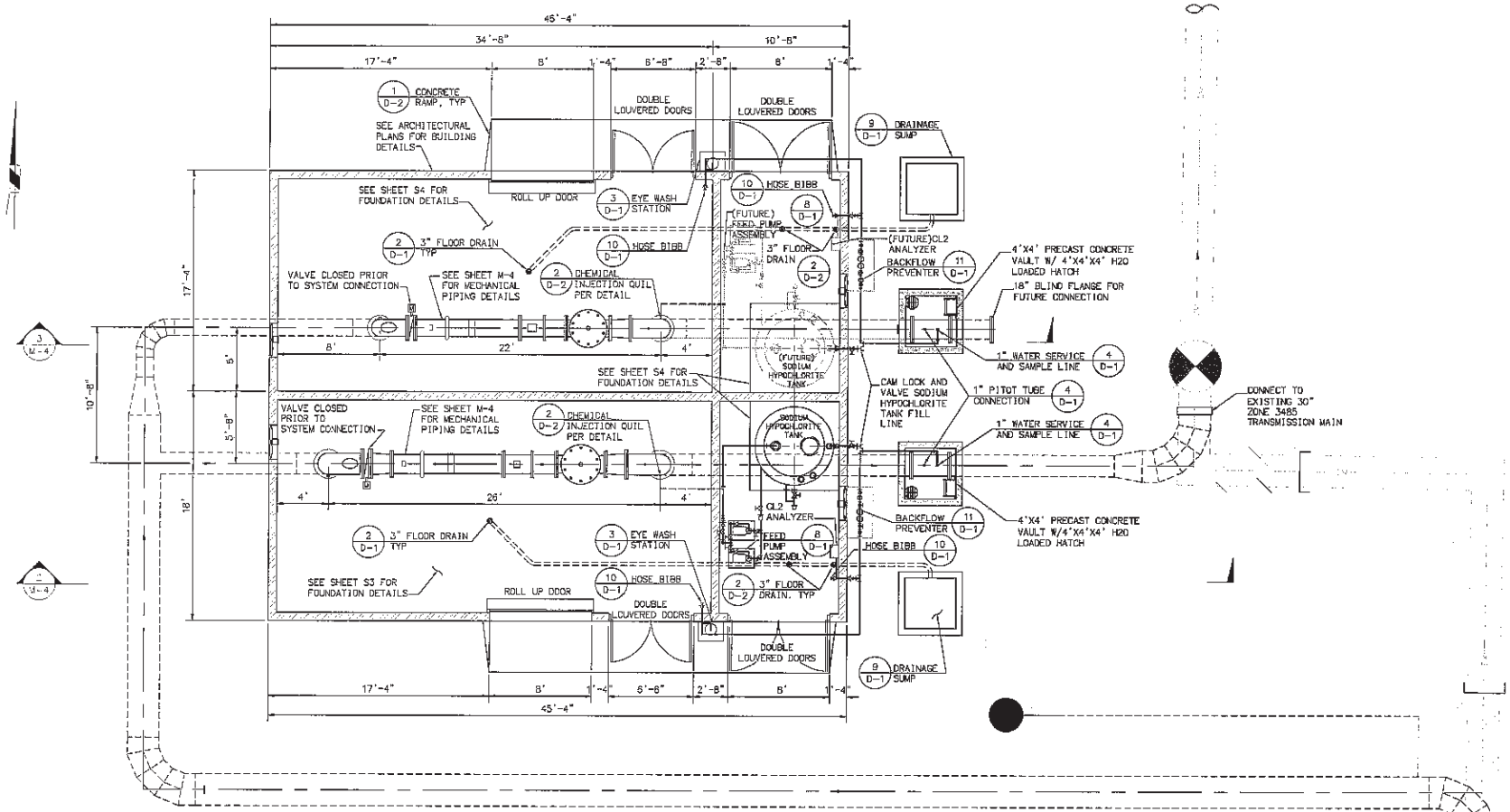

PLAN

SCALE: 1/4"=1'-0"

NOTE:
FOR TURNOUT NO. 7, SODIUM HYPOCHLORITE STORAGE TANK, FEED PUMP SYSTEM, CHLORINE ANALYZER AND ABOVE GRADE PIPING WITHIN CHEMICAL ROOM WILL BE CONSTRUCTED UNDER A FUTURE CONTRACT. CONTRACTOR TO STUB AND CAP ALL PIPING WITHIN CHEMICAL ROOM FOR FUTURE CONNECTION.

CONNECT TO EXISTING 30" ZONE 3485 TRANSMISSION MAIN

EXHIBIT FOUR

UNDERGROUND SERVICE ALERT
CALL: TOLL FREE
811
TWO WORKING DAYS BEFORE YOU DIG

NOTES:
1. CONTACTING DIG ALERT DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF LOCATING THE EXISTING UTILITIES AND SERVICES
2. IF CONSTRUCTION OCCURS MORE THAN ONE YEAR FROM THE DATE OF THE PLANS EXISTING UTILITIES SHALL BE RE-IDENTIFIED BY THE CONTRACTOR.
3. CONTRACTOR TO LOCATE ALL SERVICE LATERALS PRIOR TO CONSTRUCTION, PROTECT IN PLACE

REV.	DATE	BY	DESCRIPTION	APPROVED	DATE

DESIGNED
DRAWN
REVIEWED
JOB NUMBER 65100342

PREPARED UNDER THE SUPERVISION OF:
CINDY L. MILLER RCE 58116 DATE

REGISTERED PROFESSIONAL ENGINEER CINDY L. MILLER No. 58116 Civil STATE OF CALIFORNIA

Mojave Water Agency
22450 HEADQUARTERS DRIVE
APPLE VALLEY, CA 92307
760.946.7000 FAX 760.240.2642
www.MOJAVEWATER.org
APPROVED
GARY MARTIN RCE 31145 DATE

RBF CONSULTING
PLANNING • DESIGN • CONSTRUCTION
9200 EAST CHARTER ROAD, SUITE 100
ONTARIO, CALIFORNIA 91761
909.574.8800 • FAX 909.574.8804 • www.RBF.com

MOJAVE WATER AGENCY
MWA R³ PROJECT
TURNOUTS 3, 4, 6 & 7
PHASE 1 FACILITIES
MECHANICAL PLAN—TURNOUTS 6 & 7

DRAWING M-3
SHEET 24 OF 80

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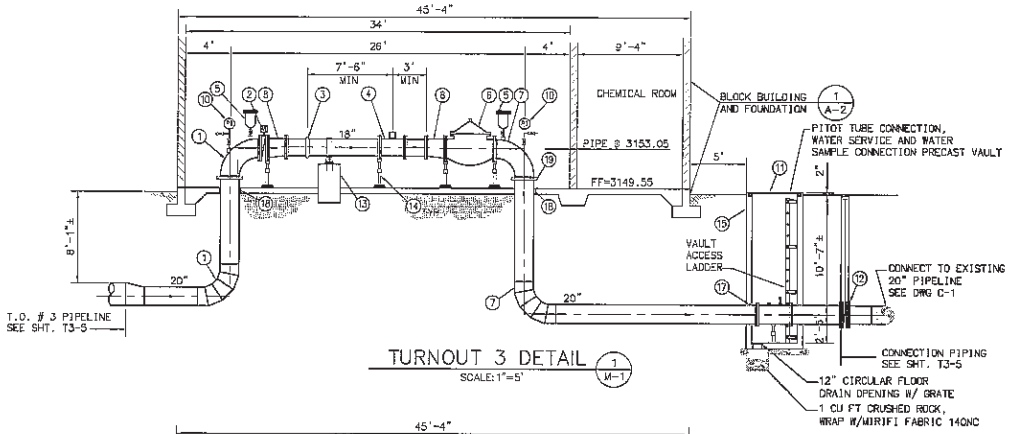
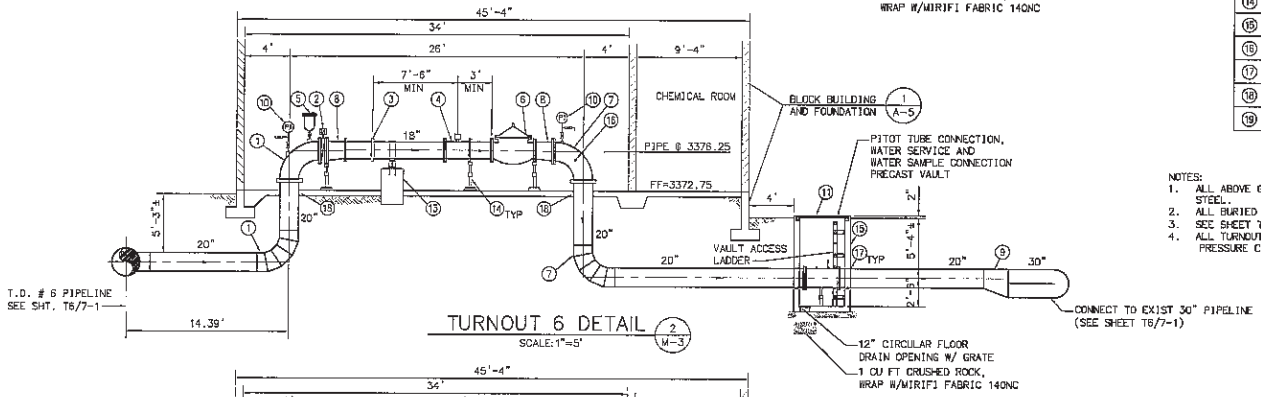
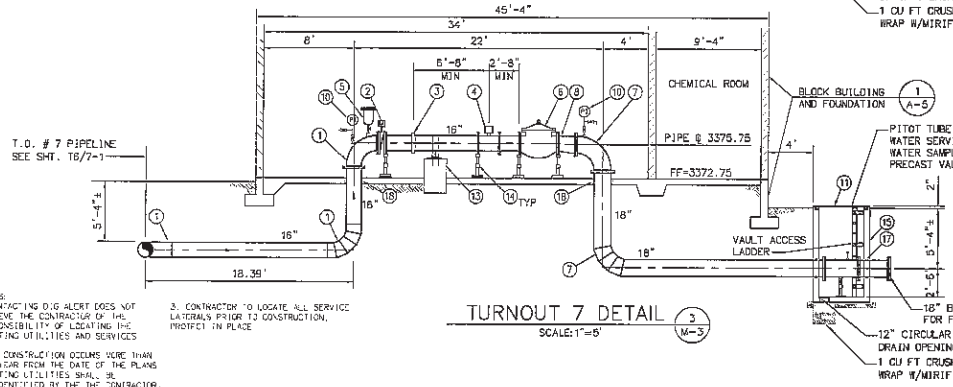


TURNOUT 3 DETAIL 1 M-1
SCALE: 1"=5'



TURNOUT 6 DETAIL 2 M-3
SCALE: 1"=5'



TURNOUT 7 DETAIL 3 M-3
SCALE: 1"=5'

ITEM	DESCRIPTION	T0-3	T0-6	T0-7
1	90° FULLY RESTRAINED BEND	20"	20"	18"
2	MOTOR OPERATED BUTTERFLY VALVE	20"	20"	16"
3	VICTAULIC COUPLING	18"	18"	16"
4	MAGNETIC TYPE FLOW METER	18"	18"	16"
5	COMBINATION AIR VALVE PER DETAIL 1 ON D1	4"	3"	3"
6	ELECTRONIC CONTROL VALVE CLA-VAL MODEL 131	20"	18"	16"
7	90° FULLY RESTRAINED BEND	20"	20"	18"
8	ECCENTRIC REDUCER	20X18	20X18	18X16
9	ECCENTRIC REDUCER	-	30X20	-
10	PRESSURE INDICATOR / TRANSMITTER WITH SAMPLE STATION PER DETAIL 4 ON DWG D-2			
11	48"X48" LOCKABLE H20 ALUMINUM ACCESS HATCH			
12	20" BFV W/ VALVE BOX PER DWG W-6			
13	THRUST SUPPORT PER MWA STD. PER DETAIL 3 ON DWG D-2			
14	PIPE SUPPORT PER DWG W-43			
15	48"X48" PRECAST CONCRETE VAULT W/ ACCESS LADDER			
16	CHEMICAL INJECTION QUIL PER DETAIL 2 ON DWG D-2			
17	PIPE PENTRATION PER DETAIL 7 ON D1 (TYP)			
18	FLOOR PENETRATION PER DETAIL 7 ON D2 (TYP)			
19	ORIFICE PLATE WITH 11.8"ø BORE			

NOTES ABOVE VALID FOR THIS SHEET ONLY

NOTES:
1. ALL ABOVE GROUND PIPE AND FITTINGS TO BE EPOXY LINED AND COATED STEEL.
2. ALL BURIED PIPE AND FITTINGS TO BE CMLWC STEEL.
3. SEE SHEET T3-5 AND T6/7-1 FOR PIPING PROFILE
4. ALL TURNOUT PIPING, VALVES AND FITTINGS SHALL MATCH AT A MINIMUM PRESSURE CLASS OF UPSTREAM PIPING.

UNDERGROUND SERVICE ALERT
CALL: TOLL FREE
811
TWO WORKING DAYS BEFORE YOU DIG

NOTES:
1. CONTACTING DIG ALERT DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF LOCATING THE EXISTING UTILITIES AND SERVICES
2. IF CONSTRUCTION OCCURS MORE THAN ONE YEAR FROM THE DATE OF THE PLANS EXISTING UTILITIES SHALL BE RE-IDENTIFIED BY THE THE CONTRACTOR.
3. CONTRACTOR TO LOCATE ALL SERVICE LATERALS PRIOR TO CONSTRUCTION, PROTECT IN PLACE

REV.	DATE	BY	DESCRIPTION	APPROVED	DATE
1	8/31/11	JGN	ADDENDUM 1		

DESIGNED
DRAWN
REVIEWED
JOB NUMBER 65100342

PREPARED UNDER THE SUPERVISION OF:
CINDY L. MILLER RCE 58116 DATE

Mojave Water Agency
22450 HEADQUARTERS DRIVE
APPLE VALLEY, CA 92307
760.946.7000 FAX 760.240.2642
www.MOJAVEWATER.org
APPROVED
BARY MARTIN RCE 35145 DATE

RBF CONSULTING
PLANNING ■ DESIGN ■ CONSTRUCTION
9200 EAST CLEMENT ROAD, SUITE 100
ONTARIO, CALIFORNIA 91761
909.974.4900 ■ FAX 909.974.4904 ■ www.RBF.com

MOJAVE WATER AGENCY
MWA R³ PROJECT
TURNOUTS 3, 4, 6 & 7
PHASE 1 FACILITIES
MECHANICAL SECTIONS–TURNOUTS 3, 6 & 7

DRAWING M-4
SHEET 25 OF 80

EXHIBIT FIVE

H:\PROJ\A\AS\100342\LAND\WA\UP\BLV\DIFFUSER-1\RFS\0342 TO 4 BUILDING.DWG 6/15/11 3:36 pm

EXHIBIT SIX

Regional Recharge and Recovery Project
Phase 1 Schedule of Delivery Capacities for Project Participants
June 15, 2012

Annual Amount Approved for Delivery Via W. Conveyance System (acre-feet per year)	Capacity Available to Hesperia Turnout 4		Capacity Available to VWD Turnouts 3 or 6		Capacity Available to Adelanto Turnout 7	
	af per year	cfs	af per year	cfs	af per year	cfs
0	0	0	0	0	0	0
1,000	246	0.41	523	0.88	231	0.39
2,000	492	0.83	1,046	1.76	462	0.78
3,000	738	1.24	1,569	2.64	692	1.16
4,000	985	1.65	2,092	3.52	923	1.55
5,000	1,231	2.07	2,615	4.40	1,154	1.94
6,000	1,477	2.48	3,138	5.27	1,385	2.33
7,000	1,723	2.90	3,662	6.15	1,615	2.71
8,000	1,969	3.31	4,185	7.03	1,846	3.10
9,000	2,215	3.72	4,708	7.91	2,077	3.49
10,000	2,462	4.14	5,231	8.79	2,308	3.88
11,000	2,708	4.55	5,754	9.67	2,538	4.27
12,000	2,954	4.96	6,277	10.55	2,769	4.65
13,000 and above	3,200	5.38	6,800	11.43	3,000	5.04

Note: Capcities at respective turnouts can be interpolated using tabulated values for actual delivery amounts between 0 and 13,000 acre-feet per year.

APPENDIX G. AWWA WATER AUDIT 2015

AWWA Free Water Audit Software v5.0

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This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Donna McCormick
Email Address:	dmccormick@victorvilleca.gov
Telephone (incl Ext.):	760-995-2016
Name of City / Utility:	City of Victorville/Victorville Water District
City/Town/Municipality:	Victorville
State / Province:	California (CA)
Country:	United States
Year:	2015
Start Date:	01/2015 Enter MM/YYYY numeric format
End Date:	12/2015 Enter MM/YYYY numeric format
Audit Preparation Date:	2/1/2016
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	3610052

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.
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? Click to access definition
+ Click to add a comment

Water Audit Report for: City of Victorville/Victorville Water District (3610052)
Reporting Year: 2015 | 1/2015 - 12/2015

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

								Pcnt:		Value:	
Volume from own sources:	+	?	5	17,340.000	acre-ft/yr	+ ?	4				acre-ft/yr
Water imported:	+	?	2	3,503.000	acre-ft/yr	+ ?	6				acre-ft/yr
Water exported:	+	?	10	274.000	acre-ft/yr	+ ?	2				acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 20,569.000 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

						Pcnt:	Value:	
Billed metered:	+	?	7	19,132.000	acre-ft/yr			
Billed unmetered:	+	?		0.000	acre-ft/yr			
Unbilled metered:	+	?		0.000	acre-ft/yr			
Unbilled unmetered:	+	?		257.113	acre-ft/yr	1.25%		acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: ? 19,389.113 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption)

1,179.888 acre-ft/yr

Apparent Losses

						Pcnt:	Value:	
Unauthorized consumption:	+	?		51.423	acre-ft/yr	0.25%		acre-ft/yr
Customer metering inaccuracies:	+	?	3	0.000	acre-ft/yr			acre-ft/yr
Systematic data handling errors:	+	?		47.830	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? 99.253 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 1,080.635 acre-ft/yr

WATER LOSSES: 1,179.888 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 1,437.000 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+	?	8	690.0	miles
Number of active AND inactive service connections:	+	?	8	34,699	
Service connection density:		?		50	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: + ? 9 80.0 psi

COST DATA

Total annual cost of operating water system:	+	?	6	$29,817,000	$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	8	$134,722.37	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	?	5	$531,652.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 55 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Customer metering inaccuracies
3: Water imported

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

American Water Works Association.
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Water Audit Report for: City of Victorville/Victorville Water District (3610052)
Reporting Year: 2015 | 1/2015 - 12/2015

***** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 55 out of 100 *****

System Attributes:

	Apparent Losses:	99.253	acre-ft/yr
+	Real Losses:	1,080.635	acre-ft/yr
=	**Water Losses:**	**1,179.888**	acre-ft/yr
?	Unavoidable Annual Real Losses (UARL):	800.92	acre-ft/yr
	Annual cost of Apparent Losses:	$5,824,639,352	
	Annual cost of Real Losses:	$574,521,759	Valued at **Variable Production Cost**

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	7.0%	
	Non-revenue water as percent by cost of operating system:	21919.9%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	2.55	gallons/connection/day
	Real Losses per service connection per day:	27.80	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.35	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	1,080.64	acre-feet/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.35	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

WAS v5.0

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Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	
Vol. from own sources: Master meter error adjustment:	
Water imported:	
Water imported: master meter error adjustment:	
Water exported:	
Water exported: master meter error adjustment:	
Billed metered:	
Billed unmetered:	
Unbilled metered:	

Audit Item	Comment
Unbilled unmetered:	
Unauthorized consumption:	
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	
Number of active AND inactive service connections:	
Average length of customer service line:	
Average operating pressure:	Steve Ashton, Water Supply Manager reports we have a robust SCADA system that tracks real time pressure at all supply sites. Joe Ogg, Water Distribution Manager reports the Engineering Department has quality specifications and standards for installation and replacement of new water mains. Our IT Department now as their upgraded GIS operational. This used in conjunction with the Sedaru softare, our crews can field verify our water system and send discrepancies to both the Engineering and IT departments. Sedaru is also used for data collection and organizing such as hydrant and valve maintenance. Soon, the crews will begin to input
Total annual cost of operating water system:	
Customer retail unit cost (applied to Apparent Losses):	
Variable production cost (applied to Real Losses):	

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.

Water Audit Report for:	City of Victorville/Victorville Water District (3610052)	
Reporting Year:	2015	1/2015 - 12/2015
Data Validity Score:	54	

Own Sources (Adjusted for known errors) 17,340.000	Water Exported 0.000	Billed Water Exported			
	Water Supplied 20,851.000	Authorized Consumption 19,392.638	Billed Authorized Consumption 19,132.000	Billed Metered Consumption (water exported is removed) 19,132.000	Revenue Water 19,132.000
				Billed Unmetered Consumption 0.000	
			Unbilled Authorized Consumption 260.638	Unbilled Metered Consumption 0.000	Non-Revenue Water (NRW) 1,719.000
				Unbilled Unmetered Consumption 260.638	
		Water Losses 1,458.363	Apparent Losses 99.958	Unauthorized Consumption 52.128	
				Customer Metering Inaccuracies 0.000	
				Systematic Data Handling Errors 47.830	
Water Imported 3,511.000			Real Losses 1,358.405	Leakage on Transmission and/or Distribution Mains Not broken down	
				Leakage and Overflows at Utility's Storage Tanks Not broken down	
				Leakage on Service Connections Not broken down	

AWWA Free Water Audit Software:
Dashboard

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American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

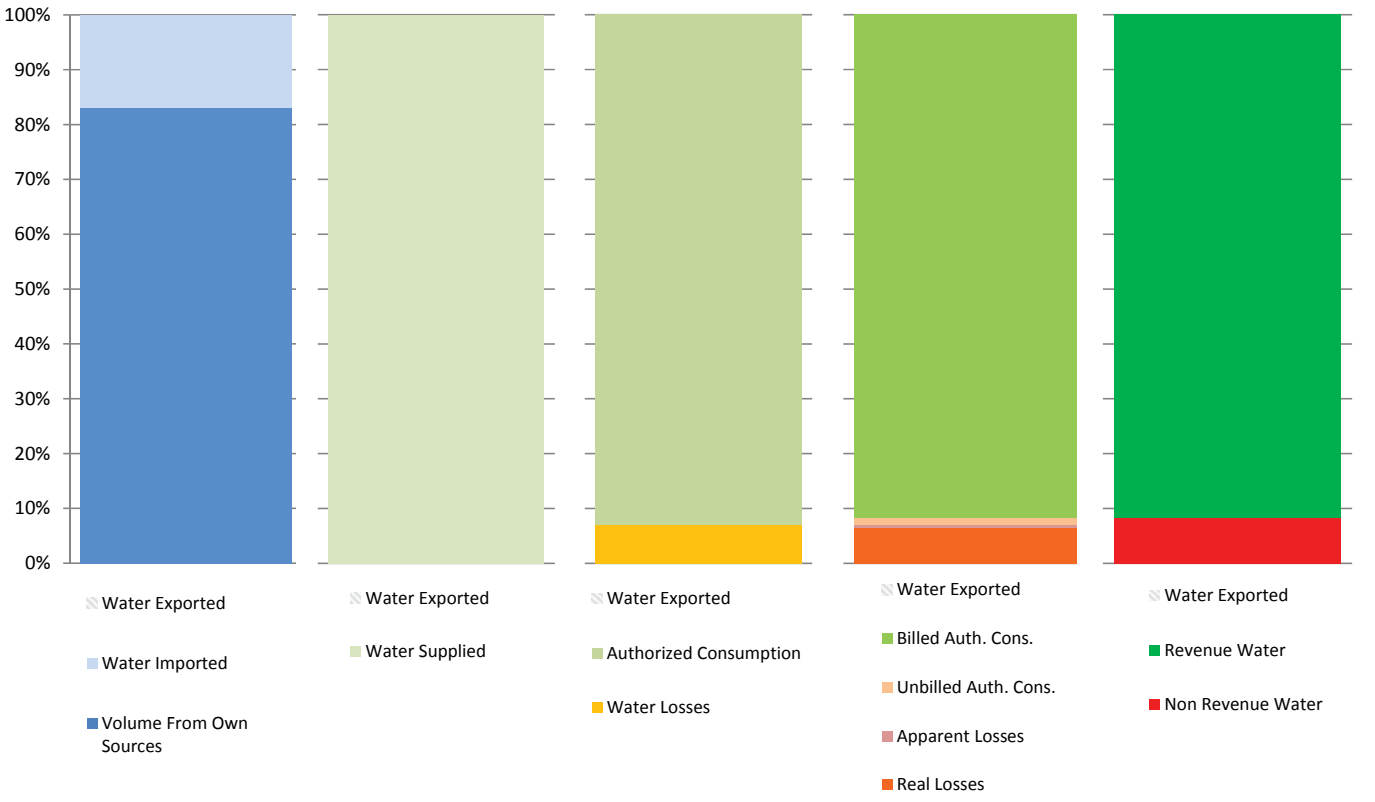
Water Audit Report for: **City of Victorville/Victorville Water District (3610052)**

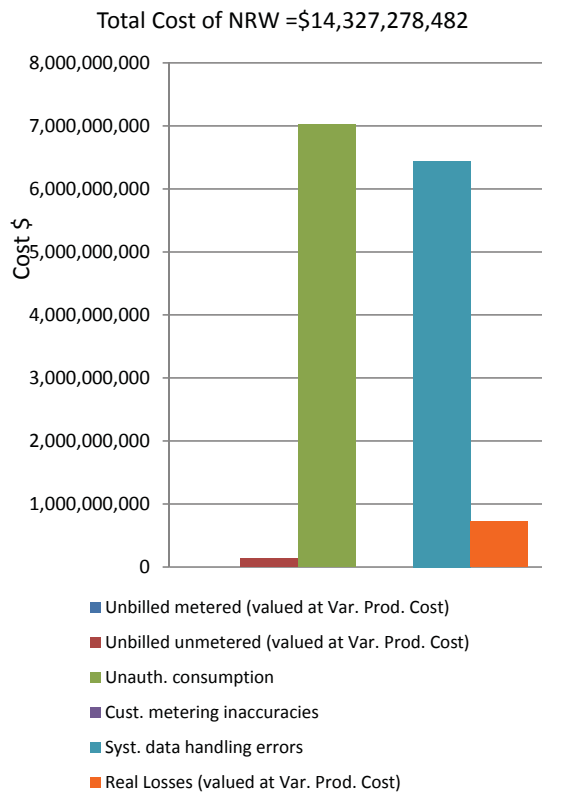
Reporting Year: **2015** **1/2015 - 12/2015**

Data Validity Score: **54**

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software: Grading Matrix

WAS 5.0

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The grading assigned to each audit component and the corresponding recommended improvements and actions are highlighted in yellow. Audit accuracy is likely to be improved by prioritizing those items shown in red

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
WATER SUPPLIED											
Volume from own sources:	Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)	Less than 25% of water production sources are metered, remaining sources are estimated. No regular meter accuracy testing or electronic calibration conducted.	25% - 50% of treated water production sources are metered; other sources estimated. No regular meter accuracy testing or electronic calibration conducted.	Conditions between 2 and 4	50% - 75% of treated water production sources are metered, other sources estimated. Occasional meter accuracy testing or electronic calibration conducted.	Conditions between 4 and 6	At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources. Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Improvements to attain higher data grading for "Volume from own Sources" component:		to qualify for 2: Organize and launch efforts to collect data for determining volume from own sources	to qualify for 4: Locate all water production sources on maps and in the field, launch meter accuracy testing for existing meters, begin to install meters on unmetered water production sources and replace any obsolete/defective meters.		to qualify for 6: Formalize annual meter accuracy testing for all source meters; specify the frequency of testing. Complete installation of meters on unmetered water production sources and complete replacement of all obsolete/defective meters.		to qualify for 8: Conduct annual meter accuracy testing and calibration of related instrumentation on all meter installations on a regular basis. Complete project to install new, or replace defective existing, meters so that entire production meter population is metered. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Maintain annual meter accuracy testing and calibration of related instrumentation for all meter installations. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to further improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Volume from own sources master meter and supply error adjustment:	Select n/a only if the water utility fails to have meters on its sources of supply	Inventory information on meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined	No automatic datalogging of production volumes; daily readings are scribed on paper records without any accountability controls. Flows are not balanced across the water distribution system: tank/storage elevation changes are not employed in calculating the "Volume from own sources" component and archived flow data is adjusted only when grossly evident data error occurs.	Conditions between 2 and 4	Production meter data is logged automatically in electronic format and reviewed at least on a monthly basis with necessary corrections implemented. "Volume from own sources" tabulations include estimate of daily changes in tanks/storage facilities. Meter data is adjusted when gross data errors occur, or occasional meter testing deems this necessary.	Conditions between 4 and 6	Hourly production meter data logged automatically & reviewed on at least a weekly basis. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and/or error is confirmed by meter accuracy testing. Tank/storage facility elevation changes are automatically used in calculating a balanced "Volume from own sources" component, and data gaps in the archived data are corrected on at least a weekly basis.	Conditions between 6 and 8	Continuous production meter data is logged automatically & reviewed each business day. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and/or results of meter accuracy testing. Tank/storage facility elevation changes are automatically used in "Volume from own sources" tabulations and data gaps in the archived data are corrected on a daily basis.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically balances flows from all sources and storages; results are reviewed each business day. Tight accountability controls ensure that all data gaps that occur in the archived flow data are quickly detected and corrected. Regular calibrations between SCADA and sources meters ensures minimal data transfer error.
Improvements to attain higher data grading for "Master meter and supply error adjustment" component:		to qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature.	to qualify for 4: Install automatic datalogging equipment on production meters. Complete installation of level instrumentation at all tanks/storage facilities and include tank level data in automatic calculation routine in a computerized system. Construct a computerized listing or spreadsheet to archive input volumes, tank/storage volume changes and import/export flows in order to determine the composite "Water Supplied" volume for the distribution system. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps.		to qualify for 6: Refine computerized data collection and archive to include hourly production meter data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Use daily net storage change to balance flows in calculating "Water Supplied" volume. Necessary corrections to data errors are implemented on a weekly basis.		to qualify for 8: Ensure that all flow data is collected and archived on at least an hourly basis. All data is reviewed and detected errors corrected each business day. Tank/storage levels variations are employed in calculating balanced "Water Supplied" component. Adjust production meter data for gross error and inaccuracy confirmed by testing.		to qualify for 10: Link all production and tank/storage facility elevation change data to a Supervisory Control & Data Acquisition (SCADA) System, or similar computerized monitoring/control system, and establish automatic flow balancing algorithm and regularly calibrate between SCADA and source meters. Data is reviewed and corrected each business day.		to maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters. Continue to replace or repair meters as they perform outside of desired accuracy limits. Stay abreast of new and more accurate water level instruments to better record tank/storage levels and archive the variations in storage volume. Keep current with SCADA and data management systems to ensure that archived data is well-managed and error free.
Water Imported:	Select n/a if the water utility's supply is exclusively from its own water resources (no bulk purchased/ imported water)	Less than 25% of imported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of imported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of imported water sources are metered, other sources estimated. Occasional meter accuracy testing conducted.	Conditions between 4 and 6	At least 75% of imported water sources are metered, meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually for all meter installations. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of imported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of imported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually for all meter installations, with less than 10% of accuracy tests found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Imported Volume" component: *(Note: usually the water supplier selling the water - "the Exporter" - to the utility being audited is responsible to maintain the metering installation measuring the imported volume. The utility should coordinate carefully with the Exporter to ensure that adequate meter upkeep takes place and an accurate measure of the Water Imported volume is quantified.)*		to qualify for 2: Review bulk water purchase agreements with partner suppliers; confirm requirements for use and maintenance of accurate metering. Identify needs for new or replacement meters with goal to meter all imported water sources.	To qualify for 4: Locate all imported water sources on maps and in the field, launch meter accuracy testing for existing meters, begin to install meters on unmetered imported water interconnections and replace obsolete/defective meters.		to qualify for 6: Formalize annual meter accuracy testing for all imported water meters, planning for both regular meter accuracy testing and calibration of the related instrumentation. Continue installation of meters on unmetered imported water interconnections and replacement of obsolete/defective meters.		to qualify for 8: Complete project to install new, or replace defective, meters on all imported water interconnections. Maintain annual meter accuracy testing for all imported water meters and conduct calibration of related instrumentation at least annually. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Conduct meter accuracy testing for all meters on a semi-annual basis, along with calibration of all related instrumentation. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Continue to conduct calibration of related instrumentation on a semi-annual basis. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Water imported master meter and supply error adjustment:	Select n/a if the Imported water supply is unmetered, with Imported water quantities estimated on the billing invoices sent by the Exporter to the purchasing Utility.	Inventory information on imported meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined Written agreement(s) with water Exporter(s) are missing or written in vague language concerning meter management and testing.	No automatic datalogging of imported supply volumes; daily readings are scribed on paper records without any accountability controls to confirm data accuracy and the absence of errors and data gaps in recorded volumes. Written agreement requires meter accuracy testing but is vague on the details of how and who conducts the testing.	Conditions between 2 and 4	Imported supply metered flow data is logged automatically in electronic format and reviewed at least on a monthly basis by the Exporter with necessary corrections implemented. Meter data is adjusted by the Exporter when gross data errors are detected. A coherent data trail exists for this process to protect both the selling and the purchasing Utility. Written agreement exists and clearly states requirements and roles for meter accuracy testing and data management.	Conditions between 4 and 6	Hourly Imported supply metered data is logged automatically & reviewed on at least a weekly basis by the Exporter. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and to correct for error confirmed by meter accuracy testing. Any data gaps in the archived data are detected and corrected during the weekly review. A coherent data trail exists for this process to protect both the selling and the purchasing Utility.	Conditions between 6 and 8	Continuous Imported supply metered flow data is logged automatically & reviewed each business day by the Importer. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and/or results of meter accuracy testing. Any data errors/gaps are detected and corrected on a daily basis. A data trail exists for the process to protect both the selling and the purchasing Utility.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically records data which is reviewed each business day by the Exporter. Tight accountability controls ensure that all error/data gaps that occur in the archived flow data are quickly detected and corrected. A reliable data trail exists and contract provisions for meter testing and data management are reviewed by the selling and purchasing Utility at least once every five years.
Improvements to attain higher data grading for "Water imported master meter and supply error adjustment" component:		to qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature. Review the written agreement between the selling and purchasing Utility.	to qualify for 4: Install automatic datalogging equipment on Imported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the Exporters to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.		to qualify for 6: Refine computerized data collection and archive to include hourly Imported supply metered flow data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Make necessary corrections to errors/data errors on a weekly basis.		to qualify for 8: Ensure that all Imported supply metered flow data is collected and archived on at least an hourly basis. All data is reviewed and errors/data gaps are corrected each business day.		to qualify for 10: Conduct accountability checks to confirm that all Imported supply metered data is reviewed and corrected each business day by the Exporter. Results of all meter accuracy tests and data corrections should be available for sharing between the Exporter and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreement between the selling and the purchasing Utility; at least every five years.		to maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters; work with the Exporter to help identify meter replacement needs. Keep communication lines with Exporters open and maintain productive relations. Keep the written agreement current with clear and explicit language that meets the ongoing needs of all parties.
Water Exported:	Select n/a if the water utility sells no bulk water to neighboring water utilities (no exported water sales)	Less than 25% of exported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of exported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of exported water sources are metered, other sources estimated. Occasional meter accuracy testing conducted.	Conditions between 4 and 6	At least 75% of exported water sources are metered, meter accuracy testing and/or electronic calibration conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of exported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of exported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually for all meter installations, with less than 10% of accuracy tests found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Exported Volume" component: (*Note: usually, if the water utility being audited sells (Exports) water to a neighboring purchasing Utility, it is the responsibility of the utility exporting the water to maintain the metering installation measuring the Exported volume. The utility exporting the water should ensure that adequate meter upkeep takes place and an accurate measure of the Water Exported volume is quantified.*)		to qualify for 2: Review bulk water sales agreements with purchasing utilities; confirm requirements for use & upkeep of accurate metering. Identify needs to install new, or replace defective meters as needed.	To qualify for 4: Locate all exported water sources on maps and in field, launch meter accuracy testing for existing meters, begin to install meters on unmetered exported water interconnections and replace obsolete/defective meters		to qualify for 6: Formalize annual meter accuracy testing for all exported water meters. Continue installation of meters on unmetered exported water interconnections and replacement of obsolete/defective meters.		to qualify for 8: Complete project to install new, or replace defective, meters on all exported water interconnections. Maintain annual meter accuracy testing for all exported water meters. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Maintain annual meter accuracy testing for all meters. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Water exported master meter and supply error adjustment:	Select n/a only if the water utility fails to have meters on its exported supply interconnections.	Inventory information on exported meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined Written agreement(s) with the utility purchasing the water are missing or written in vague language concerning meter management and testing.	No automatic datalogging of exported supply volumes; daily readings are scribed on paper records without any accountability controls to confirm data accuracy and the absence of errors and data gaps in recorded volumes. Written agreement requires meter accuracy testing but is vague on the details of how and who conducts the testing.	Conditions between 2 and 4	Exported metered flow data is logged automatically in electronic format and reviewed at least on a monthly basis, with necessary corrections implemented. Meter data is adjusted by the utility selling (exporting) the water when gross data errors are detected. A coherent data trail exists for this process to protect both the utility exporting the water and the purchasing Utility. Written agreement exists and clearly states requirements and roles for meter accuracy testing and data management.	Conditions between 4 and 6	Hourly exported supply metered data is logged automatically & reviewed on at least a weekly basis by the utility selling the water. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and to correct for error found by meter accuracy testing. Any data gaps in the archived data are detected and corrected during the weekly review. A coherent data trail exists for this process to protect both the selling (exporting) utility and the purchasing Utility.	Conditions between 6 and 8	Continuous exported supply metered flow data is logged automatically & reviewed each business day by the utility selling (exporting) the water. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and any error confirmed by meter accuracy testing. Any data errors/gaps are detected and corrected on a daily basis. A data trail exists for the process to protect both the selling (exporting) Utility and the purchasing Utility.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically records data which is reviewed each business day by the utility selling (exporting) the water. Tight accountability controls ensure that all error/data gaps that occur in the archived flow data are quickly detected and corrected. A reliable data trail exists and contract provisions for meter testing and data management are reviewed by the selling Utility and purchasing Utility at least once every five years.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Water exported master meter and supply error adjustment" component:		to qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature. Review the written agreement between the utility selling (exporting) the water and the purchasing Utility.	to qualify for 4: Install automatic datalogging equipment on exported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the purchasing utilities to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.		to qualify for 6: Refine computerized data collection and archive to include hourly exported supply metered flow data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Make necessary corrections to errors/data errors on a weekly basis.		to qualify for 8: Ensure that all exported metered flow data is collected and archived on at least an hourly basis. All data is reviewed and errors/data gaps are corrected each business day.		to qualify for 10: Conduct accountability checks to confirm that all exported metered flow data is reviewed and corrected each business day by the utility selling the water. Results of all meter accuracy tests and data corrections should be available for sharing between the utility and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreements with the purchasing utilities at least every five years.		to maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters; work with the purchasing utilities to help identify meter replacement needs. Keep communication lines with the purchasing utilities open and maintain productive relations. Keep the written agreement current with clear and explicit language that meets the ongoing needs of all parties.
AUTHORIZED CONSUMPTION											
Billed metered:	n/a (not applicable). Select n/a only if the entire customer population is not metered and is billed for water service on a flat or fixed rate basis. In such a case the volume entered must be zero.	Less than 50% of customers with volume-based billings from meter readings; flat or fixed rate billing exists for the majority of the customer population	At least 50% of customers with volume-based billing from meter reads; flat rate billing for others. Manual meter reading is conducted, with less than 50% meter read success rate, remaining accounts' consumption is estimated. Limited meter records, no regular meter testing or replacement. Billing data maintained on paper records, with no auditing.	Conditions between 2 and 4	At least 75% of customers with volume-based, billing from meter reads; flat or fixed rate billing for remaining accounts. Manual meter reading is conducted with at least 50% meter read success rate; consumption for accounts with failed reads is estimated. Purchase records verify age of customer meters; only very limited meter accuracy testing is conducted. Customer meters are replaced only upon complete failure. Computerized billing records exist, but only sporadic internal auditing conducted.	Conditions between 4 and 6	At least 90% of customers with volume-based billing from meter reads; consumption for remaining accounts is estimated. Manual customer meter reading gives at least 80% customer meter reading success rate; consumption for accounts with failed reads is estimated. Good customer meter records eixst, but only limited meter accuracy testing is conducted. Regular replacement is conducted for the oldest meters. Computerized billing records exist with annual auditing of summary statistics conducting by utility personnel.	Conditions between 6 and 8	At least 97% of customers exist with volume-based billing from meter reads. At least 90% customer meter reading success rate; or at least 80% read success rate with planning and budgeting for trials of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) in one or more pilot areas. Good customer meter records. Regular meter accuracy testing guides replacement of statistically significant number of meters each year. Routine auditing of computerized billing records for global and detailed statistics occurs annually by utility personnel, and is verified by third party at least once every five years.	Conditions between 8 and 10	At least 99% of customers exist with volume-based billing from meter reads. At least 95% customer meter reading success rate; or minimum 80% meter reading success rate, with Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) trials underway. Statistically significant customer meter testing and replacement program in place on a continuous basis. Computerized billing with routine, detailed auditing, including field investigation of representative sample of accounts undertaken annually by utility personnel. Audit is conducted by third party auditors at least once every three years.
Improvements to attain higher data grading for "Billed Metered Consumption" component:	If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	to qualify for 2: Conduct investigations or trials of customer meters to select appropriate meter models. Budget funding for meter installations. Investigate volume based water rate structures.	to qualify for 4: Purchase and install meters on unmetered accounts. Implement policies to improve meter reading success. Catalog meter information during meter read visits to identify age/model of existing meters. Test a minimal number of meters for accuracy. Install computerized billing system.		to qualify for 6: Purchase and install meters on unmetered accounts. Eliminate flat fee billing and establish appropriate water rate structure based upon measured consumption. Continue to achieve verifiable success in removing manual meter reading barriers. Expand meter accuracy testing. Launch regular meter replacement program. Launch a program of annual auditing of global billing statistics by utility personnel.		to qualify for 8: Purchase and install meters on unmetered accounts. If customer meter reading success rate is less than 97%, assess cost-effectiveness of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system for portion or entire system; or otherwise achieve ongoing improvements in manual meter reading success rate to 97% or higher. Refine meter accuracy testing program. Set meter replacement goals based upon accuracy test results. Implement annual auditing of detailed billing records by utility personnel and implement third party auditing at least once every five years.		to qualify for 10: Purchase and install meters on unmetered accounts. Launch Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system trials if manual meter reading success rate of at least 99% is not achieved within a five-year program. Continue meter accuracy testing program. Conduct planning and budgeting for large scale meter replacement based upon meter life cycle analysis using cumulative flow target. Continue annual detailed billing data auditing by utility personnel and conduct third party auditing at least once every three years.		to maintain 10: Continue annual internal billing data auditing, and third party auditing at least every three years. Continue customer meter accuracy testing to ensure that accurate customer meter readings are obtained and entered as the basis for volume based billing. Stay abreast of improvements in Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) and information management. Plan and budget for justified upgrades in metering, meter reading and billing data management to maintain very high accuracy in customer metering and billing.
Billed unmetered:	Select n/a if it is the policy of the water utility to meter all customer connections and it has been confirmed by detailed auditing that all customers do indeed have a water meter; i.e. no intentionally unmetered accounts exist	Water utility policy does not require customer metering; flat or fixed fee billing is employed. No data is collected on customer consumption. The only estimates of customer population consumption available are derived from data estimation methods using average fixture count multiplied by number of connections, or similar approach.	Water utility policy does not require customer metering; flat or fixed fee billing is employed. Some metered accounts exist in parts of the system (pilot areas or District Metered Areas) with consumption read periodically or recorded on portable dataloggers over one, three, or seven day periods. Data from these sample meters are used to infer consumption for the total customer population. Site specific estimation methods are used for unusual buildings/water uses.	Conditions between 2 and 4	Water utility policy does require metering and volume based billing in general. However, a liberal amount of exemptions and a lack of clearly written and communicated procedures result in up to 20% of billed accounts believed to be unmetered by exemption; or the water utility is in transition to becoming fully metered, and a large number of customers remain unmetered. A rough estimate of the annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 4 and 6	Water utility policy does require metering and volume based billing but established exemptions exist for a portion of accounts such as municipal buildings. As many as 15% of billed accounts are unmetered due to this exemption or meter installation difficulties. Only a group estimate of annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 6 and 8	Water utility policy does require metering and volume based billing for all customer accounts. However, less than 5% of billed accounts remain unmetered because meter installation is hindered by unusual circumstances. The goal is to minimize the number of unmetered accounts. Reliable estimates of consumption are obtained for these unmetered accounts via site specific estimation methods.	Conditions between 8 and 10	Water utility policy does require metering and volume based billing for all customer accounts. Less than 2% of billed accounts are unmetered and exist because meter installation is hindered by unusual circumstances. The goal exists to minimize the number of unmetered accounts to the extent that is economical. Reliable estimates of consumption are obtained at these accounts via site specific estimation methods.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Billed Unmetered Consumption" component:		to qualify for 2: Conduct research and evaluate cost/benefit of a new water utility policy to require metering of the customer population; thereby greatly reducing or eliminating unmetered accounts. Conduct pilot metering project by installing water meters in small sample of customer accounts and periodically reading the meters or datalogging the water consumption over one, three, or seven day periods.	to qualify for 4: Implement a new water utility policy requiring customer metering. Launch or expand pilot metering study to include several different meter types, which will provide data for economic assessment of full scale metering options. Assess sites with access difficulties to devise means to obtain water consumption volumes. Begin customer meter installation.		to qualify for 6: Refine policy and procedures to improve customer metering participation for all but solidly exempt accounts. Assign staff resources to review billing records to identify errant unmetered properties. Specify metering needs and funding requirements to install sufficient meters to significant reduce the number of unmetered accounts		to qualify for 8: Push to install customer meters on a full scale basis. Refine metering policy and procedures to ensure that all accounts, including municipal properties, are designated for meters. Plan special efforts to address "hard-to-access" accounts. Implement procedures to obtain a reliable consumption estimate for the remaining few unmetered accounts awaiting meter installation.		to qualify for 10: Continue customer meter installation throughout the service area, with a goal to minimize unmetered accounts. Sustain the effort to investigate accounts with access difficulties, and devise means to install water meters or otherwise measure water consumption.		to maintain 10: Continue to refine estimation methods for unmetered consumption and explore means to establish metering, for as many billed remaining unmetered accounts as is economically feasible.
Unbilled metered:	select n/a if all billing-exempt consumption is unmetered.	Billing practices exempt certain accounts, such as municipal buildings, but written policies do not exist; and a reliable count of unbilled metered accounts is unavailable. Meter upkeep and meter reading on these accounts is rare and not considered a priority. Due to poor recordkeeping and lack of auditing, water consumption for all such accounts is purely guesstimated.	Billing practices exempt certain accounts, such as municipal buildings, but only scattered, dated written directives exist to justify this practice. A reliable count of unbilled metered accounts is unavailable. Sporadic meter replacement and meter reading occurs on an as-needed basis. The total annual water consumption for all unbilled, metered accounts is estimated based upon approximating the number of accounts and assigning consumption from actively billed accounts of same meter size.	Conditions between 2 and 4	Dated written procedures permit billing exemption for specific accounts, such as municipal properties, but are unclear regarding certain other types of accounts. Meter reading is given low priority and is sporadic. Consumption is quantified from meter readings where available. The total number of unbilled, unmetered accounts must be estimated along with consumption volumes.	Conditions between 4 and 6	Written policies regarding billing exemptions exist but adherence in practice is questionable. Metering and meter reading for municipal buildings is reliable but sporadic for other unbilled metered accounts. Periodic auditing of such accounts is conducted. Water consumption is quantified directly from meter readings where available, but the majority of the consumption is estimated.	Conditions between 6 and 8	Written policy identifies the types of accounts granted a billing exemption. Customer meter management and meter reading are considered secondary priorities, but meter reading is conducted at least annually to obtain consumption volumes for the annual water audit. High level auditing of billing records ensures that a reliable census of such accounts exists.	Conditions between 8 and 10	Clearly written policy identifies the types of accounts given a billing exemption, with emphasis on keeping such accounts to a minimum. Customer meter management and meter reading for these accounts is given proper priority and is reliably conducted. Regular auditing confirms this. Total water consumption for these accounts is taken from reliable readings from accurate meters.
Improvements to attain higher data grading for "Unbilled Metered Consumption" component:		to qualify for 2: Reassess the water utility's policy allowing certain accounts to be granted a billing exemption. Draft an outline of a new written policy for billing exemptions, with clear justification as to why any accounts should be exempt from billing, and with the intention to keep the number of such accounts to a minimum.	to qualify for 4: Review historic written directives and policy documents allowing certain accounts to be billing-exempt. Draft an outline of a written policy for billing exemptions, identify criteria that grants an exemption, with a goal of keeping this number of accounts to a minimum. Consider increasing the priority of reading meters on unbilled accounts at least annually.		to qualify for 6: Draft a new written policy regarding billing exemptions based upon consensus criteria allowing this occurrence. Assign resources to audit meter records and billing records to obtain census of unbilled metered accounts. Gradually include a greater number of these metered accounts to the routes for regular meter reading.		to qualify for 8: Communicate billing exemption policy throughout the organization and implement procedures that ensure proper account management. Conduct inspections of accounts confirmed in unbilled metered status and verify that accurate meters exist and are scheduled for routine meter readings. Gradually increase the number of unbilled metered accounts that are included in regular meter reading routes.		to qualify for 10: Ensure that meter management (meter accuracy testing, meter replacement) and meter reading activities for unbilled accounts are accorded the same priority as billed accounts. Establish ongoing annual auditing process to ensure that water consumption is reliably collected and provided to the annual water audit process.		to maintain 10: Reassess the utility's philosophy in allowing any water uses to go "unbilled". It is possible to meter and bill all accounts, even if the fee charged for water consumption is discounted or waived. Metering and billing all accounts ensures that water consumption is tracked and water waste from plumbing leaks is detected and minimized.
Unbilled unmetered:		Extent of unbilled, unmetered consumption is unknown due to unclear policies and poor recordkeeping. Total consumption is quantified based upon a purely subjective estimate.	Clear extent of unbilled, unmetered consumption is unknown, but a number of events are randomly documented each year, confirming existence of such consumption, but without sufficient documentation to quantify an accurate estimate of the annual volume consumed.	Conditions between 2 and 4	Extent of unbilled, unmetered consumption is partially known, and procedures exist to document certain events such as miscellaneous fire hydrant uses. Formulae is used to quantify the consumption from such events (time running multiplied by typical flowrate, multiplied by number of events).	Default value of 1.25% of system input volume is employed	Coherent policies exist for some forms of unbilled, unmetered consumption but others await closer evaluation. Reasonable recordkeeping for the managed uses exists and allows for annual volumes to be quantified by inference, but unsupervised uses are guesstimated.	Conditions between 6 and 8	Clear policies and good recordkeeping exist for some uses (ex: water used in periodic testing of unmetered fire connections), but other uses (ex: miscellaneous uses of fire hydrants) have limited oversight. Total consumption is a mix of well quantified use such as from formulae (time running multiplied by typical flow, multiplied by number of events) or temporary meters, and relatively subjective estimates of less regulated use.	Conditions between 8 and 10	Clear policies exist to identify permitted use of water in unbilled, unmetered fashion, with the intention of minimizing this type of consumption. Good records document each occurrence and consumption is quantified via formulae (time running multiplied by typical flow, multiplied by number of events) or use of temporary meters.
Improvements to attain higher data grading for "Unbilled Unmetered Consumption" component:		to qualify for 5: Utilize the accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use. to qualify for 2: Establish a policy regarding what water uses should be allowed to remain as unbilled and unmetered. Consider tracking a small sample of one such use (ex: fire hydrant flushings).	to qualify for 5: Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use. to qualify for 4: Evaluate the documentation of events that have been observed. Meet with user groups (ex: for fire hydrants - fire departments, contractors to ascertain their need and/or volume requirements for water from fire hydrants).		to qualify for 5: Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process, and should focus on other components since the volume of unbilled, umetered consumption is usually a relatively small quatity component, and other larger-quantity components should take priority.	to qualify for 6 or greater: Finalize policy and begin to conduct field checks to better establish and quantify such usage. Proceed if top-down audit exists and/or a great volume of such use is suspected.	to qualify for 8: Assess water utility policy and procedures for various unmetered usages. For example, ensure that a policy exists and permits are issued for use of fire hydrants by persons outside of the utility. Create written procedures for use and documentation of fire hydrants by water utility personnel. Use same approach for other types of unbilled, unmetered water usage.		to qualify for 10: Refine written procedures to ensure that all uses of unbilled, unmetered water are overseen by a structured permitting process managed by water utility personnel. Reassess policy to determine if some of these uses have value in being converted to billed and/or metered status.		to maintain 10: Continue to refine policy and procedures with intention of reducing the number of allowable uses of water in unbilled and unmetered fashion. Any uses that can feasibly become billed and metered should be converted eventually.
APPARENT LOSSES											

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Unauthorized consumption:		Extent of unauthorized consumption is unknown due to unclear policies and poor recordkeeping. Total unauthorized consumption is guesstimated.	Unauthorized consumption is a known occurrence, but its extent is a mystery. There are no requirements to document observed events, but periodic field reports capture some of these occurrences. Total unauthorized consumption is approximated from this limited data.	conditions between 2 and 4	Procedures exist to document some unauthorized consumption such as observed unauthorized fire hydrant openings. Use formulae to quantify this consumption (time running multiplied typical flowrate, multiplied by number of events).	Default value of 0.25% of volume of water supplied is employed	Coherent policies exist for some forms of unauthorized consumption (more than simply fire hydrant misuse) but others await closer evaluation. Reasonable surveillance and recordkeeping exist for occurrences that fall under the policy. Volumes quantified by inference from these records.	Conditions between 6 and 8	Clear policies and good auditable recordkeeping exist for certain events (ex: tampering with water meters, illegal bypasses of customer meters); but other occurrences have limited oversight. Total consumption is a combination of volumes from formulae (time x typical flow) and subjective estimates of unconfirmed consumption.	Conditions between 8 and 10	Clear policies exist to identify all known unauthorized uses of water. Staff and procedures exist to provide enforcement of policies and detect violations. Each occurrence is recorded and quantified via formulae (estimated time running multiplied by typical flow) or similar methods. All records and calculations should exist in a form that can be audited by a third party.
Improvements to attain higher data grading for "Unauthorized Consumption" component:		to qualify for 5: Use accepted default of 0.25% of volume of water supplied. to qualify for 2: Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)	to qualify for 5: Use accepted default of 0.25% of system input volume to qualify for 4: Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)		to qualify for 5: Utilize accepted default value of 0.25% of volume of water supplied as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process.	to qualify for 6 or greater: Finalize policy updates to clearly identify the types of water consumption that are authorized from those usages that fall outside of this policy and are, therefore, unauthorized. Begin to conduct regular field checks. Proceed if the top-down audit already exists and/or a great volume of such use is suspected.	to quality for 8: Assess water utility policies to ensure that all known occurrences of unauthorized consumption are outlawed, and that appropriate penalties are prescribed. Create written procedures for detection and documentation of various occurrences of unauthorized consumption as they are uncovered.		to qualify for 10: Refine written procedures and assign staff to seek out likely occurrences of unauthorized consumption. Explore new locking devices, monitors and other technologies designed to detect and thwart unauthorized consumption.		to maintain 10: Continue to refine policy and procedures to eliminate any loopholes that allow or tacitly encourage unauthorized consumption. Continue to be vigilant in detection, documentation and enforcement efforts.
Customer metering inaccuracies:	select n/a only if the entire customer population is unmetered. In such a case the volume entered must be zero.	Customer meters exist, but with unorganized paper records on meters; no meter accuracy testing or meter replacement program for any size of retail meter. Metering workflow is driven chaotically with no proactive management. Loss volume due to aggregate meter inaccuracy is guesstimated.	Poor recordkeeping and meter oversight is recognized by water utility management who has allotted staff and funding resources to organize improved recordkeeping and start meter accuracy testing. Existing paper records gathered and organized to provide cursory disposition of meter population. Customer meters are tested for accuracy only upon customer request.	Conditions between 2 and 4	Reliable recordkeeping exists; meter information is improving as meters are replaced. Meter accuracy testing is conducted annually for a small number of meters (more than just customer requests, but less than 1% of inventory). A limited number of the oldest meters are replaced each year. Inaccuracy volume is largely an estimate, but refined based upon limited testing data.	Conditions between 4 and 6	A reliable electronic recordkeeping system for meters exists. The meter population includes a mix of new high performing meters and dated meters with suspect accuracy. Routine, but limited, meter accuracy testing and meter replacement occur. Inaccuracy volume is quantified using a mix of reliable and less certain data.	Conditions between 6 and 8	Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Testing is conducted on samples of meters of varying age and accumulated volume of throughput to determine optimum replacement time for various types of meters.	Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Statistically significant number of meters are tested in audit year. This testing is conducted on samples of meters of varying age and accumulated volume of throughput to determine optimum replacement time for these meters.	Good records of all active customer meters exist and include as a minimum: meter number, account number/location, type, size and manufacturer. Ongoing meter replacement occurs according to a targeted and justified basis. Regular meter accuracy testing gives a reliable measure of composite inaccuracy volume for the customer meter population. New metering technology is embraced to keep overall accuracy improving. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Improvements to attain higher data grading for "Customer meter inaccuracy volume" component:	If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	to qualify for 2: Gather available meter purchase records. Conduct testing on a small number of meters believed to be the most inaccurate. Review staffing needs of the metering group and budget for necessary resources to better organize meter management.	to qualify for 4: Implement a reliable record keeping system for customer meter histories, preferably using electronic methods typically linked to, or part of, the Customer Billing System or Customer Information System. Expand meter accuracy testing to a larger group of meters.		to qualify for 6: Standardize the procedures for meter recordkeeping within an electronic information system. Accelerate meter accuracy testing and meter replacements guided by testing results.		to qualify for 8: Expand annual meter accuracy testing to evaluate a statistically significant number of meter makes/models. Expand meter replacement program to replace statistically significant number of poor performing meters each year.		to qualify for 9: Continue efforts to manage meter population with reliable recordkeeping. Test a statistically significant number of meters each year and analyze test results in an ongoing manner to serve as a basis for a target meter replacement strategy based upon accumulated volume throughput.	to qualify for 10: Continue efforts to manage meter population with reliable recordkeeping, meter testing and replacement. Evaluate new meter types and install one or more types in 5-10 customer accounts each year in order to pilot improving metering technology.	to maintain 10: Increase the number of meters tested and replaced as justified by meter accuracy test data. Continually monitor development of new metering technology and Advanced Metering Infrastructure (AMI) to grasp opportunities for greater accuracy in metering of water flow and management of customer consumption data.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Systematic Data Handling Errors:	Note: all water utilities incur some amount of this error. Even in water utilities with unmetered customer populations and fixed rate billing, errors occur in annual billing tabulations. Enter a positive value for the volume and select a grading.	Policies and procedures for activation of new customer water billing accounts are vague and lack accountability. Billing data is maintained on paper records which are not well organized. No auditing is conducted to confirm billing data handling efficiency. An unknown number of customers escape routine billing due to lack of billing process oversight.	Policy and procedures for activation of new customer accounts and oversight of billing records exist but need refinement. Billing data is maintained on paper records or insufficiently capable electronic database. Only periodic unstructured auditing work is conducted to confirm billing data handling efficiency. The volume of unbilled water due to billing lapses is a guess.	Conditions between 2 and 4	Policy and procedures for new account activation and oversight of billing operations exist but needs refinement. Computerized billing system exists, but is dated or lacks needed functionality. Periodic, limited internal audits conducted and confirm with approximate accuracy the consumption volumes lost to billing lapses.	Conditions between 4 and 6	Policy and procedures for new account activation and oversight of billing operations is adequate and reviewed periodically. Computerized billing system is in use with basic reporting available. Any effect of billing adjustments on measured consumption volumes is well understood. Internal checks of billing data error conducted annually. Reasonably accurate quantification of consumption volume lost to billing lapses is obtained.	Conditions between 6 and 8	New account activation and billing operations policy and procedures are reviewed at least biannually. Computerized billing system includes an array of reports to confirm billing data and system functionality. Checks are conducted routinely to flag and explain zero consumption accounts. Annual internal checks conducted with third party audit conducted at least once every five years. Accountability checks flag billing lapses. Consumption lost to billing lapses is well quantified and reducing year-by-year.	Conditions between 8 and 10	Sound written policy and procedures exist for new account activation and oversight of customer billing operations. Robust computerized billing system gives high functionality and reporting capabilities which are utilized, analyzed and the results reported each billing cycle. Assessment of policy and data handling errors are conducted internally and audited by third party at least once every three years, ensuring consumption lost to billing lapses is minimized and detected as it occurs.
Improvements to attain higher data grading for "Systematic Data Handling Error volume" component:		to qualify for 2: Draft written policy and procedures for activating new water billing accounts and oversight of billing operations. Investigate and budget for computerized customer billing system. Conduct initial audit of billing records by flow-charting the basic business processes of the customer account/billing function.	to qualify for 4: Finalize written policy and procedures for activation of new billing accounts and overall billing operations management. Implement a computerized customer billing system. Conduct initial audit of billing records as part of this process.		to qualify for 6: Refine new account activation and billing operations procedures and ensure consistency with the utility policy regarding billing, and minimize opportunity for missed billings. Upgrade or replace customer billing system for needed functionality - ensure that billing adjustments don't corrupt the value of consumption volumes. Procedurize internal annual audit process.		to qualify for 8: Formalize regular review of new account activation process and general billing practices. Enhance reporting capability of computerized billing system. Formalize regular auditing process to reveal scope of data handling error. Plan for periodic third party audit to occur at least once every five years.		to qualify for 10: Close policy/procedure loopholes that allow some customer accounts to go unbilled, or data handling errors to exist. Ensure that billing system reports are utilized, analyzed and reported every billing cycle. Ensure that internal and third party audits are conducted at least once every three years.		to maintain 10: Stay abreast of customer information management developments and innovations. Monitor developments of Advanced Metering Infrastructure (AMI) and integrate technology to ensure that customer endpoint information is well-monitored and errors/lapses are at an economic minimum.
SYSTEM DATA											
Length of mains:		Poorly assembled and maintained paper as-built records of existing water main installations makes accurate determination of system pipe length impossible. Length of mains is guesstimated.	Paper records in poor or uncertain condition (no annual tracking of installations & abandonments). Poor procedures to ensure that new water mains installed by developers are accurately documented.	Conditions between 2 and 4	Sound written policy and procedures exist for documenting new water main installations, but gaps in management result in a uncertain degree of error in tabulation of mains length.	Conditions between 4 and 6	Sound written policy and procedures exist for permitting and commissioning new water mains. Highly accurate paper records with regular field validation; or electronic records and asset management system in good condition. Includes system backup.	Conditions between 6 and 8	Sound written policy and procedures exist for permitting and commissioning new water mains. Electronic recordkeeping such as a Geographical Information System (GIS) and asset management system are used to store and manage data.	Conditions between 8 and 10	Sound written policy exists for managing water mains extensions and replacements. Geographic Information System (GIS) data and asset management database agree and random field validation proves truth of databases. Records of annual field validation should be available for review.
Improvements to attain higher data grading for "Length of Water Mains" component:		to qualify for 2: Assign personnel to inventory current as-built records and compare with customer billing system records and highway plans in order to verify poorly documented pipelines. Assemble policy documents regarding permitting and documentation of water main installations by the utility and building developers; identify gaps in procedures that result in poor documentation of new water main installations.	to qualify for 4: Complete inventory of paper records of water main installations for several years prior to audit year. Review policy and procedures for commissioning and documenting new water main installation.		to qualify for 6: Finalize updates/improvements to written policy and procedures for permitting/commissioning new main installations. Confirm inventory of records for five years prior to audit year; correct any errors or omissions.		to qualify for 8: Launch random field checks of limited number of locations. Convert to electronic database such as a Geographic Information System (GIS) with backup as justified. Develop written policy and procedures.		to qualify for 10: Link Geographic Information System (GIS) and asset management databases, conduct field verification of data. Record field verification information at least annually.		to maintain 10: Continue with standardization and random field validation to improve the completeness and accuracy of the system.
Number of active AND inactive service connections:		Vague permitting (of new service connections) policy and poor paper recordkeeping of customer connections/billings result in suspect determination of the number of service connections, which may be 10-15% in error from actual count.	General permitting policy exists but paper records, procedural gaps, and weak oversight result in questionable total for number of connections, which may vary 5-10% of actual count.	Conditions between 2 and 4	Written account activation policy and procedures exist, but with some gaps in performance and oversight. Computerized information management system is being brought online to replace dated paper recordkeeping system. Reasonably accurate tracking of service connection installations & abandonments; but count can be up to 5% in error from actual total.	Conditions between 4 and 6	Written new account activation and overall billing policies and procedures are adequate and reviewed periodically. Computerized information management system is in use with annual installations & abandonments totaled. Very limited field verifications and audits. Error in count of number of service connections is believed to be no more than 3%.	Conditions between 6 and 8	Policies and procedures for new account activation and overall billing operations are written, well-structured and reviewed at least biannually. Well-managed computerized information management system exists and routine, periodic field checks and internal system audits are conducted. Counts of connections are no more than 2% in error.	Conditions between 8 and 10	Sound written policy and well managed and audited procedures ensure reliable management of service connection population. Computerized information management system, Customer Billing System, and Geographic Information System (GIS) information agree; field validation proves truth of databases. Count of connections recorded as being in error is less than 1% of the entire population.
Improvements to attain higher data grading for "Number of Active and Inactive Service Connections" component:	**Note: The number of Service Connections does not include fire hydrant leads/lines connecting the hydrant to the water main**	to qualify for 2: Draft new policy and procedures for new account activation and overall billing operations. Research and collect paper records of installations & abandonments for several years prior to audit year.	to qualify for 4: Refine policy and procedures for new account activation and overall billing operations. Research computerized recordkeeping system (Customer Information System or Customer Billing System) to improve documentation format for service connections.		to qualify for 6: Refine procedures to ensure consistency with new account activation and overall billing policy to establish new service connections or decommission existing connections. Improve process to include all totals for at least five years prior to audit year.		to qualify for 8: Formalize regular review of new account activation and overall billing operations policies and procedures. Launch random field checks of limited number of locations. Develop reports and auditing mechanisms for computerized information management system.		to qualify for 10: Close any procedural loopholes that allow installations to go undocumented. Link computerized information management system with Geographic Information System (GIS) and formalize field inspection and information system auditing processes. Documentation of new or decommissioned service connections encounters several levels of checks and balances.		to maintain 10: Continue with standardization and random field validation to improve knowledge of system.
	Note: if customer water	Gradings 1-9 apply if customer properties are unmetered, if customer meters exist and are located inside the customer building premises, or if the water utility owns and is responsible for the entire service connection piping from the water main to the customer building. In any of these cases the average distance between the curb stop or boundary separating utility/customer responsibility for service connection piping, and the typical first point of use (ex: faucet) or the customer meter must be quantified. Gradings of 1-9 are used to grade the validity of the means to quantify this value. (See the "Service Connection Diagram" worksheet)									Either of two conditions can be met for a grading of 10:

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Average length of customer service line:	meters are located outside of the customer building next to the curb stop or boundary separating utility/customer responsibility, then the auditor should answer "Yes" to the question on the Reporting Worksheet asking about this. If the answer is Yes, the grading description listed under the Grading of 10(a) will be followed, with a value of zero automatically entered at a Grading of 10. See the Service Connection Diagram worksheet for a visual presentation of this distance.	Vague policy exists to define the delineation of water utility ownership and customer ownership of the service connection piping. Curb stops are perceived as the breakpoint but these have not been well-maintained or documented. Most are buried or obscured. Their location varies widely from site-to-site, and estimating this distance is arbitrary due to the unknown location of many curb stops.	Policy requires that the curb stop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. The piping from the water main to the curb stop is the property of the water utility; and the piping from the curb stop to the customer building is owned by the customer. Curb stop locations are not well documented and the average distance is based upon a limited number of locations measured in the field.	Conditions between 2 and 4	Good policy requires that the curb stop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. Curb stops are generally installed as needed and are reasonably documented. Their location varies widely from site-to-site, and an estimate of this distance is hindered by the availability of paper records of limited accuracy.	Conditions between 4 and 6	Clear written policy exists to define utility/customer responsibility for service connection piping. Accurate, well-maintained paper or basic electronic recordkeeping system exists. Periodic field checks confirm piping lengths for a sample of customer properties.	Conditions between 6 and 8	Clearly worded policy standardizes the location of curb stops and meters, which are inspected upon installation. Accurate and well maintained electronic records exist with periodic field checks to confirm locations of service lines, curb stops and customer meter pits. An accurate number of customer properties from the customer billing system allows for reliable averaging of this length.	Conditions between 8 and 10	a) Customer water meters exist outside of customer buildings next to the curb stop or boundary separating utility/customer responsibility for service connection piping. If so, answer "Yes" to the question on the Reporting Working asking about this condition. A value of zero and a Grading of 10 are automatically entered in the Reporting Worksheet . b). Meters exist inside customer buildings, or properties are unmetered. In either case, answer "No" to the Reporting Worksheet question on meter location, and enter a distance determined by the auditor. For a Grading of 10 this value must be a very reliable number from a Geographic Information System (GIS) and confirmed by a statistically valid number of field checks.
Improvements to attain higher data grading for "Average Length of Customer Service Line" component:		to qualify for 2: Research and collect paper records of service line installations. Inspect several sites in the field using pipe locators to locate curb stops. Obtain the length of this small sample of connections in this manner.	to qualify for 4: Formalize and communicate policy delineating utility/customer responsibilities for service connection piping. Assess accuracy of paper records by field inspection of a small sample of service connections using pipe locators as needed. Research the potential migration to a computerized information management system to store service connection data.		to qualify for 6: Establish coherent procedures to ensure that policy for curb stop, meter installation and documentation is followed. Gain consensus within the water utility for the establishment of a computerized information management system.		to qualify for 8: Implement an electronic means of recordkeeping, typically via a customer information system, customer billing system, or Geographic Information System (GIS). Standardize the process to conduct field checks of a limited number of locations.		to qualify for 10: Link customer information management system and Geographic Information System (GIS), standardize process for field verification of data.		to maintain 10: Continue with standardization and random field validation to improve knowledge of service connection configurations and customer meter locations.
Average operating pressure:		Available records are poorly assembled and maintained paper records of supply pump characteristics and water distribution system operating conditions. Average pressure is guesstimated based upon this information and ground elevations from crude topographical maps. Widely varying distribution system pressures due to undulating terrain, high system head loss and weak/erratic pressure controls further compromise the validity of the average pressure calculation.	Limited telemetry monitoring of scattered pumping station and water storage tank sites provides some static pressure data, which is recorded in handwritten logbooks. Pressure data is gathered at individual sites only when low pressure complaints arise. Average pressure is determined by averaging relatively crude data, and is affected by significant variation in ground elevations, system head loss and gaps in pressure controls in the distribution system.	Conditions between 2 and 4	Effective pressure controls separate different pressure zones; moderate pressure variation across the system, occasional open boundary valves are discovered that breech pressure zones. Basic telemetry monitoring of the distribution system logs pressure data electronically. Pressure data gathered by gauges or dataloggers at fire hydrants or buildings when low pressure complaints arise, and during fire flow tests and system flushing. Reliable topographical data exists. Average pressure is calculated using this mix of data.	Conditions between 4 and 6	Reliable pressure controls separate distinct pressure zones; only very occasional open boundary valves are encountered that breech pressure zones. Well-covered telemetry monitoring of the distribution system (not just pumping at source treatment plants or wells) logs extensive pressure data electronically. Pressure gathered by gauges/dataloggers at fire hydrants and buildings when low pressure complaints arise, and during fire flow tests and system flushing. Average pressure is determined by using this mix of reliable data.	Conditions between 6 and 8	Well-managed, discrete pressure zones exist with generally predictable pressure fluctuations. A current full-scale SCADA System or similar realtime monitoring system exists to monitor the water distribution system and collect data, including real time pressure readings at representative sites across the system. The average system pressure is determined from reliable monitoring system data.	Conditions between 8 and 10	Well-managed pressure districts/zones, SCADA System and hydraulic model exist to give very precise pressure data across the water distribution system. Average system pressure is reliably calculated from extensive, reliable, and cross-checked data. Calculations are reported on an annual basis as a minimum.
Improvements to attain higher data grading for "Average Operating Pressure" component:		to qualify for 2: Employ pressure gauging and/or datalogging equipment to obtain pressure measurements from fire hydrants. Locate accurate topographical maps of service area in order to confirm ground elevations. Research pump data sheets to find pump pressure/flow characteristics	to qualify for 4: Formalize a procedure to use pressure gauging/datalogging equipment to gather pressure data during various system events such as low pressure complaints, or operational testing. Gather pump pressure and flow data at different flow regimes. Identify faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) and plan to properly configure pressure zones. Make all pressure data from these efforts available to generate system-wide average pressure.		to qualify for 6: Expand the use of pressure gauging/datalogging equipment to gather scattered pressure data at a representative set of sites, based upon pressure zones or areas. Utilize pump pressure and flow data to determine supply head entering each pressure zone or district. Correct any faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) to ensure properly configured pressure zones. Use expanded pressure dataset from these activities to generate system-wide average pressure.		to qualify for 8: Install a Supervisory Control and Data Acquisition (SCADA) System, or similar realtime monitoring system, to monitor system parameters and control operations. Set regular calibration schedule for instrumentation to insure data accuracy. Obtain accurate topographical data and utilize pressure data gathered from field surveys to provide extensive, reliable data for pressure averaging.		to qualify for 10: Annually, obtain a system-wide average pressure value from the hydraulic model of the distribution system that has been calibrated via field measurements in the water distribution system and confirmed in comparisons with SCADA System data.		to maintain 10: Continue to refine the hydraulic model of the distribution system and consider linking it with SCADA System for real-time pressure data calibration, and averaging.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
COST DATA											
Total annual cost of operating water system:		Incomplete paper records and lack of financial accounting documentation on many operating functions makes calculation of water system operating costs a pure guesstimate	Reasonably maintained, but incomplete, paper or electronic accounting provides data to estimate the major portion of water system operating costs.	Conditions between 2 and 4	Electronic, industry-standard cost accounting system in place. However, gaps in data are known to exist, periodic internal reviews are conducted but not a structured financial audit.	Conditions between 4 and 6	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited periodically by utility personnel, but not a Certified Public Accountant (CPA).	Conditions between 6 and 8	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited at least annually by utility personnel, and at least once every three years by third-party CPA.	Conditions between 8 and 10	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited annually by utility personnel and annually also by third-party CPA.
Improvements to attain higher data grading for "Total Annual Cost of Operating the Water System" component:		to qualify for 2: Gather available records, institute new financial accounting procedures to regularly collect and audit basic cost data of most important operations functions.	to qualify for 4: Implement an electronic cost accounting system, structured according to accounting standards for water utilities		to qualify for 6: Establish process for periodic internal audit of water system operating costs; identify cost data gaps and institute procedures for tracking these outstanding costs.		to qualify for 8: Standardize the process to conduct routine financial audit on an annual basis. Arrange for CPA audit of financial records at least once every three years.		to qualify for 10: Standardize the process to conduct a third-party financial audit by a CPA on an annual basis.		to maintain 10: Maintain program, stay abreast of expenses subject to erratic cost changes and long-term cost trend, and budget/track costs proactively
Customer retail unit cost (applied to Apparent Losses):	Customer population unmetered, and/or only a fixed fee is charged for consumption.	Antiquated, cumbersome water rate structure is used, with periodic historic amendments that were poorly documented and implemented; resulting in classes of customers being billed inconsistent charges. The actual composite billing rate likely differs significantly from the published water rate structure, but a lack of auditing leaves the degree of error indeterminate.	Dated, cumbersome water rate structure, not always employed consistently in actual billing operations. The actual composite billing rate is known to differ from the published water rate structure, and a reasonably accurate estimate of the degree of error is determined, allowing a composite billing rate to be quantified.	Conditions between 2 and 4	Straight-forward water rate structure in use, but not updated in several years. Billing operations reliably employ the rate structure. The composite billing rate is derived from a single customer class such as residential customer accounts, neglecting the effect of different rates from varying customer classes.	Conditions between 4 and 6	Clearly written, up-to-date water rate structure is in force and is applied reliably in billing operations. Composite customer rate is determined using a weighted average residential rate using volumes of water in each rate block.	Conditions between 6 and 8	Effective water rate structure is in force and is applied reliably in billing operations. Composite customer rate is determined using a weighted average composite consumption rate, which includes residential, commercial, industrial, institutional (CII), and any other distinct customer classes within the water rate structure.	Conditions between 8 and 10	Current, effective water rate structure is in force and applied reliably in billing operations. The rate structure and calculations of composite rate - which includes residential, commercial, industrial, institutional (CII), and other distinct customer classes - are reviewed by a third party knowledgeable in the M36 methodology at least once every five years.
Improvements to attain higher data grading for "Customer Retail Unit Cost" component:		to qualify for 2: Formalize the process to implement water rates, including a secure documentation procedure. Create a current, formal water rate document and gain approval from all stakeholders.	to qualify for 4: Review the water rate structure and update/formalize as needed. Assess billing operations to ensure that actual billing operations incorporate the established water rate structure.		to qualify for 6: Evaluate volume of water used in each usage block by residential users. Multiply volumes by full rate structure.	Launch effort to fully meter the customer population and charge rates based upon water volumes	to qualify for 8: Evaluate volume of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.		to qualify for 10: Conduct a periodic third-party audit of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.		to maintain 10: Keep water rate structure current in addressing the water utility's revenue needs. Update the calculation of the customer unit rate as new rate components, customer classes, or other components are modified.
Variable production cost (applied to Real Losses):	Note: if the water utility purchases/imports its entire water supply, then enter the unit purchase cost of the bulk water supply in the Reporting Worksheet with a grading of 10	Incomplete paper records and lack of documentation on primary operating functions (electric power and treatment costs most importantly) makes calculation of variable production costs a pure guesstimate	Reasonably maintained, but incomplete, paper or electronic accounting provides data to roughly estimate the basic operations costs (pumping power costs and treatment costs) and calculate a unit variable production cost.	Conditions between 2 and 4	Electronic, industry-standard cost accounting system in place. Electric power and treatment costs are reliably tracked and allow accurate weighted calculation of unit variable production costs based on these two inputs and water imported purchase costs (if applicable). All costs are audited internally on a periodic basis.	Conditions between 4 and 6	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Pertinent additional costs beyond power, treatment and water imported purchase costs (if applicable) such as liability, residuals management, wear and tear on equipment, impending expansion of supply, are included in the unit variable production cost, as applicable. The data is audited at least annually by utility personnel.	Conditions between 6 and 8	Reliable electronic, industry-standard cost accounting system in place, with all pertinent primary and secondary variable production and water imported purchase (if applicable) costs tracked. The data is audited at least annually by utility personnel, and at least once every three years by a third-party knowledgeable in the M36 methodology.	Conditions between 8 and 10	Either of two conditions can be met to obtain a grading of 10: 1) Third party CPA audit of all pertinent primary and secondary variable production and water imported purchase (if applicable) costs on an annual basis. or: 2) Water supply is entirely purchased as bulk imported water, and unit purchase cost serves as the variable production cost.
Improvements to attain higher data grading for "Variable Production Cost" component:		to qualify for 2: Gather available records, institute new procedures to regularly collect and audit basic cost data and most important operations functions.	to qualify for 4: Implement an electronic cost accounting system, structured according to accounting standards for water utilities		to qualify for 6: Formalize process for regular internal audits of production costs. Assess whether additional costs (liability, residuals management, equipment wear, impending infrastructure expansion) should be included to calculate a more representative variable production cost.		to qualify for 8: Formalize the accounting process to include direct cost components (power, treatment) as well as indirect cost components (liability, residuals management, etc.) Arrange to conduct audits by a knowledgable third-party at least once every three years.		to qualify for 10: Standardize the process to conduct a third-party financial audit by a CPA on an annual basis.		to maintain 10: Maintain program, stay abreast of expenses subject to erratic cost changes and budget/track costs proactively

AWWA Free Water Audit Software: Customer Service Line Diagrams

WAS v5.0

American Water Works Association.
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Average Length of Customer Service Line

The three figures shown on this worksheet display the assignment of the Average Length of Customer Service Line, Lp, for the three most common piping configurations.

Figure 1 shows the configuration of the water meter outside of the customer building next to the curb stop valve. In this configuration Lp = 0 since the distance between the curb stop and the customer metering point is essentially zero.

Figure 2 shows the configuration of the customer water meter located inside the customer building, where Lp is the distance from the curb stop to the water meter.

Figure 3 shows the configuration of an unmetered customer building , where Lp is the distance from the curb stop to the first point of customer water consumption, or, more simply, the building line.

In any water system the Lp will vary notably in a community of different structures, therefore the average Lp value is used and this should be approximated or calculated if a sample of service line measurements has been gathered.

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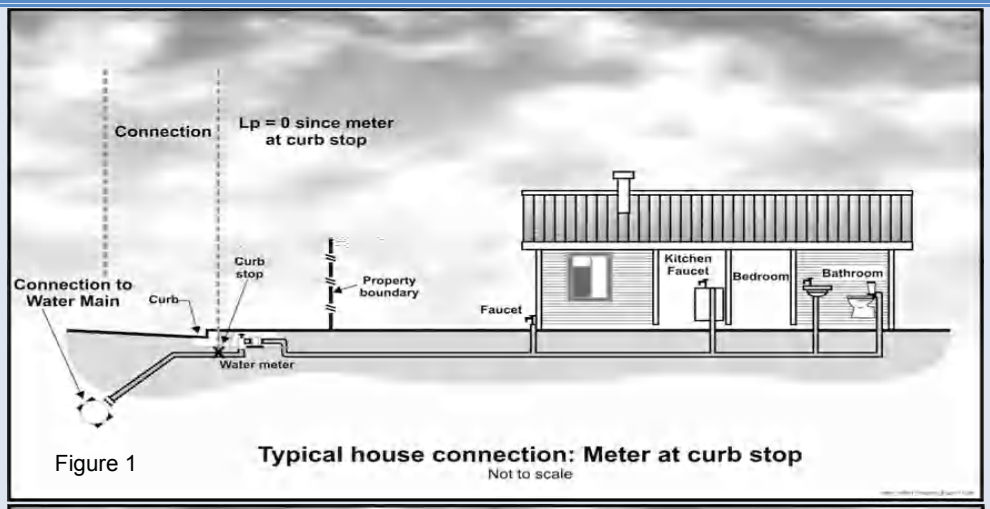

Figure 1 **Typical house connection: Meter at curb stop**
Not to scale

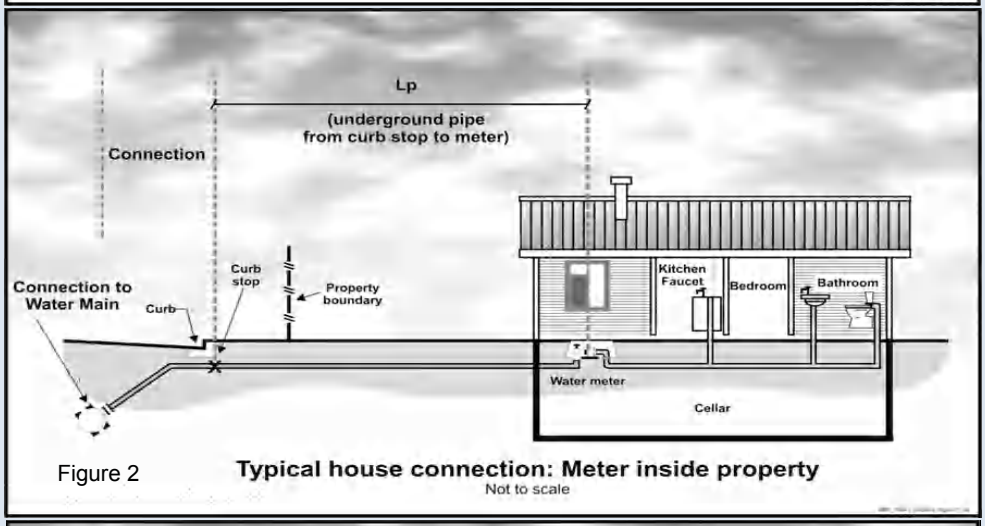

Figure 2 **Typical house connection: Meter inside property**
Not to scale

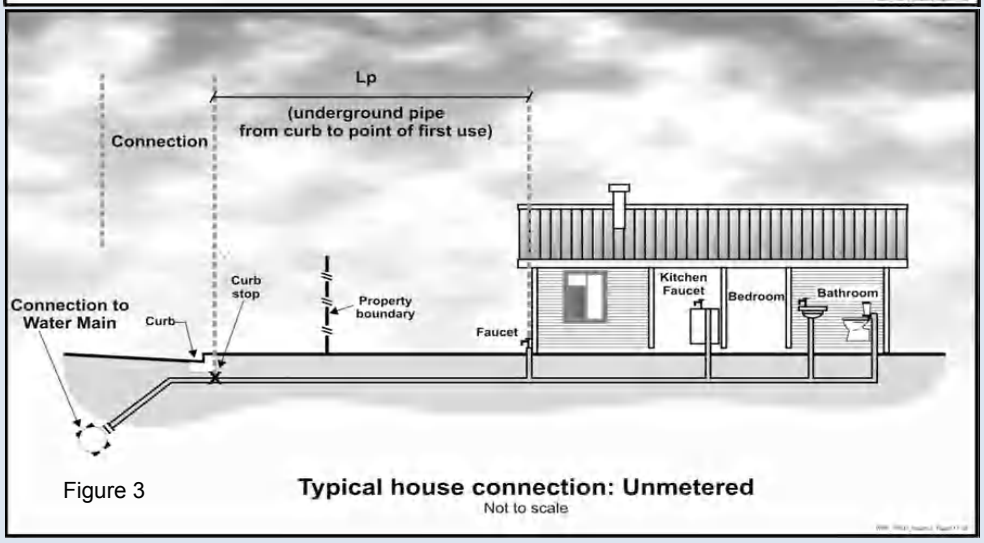

Figure 3 **Typical house connection: Unmetered**
Not to scale

AWWA Free Water Audit Software: Definitions

WAS v5.0

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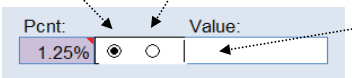
Item Name	Description
Apparent Losses Find	= unauthorized consumption + customer metering inaccuracies + systematic data handling errors Apparent Losses include all types of inaccuracies associated with customer metering (worn meters as well as improperly sized meters or wrong type of meter for the water usage profile) as well as systematic data handling errors (meter reading, billing, archiving and reporting), plus unauthorized consumption (theft or illegal use). NOTE: Over-estimation of Apparent Losses results in under-estimation of Real Losses. Under-estimation of Apparent Losses results in over-estimation of Real Losses.
AUTHORIZED CONSUMPTION Find	= billed water exported + billed metered + billed unmetered + unbilled metered + unbilled unmetered consumption The volume of metered and/or unmetered water taken by registered customers, the water utility's own uses, and uses of others who are implicitly or explicitly authorized to do so by the water utility; for residential, commercial, industrial and public-minded purposes. Typical retail customers' consumption is tabulated usually from established customer accounts as billed metered consumption, or - for unmetered customers - billed unmetered consumption. These types of consumption, along with billed water exported, provide revenue potential for the water utility. **Be certain to tabulate the water exported volume as a separate component and do not "double-count" it by including in the billed metered consumption component as well as the water exported component.** Unbilled authorized consumption occurs typically in non-account uses, including water for fire fighting and training, flushing of water mains and sewers, street cleaning, watering of municipal gardens, public fountains, or similar public-minded uses. Occasionally these uses may be metered and billed (or charged a flat fee), but usually they are unmetered and unbilled. In the latter case, the water auditor may use a default value to estimate this quantity, or implement procedures for the reliable quantification of these uses. This starts with documenting usage events as they occur and estimating the amount of water used in each event. (See Unbilled unmetered consumption)
View Service Connection Diagram **Average length of customer service line** Find	This is the average length of customer service line, Lp, that is owned and maintained by the customer; from the point of ownership transfer to the customer water meter, or building line (if unmetered). The quantity is one of the data inputs for the calculation of Unavoidable Annual Real Losses (UARL), which serves as the denominator of the performance indicator: Infrastructure Leakage Index (ILI). The value of Lp is multiplied by the number of customer service connections to obtain a total length of customer owned piping in the system. The purpose of this parameter is to account for the unmetered service line infrastructure that is the responsibility of the customer for arranging repairs of leaks that occur on their lines. In many cases leak repairs arranged by customers take longer to be executed than leak repairs arranged by the water utility on utility-maintained piping. Leaks run longer - and lose more water - on customer-owned service piping, than utility owned piping. If the customer water meter exists near the ownership transfer point (usually the curb stop located between the water main and the customer premises) this distance is zero because the meter and transfer point are the same. This is the often encountered configuration of customer water meters located in an underground meter box or "pit" outside of the customer's building. The Free Water Audit Software asks a "Yes/No" question about the meter at this location. If the auditor selects "Yes" then this distance is set to zero and the data grading score for this component is set to 10. If water meters are typically located inside the customer premise/building, or properties are unmetered, it is up to the water auditor to estimate a system-wide average Lp length based upon the various customer land parcel sizes and building locations in the service area. Lp will be a shorter length in areas of high density housing, and a longer length in areas of low density housing and varied commercial and industrial buildings. General parcel demographics should be employed to obtain a composite average Lp length for the entire system. Refer to the "Service Connection Diagram" worksheet for a depiction of the service line/metering configurations that typically exist in water utilities. This worksheet gives guidance on the determination of the Average Length, Lp, for each configuration.
Average operating pressure Find	This is the average pressure in the distribution system that is the subject of the water audit. Many water utilities have a calibrated hydraulic model of their water distribution system. For these utilities, the hydraulic model can be utilized to obtain a very accurate quantity of average pressure. In the absence of a hydraulic model, the average pressure may be approximated by obtaining readings of static water pressure from a representative sample of fire hydrants or other system access points evenly located across the system. A weighted average of the pressure can be assembled; but be sure to take into account the elevation of the fire hydrants, which typically exist several feet higher than the level of buried water pipelines. If the water utility is compiling the water audit for the first time, the average pressure can be approximated, but with a low data grading. In subsequent years of auditing, effort should be made to improve the accuracy of the average pressure quantity. This will then qualify the value for a higher data grading.
Billed Authorized Consumption	All consumption that is billed and authorized by the utility. This may include both metered and unmetered consumption. See "Authorized Consumption" for more information.
Billed metered consumption Find	All metered consumption which is billed to retail customers, including all groups of customers such as domestic, commercial, industrial or institutional. **It does NOT include water supplied to neighboring utilities (water exported) which is metered and billed. Be sure to subtract any consumption for exported water sales that may be included in these billing roles. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component.** The metered consumption data can be taken directly from billing records for the water audit period. The accuracy of yearly metered consumption data can be refined by including an adjustment to account for customer meter reading lag time since not all customer meters are read on the same day of the meter reading period. However additional analysis is necessary to determine the lag time adjustment value, which may or may not be significant.
Billed unmetered consumption Find	All billed consumption which is calculated based on estimates or norms from water usage sites that have been determined <u>by utility policy</u> to be left unmetered. This is typically a very small component in systems that maintain a policy to meter their customer population. However, this quantity can be the key consumption component in utilities that have not adopted a universal metering policy. **This component should NOT include any water that is supplied to neighboring utilities (water exported) which is unmetered but billed. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component.**

Item Name	Description
Customer metering inaccuracies Find	Apparent water losses caused by the collective under-registration of customer water meters. Many customer water meters gradually wear as large cumulative volumes of water are passed through them over time. This causes the meters to under-register the flow of water. This occurrence is common with smaller residential meters of sizes 5/8-inch and 3/4 inch after they have registered very large cumulative volumes of water, which generally occurs only after periods of years. For meters sized 1-inch and larger - typical of multi-unit residential, commercial and industrial accounts - meter under-registration can occur from wear or from the improper application of the meter; i.e. installing the wrong type of meter or the wrong size of meter, for the flow pattern (profile) of the consumer. For instance, many larger meters have reduced accuracy at low flows. If an oversized meter is installed, most of the time the routine flow will occur in the low flow range of the meter, and a significant portion of it may not be registered. It is important to properly select and install all meters, but particularly large customer meters, size 1-inch and larger. The auditor has two options for entering data for this component of the audit. The auditor can enter a percentage under-registration (typically an estimated value), this will apply the selected percentage to the two categories of metered consumption to determine the volume of water not recorded due to customer meter inaccuracy. Note that this percentage is a composite average inaccuracy for all customer meters in the entire meter population. The percentage will be multiplied by the sum of the volumes in the Billed Metered and Unbilled Metered components. Alternatively, if the auditor has substantial data from meter testing activities, he or she can calculate their own loss volumes, and this volume may be entered directly. Note that a value of zero will be accepted but an alert will appear asking if the customer population is unmetered. Since all metered systems have some degree of inaccuracy, a positive value should be entered. A value of zero in this component is valid only if the water utility does not meter its customer population.
Customer retail unit cost Find	The Customer Retail Unit Cost represents the charge that customers pay for water service. This unit cost is applied routinely to the components of Apparent Loss, since these losses represent water reaching customers but not (fully) paid for. Since most water utilities have a rate structure that includes a variety of different costs based upon class of customer, a weighted average of individual costs and number of customer accounts in each class can be calculated to determine a single composite cost that should be entered into this cell. Finally, the weighted average cost should also include additional charges for sewer, storm water or biosolids processing, but only if these charges are based upon the volume of potable water consumed. For water utilities in regions with limited water resources and a questionable ability to meet the drinking water demands in the future, the Customer Retail Unit Cost might also be applied to value the Real Losses; instead of applying the Variable Production Cost to Real Losses. In this way, it is assumed that every unit volume of leakage reduced by leakage management activities will be sold to a customer. Note: the Free Water Audit Software allows the user to select the units that are charged to customers (either $/1,000 gallons, $/hundred cubic feet, or $/1,000 litres) and automatically converts these units to the units that appear in the "WATER SUPPLIED" box. The monetary units are United States dollars, $.
Infrastructure Leakage Index (ILI) Find	The ratio of the Current Annual Real Losses (Real Losses) to the Unavoidable Annual Real Losses (UARL). The ILI is a highly effective performance indicator for comparing (benchmarking) the performance of utilities in operational management of real losses.
Length of mains Find	Length of all pipelines (except service connections) in the system starting from the point of system input metering (for example at the outlet of the treatment plant). It is also recommended to include in this measure the total length of fire hydrant lead pipe. Hydrant lead pipe is the pipe branching from the water main to the fire hydrant. Fire hydrant leads are typically of a sufficiently large size that is more representative of a pipeline than a service connection. The average length of hydrant leads across the entire system can be assumed if not known, and multiplied by the number of fire hydrants in the system, which can also be assumed if not known. This value can then be added to the total pipeline length. Total length of mains can therefore be calculated as: Length of Mains, miles = (total pipeline length, miles) + [{(average fire hydrant lead length, ft) x (number of fire hydrants)} / 5,280 ft/mile] or Length of Mains, kilometres = (total pipeline length, kilometres) + [{(average fire hydrant lead length, metres) x (number of fire hydrants)} / 1,000 metres/kilometre]
NON-REVENUE WATER Find	= Apparent Losses + Real Losses + Unbilled Metered Consumption + Unbilled Unmetered Consumption. This is water which does not provide revenue potential to the utility.
Number of active AND inactive service connections Find	Number of customer service connections, extending from the water main to supply water to a customer. Please note that this includes the actual number of distinct piping connections, including fire connections, whether active or inactive. This may differ substantially from the number of customers (or number of accounts). **Note: this number does not include the pipeline leads to fire hydrants - the total length of piping supplying fire hyrants should be included in the "Length of mains" parameter.**
Real Losses Find	Physical water losses from the pressurized system (water mains and customer service connections) and the utility's storage tanks, up to the point of customer consumption. In metered systems this is the customer meter, in unmetered situations this is the first point of consumption (stop tap/tap) within the property. The annual volume lost through all types of leaks, breaks and overflows depends on frequencies, flow rates, and average duration of individual leaks, breaks and overflows.
Revenue Water	Those components of System Input Volume that are billed and have the potential to produce revenue.
Service Connection Density Find	=number of customer service connections / length of mains

Item Name	Description
Systematic data handling errors Find	Apparent losses caused by accounting omissions, errant computer programming, gaps in policy, procedure, and permitting/activation of new accounts; and any type of data lapse that results in under-stated customer water consumption in summary billing reports. **Systematic Data Handling Errors result in a direct loss of revenue potential. Water utilities can find "lost" revenue by keying on this component.** Utilities typically measure water consumption registered by water meters at customer premises. The meter should be read routinely (ex: monthly) and the data transferred to the Customer Billing System, which generates and sends a bill to the customer. Data Transfer Errors result in the consumption value being less than the actual consumption, creating an apparent loss. Such error might occur from illegible and mis-recorded hand-written readings compiled by meter readers, inputting an incorrect meter register unit conversion factor in the automatic meter reading equipment, or a variety of similar errors. Apparent losses also occur from Data Analysis Errors in the archival and data reporting processes of the Customer Billing System. Inaccurate estimates used for accounts that fail to produce a meter reading are a common source of error. Billing adjustments may award customers a rightful monetary credit, but do so by creating a negative value of consumption, thus under-stating the actual consumption. Account activation lapses may allow new buildings to use water for months without meter readings and billing. Poor permitting and construction inspection practices can result in a new building lacking a billing account, a water meter and meter reading; i.e., the customer is unknown to the utility's billing system. Close auditing of the permitting, metering, meter reading, billing and reporting processes of the water consumption data trail can uncover data management gaps that create volumes of systematic data handling error. Utilities should routinely analyze customer billing records to detect data anomalies and quantify these losses. For example, a billing account that registers zero consumption for two or more billing cycles should be checked to explain why usage has seemingly halted. Given the revenue loss impacts of these losses, water utilities are well-justified in providing continuous oversight and timely correction of data transfer errors & data handling errors. If the water auditor has not yet gathered detailed data or assessment of systematic data handling error, it is recommended that the auditor apply the default value of 0.25% of the the Billed Authorized Consumption volume. However, if the auditor has investigated the billing system and its controls, and has well validated data that indicates the volume from systematic data handling error is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations and select an appropriate grading. Note: negative values are not allowed for this audit component. If the auditor enters zero for this component then a grading of 1 will be automatically assigned.
Total annual cost of operating the water system Find	These costs include those for operations, maintenance and any annually incurred costs for long-term upkeep of the drinking water supply and distribution system. It should include the costs of day-to-day upkeep and long-term financing such as repayment of capital bonds for infrastructure expansion or improvement. Typical costs include employee salaries and benefits, materials, equipment, insurance, fees, administrative costs and all other costs that exist to sustain the drinking water supply. Depending upon water utility accounting procedures or regulatory agency requirements, it may be appropriate to include depreciation in the total of this cost. This cost should not include any costs to operate wastewater, biosolids or other systems outside of drinking water.
Unauthorized consumption Find	Includes water illegally withdrawn from fire hydrants, illegal connections, bypasses to customer consumption meters, or tampering with metering or meter reading equipment; as well as any other ways to receive water while thwarting the water utility's ability to collect revenue for the water. Unauthorized consumption results in uncaptured revenue and creates an error that understates customer consumption. In most water utilities this volume is low and, if the water auditor has not yet gathered detailed data for these loss occurrences, it is recommended that the auditor apply a default value of 0.25% of the volume of water supplied. However, if the auditor has investigated unauthorized occurrences, and has well validated data that indicates the volume from unauthorized consumption is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations. Note that a value of zero will not be accepted since all water utilities have some volume of unauthorized consumption occurring in their system. Note: if the auditor selects the default value for unauthorized consumption, a data grading of 5 is automatically assigned, but not displayed on the Reporting Worksheet.
Unavoidable Annual Real Losses (UARL) Find	UARL (gallons/day)=(5.41Lm + 0.15Nc + 7.5Lc) xP, or UARL (litres/day)=(18.0Lm + 0.8Nc + 25.0Lc) xP where: Lm = length of mains (miles or kilometres) Nc = number of customer service connections Lp = the average distance of customer service connection piping (feet or metres) (see the Worksheet "Service Connection Diagram" for guidance on deterring the value of Lp) Lc = total length of customer service connection piping (miles or km) Lc = Nc X Lp (miles or kilometres) P = Pressure (psi or metres) The UARL is a theoretical reference value representing the technical low limit of leakage that could be achieved if all of today's best technology could be successfully applied. It is a key variable in the calculation of the Infrastructure Leakage Index (ILI). Striving to reduce system leakage to a level close to the UARL is usually not needed unless the water supply is unusually expensive, scarce or both. NOTE: The UARL calculation has not yet been proven as fully valid for very small, or low pressure water distribution systems. If, in gallons per day: (Lm x 32) + Nc < 3000 or P <35psi in litres per day: (Lm x 20) + Nc < 3000 or P < 25m then the calculated UARL value may not be valid. The software does not display a value of UARL or ILI if either of these conditions is true.
Unbilled Authorized Consumption	All consumption that is unbilled, but still authorized by the utility. This includes Unbilled Metered Consumption + Unbilled Unmetered Consumption. See "Authorized Consumption" for more information. For Unbilled Unmetered Consumption, the Free Water Audit Software provides the auditor the option to select a default value if they have not audited unmetered activities in detail. The default calculates a volume that is 1.25% of the Water Supplied volume. If the auditor has carefully audited the various unbilled, unmetered, authorized uses of water, and has established reliable estimates of this collective volume, then he or she may enter the volume directly for this component, and not use the default value.

Item Name	Description
Unbilled metered consumption Find	Metered consumption which is authorized by the water utility, but, for any reason, is deemed by utility policy to be unbilled. This might for example include metered water consumed by the utility itself in treatment or distribution operations, or metered water provided to civic institutions free of charge. **It does not include water supplied to neighboring utilities (water exported) which may be metered but not billed.**
Unbilled unmetered consumption Find	Any kind of Authorized Consumption which is neither billed or metered. This component typically includes water used in activities such as fire fighting, flushing of water mains and sewers, street cleaning, fire flow tests conducted by the water utility, etc. In most water utilities it is a small component which is very often substantially overestimated. **It does NOT include water supplied to neighboring utilities (water exported) which is unmetered and unbilled – an unlikely case.** This component has many sub-components of water use which are often tedious to identify and quantify. Because of this, and the fact that it is usually a small portion of the water supplied, it is recommended that the auditor apply the default value, which is 1.25% of the Water Supplied volume. Select the default percentage to enter this value. If the water utility has carefully audited the unbilled, unmetered activities occurring in the system, and has well validated data that gives a value substantially higher or lower than the default volume, then the auditor should enter their own volume. However the default approach is recommended for most water utilities. Note that a value of zero is not permitted, since all water utilities have some volume of water in this component occurring in their system.
Units and Conversions	The user may develop an audit based on one of three unit selections: 1) Million Gallons (US) 2) Megalitres (Thousand Cubic Metres) 3) Acre-feet Once this selection has been made in the instructions sheet, all calculations are made on the basis of the chosen units. Should the user wish to make additional conversions, a unit converter is provided below (use drop down menus to select units from the yellow unit boxes): Enter Units: 1 — Convert From… **Million Gallons (US)** = **Converts to…..** **3.06888329** **Acre-feet** (conversion factor = 3.06888328973723)
Use of Option Buttons	To use the default percent value choose this button To enter a value choose this button and enter the value in the cell to the right  **NOTE:** For Unbilled Unmetered Consumption, Unauthorized Consumption and Systematic Data Handling Errors, a recommended default value can be applied by selecting the Percent option. The default values are based on fixed percentages of Water Supplied or Billed Authorized Consumption and are recommended for use in this audit unless the auditor has well validated data for their system. Default values are shown by purple cells, as shown in the example above. If a default value is selected, the user does not need to grade the item; a grading value of 5 is automatically applied (however, this grade will not be displayed).
Variable production cost (applied to Real Losses) Find	The cost to produce and supply the next unit of water (e.g., $/million gallons). This cost is determined by calculating the summed unit costs for ground and surface water treatment and all power used for pumping from the source to the customer. It may also include other miscellaneous unit costs that apply to the production of drinking water. It should also include the unit cost of bulk water purchased as an import if applicable. It is common to apply this unit cost to the volume of Real Losses. However, if water resources are strained and the ability to meet future drinking water demands is in question, then the water auditor can be justified in applying the Customer Retail Rate to the Real Loss volume, rather than applying the Variable Production Cost. The Free Water Audit Software applies the Variable Production costs to Real Losses by default. However, the auditor has the option on the Reporting Worksheet to select the Customer Retail Cost as the basis for the Real Loss cost evaluation if the auditor determines that this is warranted.
Volume from own sources Find	The volume of water withdrawn (abstracted) from water resources (rivers, lakes, streams, wells, etc) controlled by the water utility, and then treated for potable water distribution. Most water audits are compiled for utility retail water distribution systems, so this volume should reflect the amount of treated drinking water that entered the distribution system. Often the volume of water measured at the effluent of the treatment works is slightly less than the volume measured at the raw water source, since some of the water is used in the treatment process. Thus, it is useful if flows are metered at the effluent of the treatment works. If metering exists only at the raw water source, an adjustment for water used in the treatment process should be included to account for water consumed in treatment operations such as filter backwashing, basin flushing and cleaning, etc. If the audit is conducted for a wholesale water agency that sells untreated water, then this quantity reflects the measure of the raw water, typically metered at the source.
Volume from own sources: Master meter and supply error adjustment Find	An estimate or measure of the degree of inaccuracy that exists in the master (production) meters measuring the annual Volume from own Sources, and any error in the data trail that exists to collect, store and report the summary production data. This adjustment is a weighted average number that represents the collective error for all master meters for all days of the audit year and any errors identified in the data trail. Meter error can occur in different ways. A meter or meters may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Data error can occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of inaccuracy in master meters and data errors in archival systems are common; thus a value of zero should not be entered. Enter a negative percentage or value for metered data under-registration; or, enter a positive percentage or value for metered data over-registration.

Item Name	Description
Water exported Find	The Water Exported volume is the bulk water conveyed and sold by the water utility to neighboring water systems that exists outside of their service area. Typically this water is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water utility that is selling the water: i.e. the exporter. If the water utility who is compiling the annual water audit sells bulk water in this manner, they are an exporter of water. Note: The Water Exported volume is sold to wholesale customers who are typically charged a wholesale rate that is different than retail rates charged to the retail customers existing within the service area. Many state regulatory agencies require that the Water Exported volume be reported to them as a quantity separate and distinct from the retail customer billed consumption. For these reasons - and others - the Water Exported volume is always quantified separately from Billed Authorized Consumption in the standard water audit. **Be certain not to "double-count" this quantity by including it in both the Water Exported box and the Billed Metered Consumption box of the water audit Reporting Worksheet. This volume should be included only in the Water Exported box.**
Water exported: Master meter and supply error adjustment Find	An estimate or measure of the volume in which the Water Exported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived exported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of error in their metered data, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived data. Thus, a value of zero should <u>not</u> be entered. Enter a negative percentage or value for metered data under-registration; or enter a positive percentage or value for metered data over-registration. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment. Corrections to data gaps or other errors found in the archived data should also be included as a portion of this meter error adjustment.
Water imported Find	The Water Imported volume is the bulk water purchased to become part of the Water Supplied volume. Typically this is water purchased from a neighboring water utility or regional water authority, and is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water supplier selling the water to the utility conducting the water audit. The water supplier selling the bulk water usually charges the receiving utility based upon a wholesale water rate.
Water imported: Master meter and supply error adjustment Find	An estimate or measure of the volume in which the Water Imported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived imported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some level of meter inaccuracy, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived metered data. Thus, a value of zero should <u>not</u> be entered. Enter a negative percentage or value for metered data under-registration; or, enter a positive percentage or value for metered data over-registration. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment.
WATER LOSSES Find	= apparent losses + real losses Water Losses are the difference between Water Supplied and Authorized Consumption. Water losses can be considered as a total volume for the whole system, or for partial systems such as transmission systems, pressure zones or district metered areas (DMA); if one of these configurations are the basis of the water audit.

AWWA Free Water Audit Software:
Determining Water Loss Standing

WAS v5.0

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Water Audit Report for: City of Victorville/Victorville Water District (3610052)
Reporting Year: 2015 | 1/2015 - 12/2015
Data Validity Score: **54**

Water Loss Control Planning Guide

Functional Focus Area	Water Audit Data Validity Level / Score				
	Level I (0-25)	**Level II** (26-50)	**Level III** (51-70)	**Level IV** (71-90)	**Level V** (91-100)
Audit Data Collection	Launch auditing and loss control team; address production metering deficiencies	Analyze business process for customer metering and billing functions and water supply operations. Identify data gaps.	Establish/revise policies and procedures for data collection	Refine data collection practices and establish as routine business process	Annual water audit is a reliable gauge of year-to-year water efficiency standing
Short-term loss control	Research information on leak detection programs. Begin flowcharting analysis of customer billing system	Conduct loss assessment investigations on a sample portion of the system: customer meter testing, leak survey, unauthorized consumption, etc.	Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring	Refine, enhance or expand ongoing programs based upon economic justification	Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation
Long-term loss control		Begin to assess long-term needs requiring large expenditure: customer meter replacement, water main replacement program, new customer billing system or Automatic Meter Reading (AMR) system.	Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process.	Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management	Continue incremental improvements in short-term and long-term loss control interventions
Target-setting			Establish long-term apparent and real loss reduction goals (+10 year horizon)	Establish mid-range (5 year horizon) apparent and real loss reduction goals	Evaluate and refine loss control goals on a yearly basis
Benchmarking			Preliminary Comparisons - can begin to rely upon the Infrastructure Leakage Index (ILI) for performance comparisons for real losses (see below table)	Performance Benchmarking - ILI is meaningful in comparing real loss standing	Identify Best Practices/ Best in class - the ILI is very reliable as a real loss performance indicator for best in class service

For validity scores of 50 or below, the shaded blocks should not be focus areas until better data validity is achieved.

Once data have been entered into the Reporting Worksheet, the performance indicators are automatically calculated. How does a water utility operator know how well his or her system is performing? The AWWA Water Loss Control Committee provided the following table to assist water utilities is gauging an approximate Infrastructure Leakage Index (ILI) that is appropriate for their water system and local conditions. The lower the amount of leakage and real losses that exist in the system, then the lower the ILI value will be.

Note: this table offers an approximate guideline for leakage reduction target-setting. The best means of setting such targets include performing an economic assessment of various loss control methods. However, this table is useful if such an assessment is not possible.

General Guidelines for Setting a Target ILI
(without doing a full economic analysis of leakage control options)

Target ILI Range	Financial Considerations	Operational Considerations	Water Resources Considerations
1.0 - 3.0	Water resources are costly to develop or purchase; ability to increase revenues via water rates is greatly limited because of regulation or low ratepayer affordability.	Operating with system leakage above this level would require expansion of existing infrastructure and/or additional water resources to meet the demand.	Available resources are greatly limited and are very difficult and/or environmentally unsound to develop.
>3.0 -5.0	Water resources can be developed or purchased at reasonable expense; periodic water rate increases can be feasibly imposed and are tolerated by the customer population.	Existing water supply infrastructure capability is sufficient to meet long-term demand as long as reasonable leakage management controls are in place.	Water resources are believed to be sufficient to meet long-term needs, but demand management interventions (leakage management, water conservation) are included in the long-term
>5.0 - 8.0	Cost to purchase or obtain/treat water is low, as are rates charged to customers.	Superior reliability, capacity and integrity of the water supply infrastructure make it relatively immune to supply shortages.	Water resources are plentiful, reliable, and easily extracted.
Greater than 8.0	Although operational and financial considerations may allow a long-term ILI greater than 8.0, such a level of leakage is not an effective utilization of water as a resource. Setting a target level greater than 8.0 - other than as an incremental goal to a smaller long-term target - is discouraged.		
Less than 1.0	If the calculated Infrastructure Leakage Index (ILI) value for your system is 1.0 or less, two possibilities exist. a) you are maintaining your leakage at low levels in a class with the top worldwide performers in leakage control. b) A portion of your data may be flawed, causing your losses to be greatly understated. This is likely if you calculate a low ILI value but do not employ extensive leakage control practices in your operations. In such cases it is beneficial to validate the data by performing field measurements to confirm the accuracy of production and customer meters, or to identify any other potential sources of error in the data.		

APPENDIX H. SB X7-7 TABLES

SB X7-7 Table-1: Baseline Period Ranges			
Baseline	**Parameter**	**Value**	**Units**
10- to 15-year baseline period	2008 total water deliveries	25,234	Acre Feet
	2008 total volume of delivered recycled water	-	Acre Feet
	2008 recycled water as a percent of total deliveries	0.00%	Percent
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	1996	
	Year ending baseline period range[3]	2005	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2003	
	Year ending baseline period range[4]	2007	

[1] If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period. *[2] The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.*

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

[4] The ending year must be between December 31, 2007 and December 31, 2010.

NOTES: 2010 UWMP

SB X7-7 Table 2: Method for Population Estimates	
Method Used to Determine Population (may check more than one)	
☐	**1. Department of Finance** (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☑	**4. Other** DWR recommends pre-review
NOTES: Beacon DOF Population Data	

SB X7-7 Table 3: Service Area Population		
Year		**Population**
10 to 15 Year Baseline Population		
Year 1	1996	62,529
Year 2	1997	64,026
Year 3	1998	65,558
Year 4	1999	66,914
Year 5	2000	69,095
Year 6	2001	73,140
Year 7	2002	77,422
Year 8	2003	81,955
Year 9	2004	86,753
Year 10	2005	91,832
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2003	81,955
Year 2	2004	86,753
Year 3	2005	91,832
Year 4	2006	97,208
Year 5	2007	102,899
2015 Compliance Year Population		
2015		128,005
NOTES: Beacon Population Data		

SB X7-7 Table 4: Annual Gross Water Use *								
Baseline Year *Fm SB X7-7 Table 3*		**Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**Deductions**					**Annual Gross Water Use**
			Exported Water	**Change in Dist. System Storage (+/-)**	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use**	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	
10 to 15 Year Baseline - Gross Water Use								
Year 1	1996	18,921			-		-	18,921
Year 2	1997	18,835			-		-	18,835
Year 3	1998	17,455			-		-	17,455
Year 4	1999	18,960			-		-	18,960
Year 5	2000	20,636			-		-	20,636
Year 6	2001	19,859			-		-	19,859
Year 7	2002	21,736			-		-	21,736
Year 8	2003	22,409			-		-	22,409
Year 9	2004	24,245			-		-	24,245
Year 10	2005	25,923			-		-	25,923
Year 11	0	-			-		-	-
Year 12	0	-			-		-	-
Year 13	0	-			-		-	-
Year 14	0	-			-		-	-
Year 15	0	-			-		-	-
10 - 15 year baseline average gross water use								**20,898**
5 Year Baseline - Gross Water Use								
Year 1	2003	22,409			-		-	22,409
Year 2	2004	24,245			-		-	24,245
Year 3	2005	25,923			-		-	25,923
Year 4	2006	28,317			-		-	28,317
Year 5	2007	29,256			-		-	29,256
5 year baseline average gross water use								**26,030**
2015 Compliance Year - Gross Water Use								
2015		20,843	12		-		-	**20,831**

* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3

Out of service area Construction Water (email); Out of service area water breakdown (email)

SB X7-7 Table 4-A: Volume Entering the Distribution System(s) Complete one table for each source.				
Name of Source	Mojave Basin			
This water source is:				
☑	The supplier's own water source			
☐	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional* *(+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1996	18,921		18,921
Year 2	1997	18,835		18,835
Year 3	1998	17,455		17,455
Year 4	1999	18,960		18,960
Year 5	2000	20,636		20,636
Year 6	2001	19,859		19,859
Year 7	2002	21,736		21,736
Year 8	2003	22,409		22,409
Year 9	2004	24,245		24,245
Year 10	2005	25,923		25,923
Year 11	0			-
Year 12	0			-
Year 13	0			-
Year 14	0			-
Year 15	0			-
5 Year Baseline - Water into Distribution System				
Year 1	2003	22,409		22,409
Year 2	2004	24,245		24,245
Year 3	2005	25,923		25,923
Year 4	2006	28,317		28,317
Year 5	2007	29,256		29,256
2015 Compliance Year - Water into Distribution System				
2015		17,340		17,340
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES: VWD Data Request_borrowman_160309; VWD Production Report 2015				

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	Imported Water Purchase (R3)			
This water source is:				
☐	The supplier's own water source			
☑	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional* *(+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1,996	0		0
Year 2	1,997	0		0
Year 3	1,998	0		0

Year 4	1,999	0		0
Year 5	2,000	0		0
Year 6	2,001	0		0
Year 7	2,002	0		0
Year 8	2,003	0		0
Year 9	2,004	0		0
Year 10	2,005	0		0
Year 11	-			0
Year 12	-			0
Year 13	-			0
Year 14	-			0
Year 15	-			0
5 Year Baseline - Water into Distribution System				
Year 1	2,003	0		0
Year 2	2,004	0		0
Year 3	2,005	0		0
Year 4	2,006	0		0
Year 5	2,007	0		0
2015 Compliance Year - Water into Distribution System				
2015		3,503		3,503
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES:				

SB X7-7 Table 4-A: Volume Entering the Distribution	
Name of Source	Source 3
This water source is:	
☐	The supplier's own water source
☐	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1,996			0
Year 2	1,997			0
Year 3	1,998			0
Year 4	1,999			0
Year 5	2,000			0
Year 6	2,001			0
Year 7	2,002			0
Year 8	2,003			0
Year 9	2,004			0
Year 10	2,005			0
Year 11	-			0
Year 12	-			0
Year 13	-			0
Year 14	-			0
Year 15	-			0
5 Year Baseline - Water into Distribution System				
Year 1	2,003			0
Year 2	2,004			0
Year 3	2,005			0
Year 4	2,006			0

Year 5	2,007			0
2015 Compliance Year - Water into Distribution System				
2015				0
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES:				

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	Source 4			
This water source is:				
☐	The supplier's own water source			
☐	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1,996			0
Year 2	1,997			0
Year 3	1,998			0
Year 4	1,999			0
Year 5	2,000			0
Year 6	2,001			0
Year 7	2,002			0
Year 8	2,003			0
Year 9	2,004			0
Year 10	2,005			0
Year 11	-			0
Year 12	-			0
Year 13	-			0
Year 14	-			0
Year 15	-			0
5 Year Baseline - Water into Distribution System				
Year 1	2,003			0
Year 2	2,004			0
Year 3	2,005			0
Year 4	2,006			0
Year 5	2,007			0
2015 Compliance Year - Water into Distribution System				
2015				0
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES:				

SB X7-7 Table 4-A: Volume Entering the Distribution	
Name of Source	Source 5
This water source is:	
☐	The supplier's own water source
☐	A purchased or imported source

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1996	62,529	18,921	270
Year 2	1997	64,026	18,835	263
Year 3	1998	65,558	17,455	238
Year 4	1999	66,914	18,960	253
Year 5	2000	69,095	20,636	267
Year 6	2001	73,140	19,859	242
Year 7	2002	77,422	21,736	251
Year 8	2003	81,955	22,409	244
Year 9	2004	86,753	24,245	249
Year 10	2005	91,832	25,923	252
Year 11	0	-	-	
Year 12	0	-	-	
Year 13	0	-	-	
Year 14	0	-	-	
Year 15	0	-	-	
10-15 Year Average Baseline GPCD				**253**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2003	81,955	22,409	244
Year 2	2004	86,753	24,245	249
Year 3	2005	91,832	25,923	252
Year 4	2006	97,208	28,317	260
Year 5	2007	102,899	29,256	254
5 Year Average Baseline GPCD				**252**
2015 Compliance Year GPCD				
2015		128,005	20,831	**145**
NOTES:				

SB X7-7 Table 6: Gallons per Capita per Day *Summary From Table SB X7-7 Table 5*	
10-15 Year Baseline GPCD	253
5 Year Baseline GPCD	252
2015 Compliance Year GPCD	145
NOTES:	

SB X7-7 Table 7: 2020 Target Method *Select Only One*		
Target Method		Supporting Documentation
☑	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D *Contact DWR for these tables*
☐	Method 3	SB X7-7 Table 7-E
☐	Method 4	Method 4 Calculator
NOTES:		

SB X7-7 Table 7-A: Target Method 1 20% Reduction	
10-15 Year Baseline GPCD	**2020 Target GPCD**
253	**202**
NOTES:	

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target			
5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target[1]	Calculated 2020 Target[2]	**Confirmed 2020 Target**
252	239	202	**202**

[1] Maximum 2020 Target is 95% of the 5 Year Baseline GPCD [2] 2020 Target is calculated based on the selected Target Method, see SB X7-7 Table 7 and corresponding tables for agency's calculated target.

NOTES:

SB X7-7 Table 8: 2015 Interim Target GPCD		
Confirmed 2020 Target *Fm SB X7-7 Table 7-F*	10-15 year Baseline GPCD *Fm SB X7-7 Table 5*	**2015 Interim Target GPCD**
202	253	**227**
NOTES:		

SB X7-7 Table 9: 2015 Compliance								
Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments *(in GPCD)*			TOTAL Adjustments	Adjusted 2015 GPCD	2015 GPCD *(Adjusted if applicable)*	**Did Supplier Achieve Targeted Reduction for 2015?**
		Enter "0" if Adjustment Not Used						
		Extraordinary Events	Weather Normalization	Economic Adjustment				
145	227	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	-	145	145	**YES**
NOTES:								

APPENDIX I. WATER SHORTAGE CONTINGENCY PLAN

ORDINANCE NO. VWD-012

AN ORDINANCE OF THE BOARD OF DIRECTORS OF THE VICTORVILLE WATER DISTRICT ADOPTING A WATER CONSERVATION PROGRAM PURSUANT TO WATER CODE SECTION 375 AND AMENDING THE DISTRICT'S WATER SHORTAGE CONTINGENCY PLAN TG COMPLY WITH EMERGENCY REGULATIONS ADOPTED BY THE STATE WATER RESOURCES CONTROL BOARD PERTAINING TO DROUGHT CONSERVATION

WHEREAS, California is experiencing one of the most severe droughts on record; and

WHEREAS, in January 2014, California Governor Jerry Brown declared a drought state of emergency, requiring Californians in certain areas to curtail regular water use by twenty percent (20%) due to ongoing water shortfalls and further declared a continued drought state of emergency on April 25 and December 22, 2014; and

WHEREAS, on July 15, 2014 the State Water Resources Control Board ("SWRCB") adopted emergency water conservation regulations requiring urban water suppliers to implement mandatory water use restrictions and adopt a water shortage contingency plan ("Plan"); and

WHEREAS, on March 17, 2015, the SWRCB re-adopted amended emergency regulations mandating that urban water suppliers, such as the Victorville Water District (the "District"): (1) implement all requirements and actions of the stage of their Plans that includes mandatory restrictions on the number of days that outdoor irrigation of ornamental landscapes or turf with potable water is allowed; or (2) amend their Plans to include the mandatory restrictions to be implemented by May 11, 2015; and

WHEREAS, Governor Brown further issued Executive Order No. B-29-15 on April 1, 2015, which declared that all prior executive orders relating to the drought state of emergency remained in full force and ordered the SWRCB to impose restrictions on urban water suppliers to achieve a Statewide twenty-five percent (25%) reduction in urban potable water usage through February 2016; and

WHEREAS, in response to this Executive Order, the SWRCB further revised and released its emergency regulations, the final version of which repealed many provisions of the March 17, 2015 emergency regulations and now requires the District to cut its Total Potable Water Production (as defined herein and in SWRCB Regulation 865(a)(3) set forth in Title 23 of the California Code of Regulations) by twenty-eight percent (28%) for each month, as compared to the amount used in the same months in 2013, effective June 1, 2015; and

WHEREAS, to meet this new conservation standard, District staff has determined that adoption of its amended Plan (which includes the various water supply shortage stages/responses set forth in this Ordinance) must occur on or before June 1, 2015; and

CMX

WHEREAS, following notice and a public hearing and making appropriate findings of necessity, the District is authorized by California Water Code section 375 *et seq.* to adopt and enforce a water conservation program to reduce the quantity of water used for the purposes of conserving the District's water supplies; and

WHEREAS, on April 10, 2015, the District published notice that a public hearing on the adoption of this Ordinance would be held on April 21, 2015, which public hearing was duly held and subsequently continued to May 5, 2015 and now to May 19, 2015 to ensure full public comment and implement the revised water reduction mandates finally adopted on May 5, 2015 by the SWRCB; and

WHEREAS, the District is further authorized by Water Code section 350 *et seq.* to: (1) declare water shortage emergency conditions when it finds and determines that the ordinary demands and requirements of its water customers cannot be satisfied without depleting the District's water supply to the extent that there would be insufficient water for hurnan consumption, sanitation, and fire protection; and (2) adopt regulations and restrictions that include discontinuance of service as an enforcement option where a water shortage emergency condition has been declared; and

WHEREAS, given the increasingly serious and ongoing drought conditions throughout the State, the need to conserve scarce and precious water resources in the District's boundaries, and the tirne constraints for meeting the conservation standard currently set forth in the SWRCB draft regulations, the District Board of Directors ("District Board") finds that on or before May 31, 2015, it is necessary to: (1) adopt this Ordinance; and (2) subsequently adopt a resolution declaring and irnplementing the provisions of Water Supply Shortage Stage 2 as provided for in this Ordinance, to ensure the continued health, safety, welfare, and quality of life of the water users within the District's boundaries, including those in the City of Victorville; and

WHEREAS, the District Board finds that the adoption of this Ordinance is exempt from the provisions of Public Resources Code section 21000 *et seq.* (the California Environmental Quality Act) as a project undertaken as immediate action necessary to prevent or mitigate an emergency pursuant to Title 14, California Code of Regulations section 15269 and as a project undertaken to assure the maintenance, restoration or enhancement of a natural resource pursuant to Title 14, California Code of Regulations section 15307.

NOW, THEREFORE, THE BOARB OF DIRECTORS OF THE VICTORVILLE WATER DISTRICT DOES HEREBY ORDAIN AS FOLLOWS:

SECTION 1. RECITALS.

The recitals and findings set forth above are true and correct, and are hereby incorporatod by this reference as if set forth in their entirety.

SECTION 2. ADDITION OF NEW CHAPTER 10.05.

A new Chapter 10.05, titled **"Victorville Water District Conservation Program and Water Shortage Contingency Plan"** (to be temporarily codified for reference purposes only in Title 10 of the City of Victorville Municipal Code) is hereby added to read in its entirety as follows:

10.05.010 Intent and Purposo.

The intent of this Chapter is for the Victorville Water District (the "District") to establish and adopt standards, guidelines and procedures for year-round water conservation to prevent the waste or unreasonable use of water within its territorial boundaries and to further prescribe, define and enforce restrictions, prohibitions and exclusions on water use deemed necessary by the District Board of Directors ("District Board") pursuant to California Water Code section 350 *et seq.* and the regulations of the State Water Resources Control Board ("SWRCB") for the purposes of:

(a) Restricting the use of water necessary for ordinary domestic and commercial purposes during threatened or existing water supply shortages and enabling implementation of the District's Water Supply Shortage Contingency Plan stages to respond to the State's historic drought and meet the Total Potable Water Production reduction percentage required by the SWRCB emergency regulations; and

(b) Protecting and promoting the public health, safety, and welfare by ensuring continued availability of water for necessary uses; and

(c) Protecting the physical and economic stability of the District by insuring an adequate supply of water to its customers and reducing hazards to the public resulting from inappropriate use of water.

10.05.020 Application of Chaptor.

The provisions of this Chapter shall apply to all Water Users (as defined in Section 10.05.030) including the City of Victorville (the "City"). The restrictions or prohibitions in this Chapter shall not apply to water use, runoff or flow: (1) resulting from firefighting, hydrant flushing or fire training activities; (2) necessary to prevent or abate threats to the public health or safety; or (3) from routine maintenance of any District-owned water system, well flushing or from temporary water system failures or malfunctions. During Water Supply Shortage Stages 2 through 4, flushing operations will be reduced to the absolute minimum needed to maintain water quality in conformance with Federal drinking water standards and where practicable, the water from these flushing operations will be utilized beneficially.

10.05.030 Definitions.

Whenever used in this Chapter, the following definitions shall apply:

(a) "Active Recreational Area" means a turf area which measures a minimum of one hundred feet long and one hundred feet wide designated and primarily used for organized sports, including, without limitation, softball, baseball, football, soccer or a similar related sport, including all amenities related to the activity.

(b) "Administrative Fine" means a monetary civil penalty assessed for violations of this Chapter by issuance of an administrative citation.

(c) "Appellant" means any Person against whom an Administrative Fine is levied pursuant to an administrative citation issued under this Chapter and who contests or disputes such Administrative Fine. "Appellant" shall also include Persons appealing the General Manager's denial of a Hardship Exception and Persons appealing a written notice of water service discontinuation under Sections 10.05.120(b) and 10.05.190(c) of this Chapter.

(d) "Controller" means an irrigation controller, which is an automated device to operate valve stations to set days, length of time to water and frequency of water application for lawn sprinklers and Low-Volume irrigation systems.

(e) "Enforcement Officer" means any officer or employee of the District (including such officers or employees of the City serving the District in an ex officio capacity by virtue of the District's status as a subsidiary district of the City) with the authority to enforce this Chapter, including the General Manager, District staff or City code enforcement officers designated by the General Manager or empowered by Water Code section 30546 to enforce this Chapter.

(f) "Excess Runoff" means water accumulation on streets, sidewalks, gutters, adjacent properties or other areas in amounts sufficient to cause the escape or flow of water in such quantity as to: cause flooding; impede vehicular or pedestrian traffic; create a hazardous condition; or cause damage to any public or private right-of way through failure or neglect to properly operate or maintain any irrigation, water delivery or drainage system.

(g) "General Manager" means the General Manager of the District and/or his/her duly authorized designees. The Victorville City Manager serves ex officio as the District's General Manager.

(h) "Ground Cover" means various low growing shrubs and perennials used in a landscape in place of grass or where grass is difficult to grow, planted on slopes to prevent erosion and/or to prevent weed growth. Ground cover includes low-growing, clumping, trailing, creeping, or sprawling vegetation.

(i) "Hardscapes" means any inorganic decorative landscape materials, including but not limited to, stones, boulders, cobblestones, pavers, decorative concrete, decomposed granite and/or mulch, incorporated into an overall landscape design.

(j) "Hearing Officer" means any person appointed by the General Manager to preside over the administrative appeal hearings provided for in this Chapter.

(k) "Impermeable/impervious surfaces mean solid surfaces that do not allow water to penetrate, forcing runoff; such as: asphalt, concrete, traditional stone, brick or concrete pavers.

(l) "Large System" means an irrigation system that has both multiple Controllers and more than ten (10) watering Zones.

(m)"Lot" means a legally created parcel of land occupied or intended for occupancy by one main building together with its accessory buildings, and uses customarily incidental to it, including the open space required by the City's zoning ordinance, and having its principal frontage upon a street as defined in said zoning ordinance.

(n) "Low-Volume Irrigation Systems" means appropriately designed irrigation systems that utilize low volume devices appropriate to the climate and site factors. Such heads include micro sprinkler heads, drip emitters and bubbler emitters.

(o) "May" means any act, service, or performance that is permissive.

(p) "Model Home" means a facility used exclusively for the promotion and sale of homes similar to the model.

(q) "Native Plant" means a plant that lives or grows naturally in a particular region without direct or indirect human intervention.

(r) "New Model Home" and "New Residential Development" means Model Homes or Residential Developments not yet built/constructed or not occupied since built.

(s) "New Non-Residential Facilities" means Non-Residential Facilities not yet built/constructed or not occupied since built.

(t) "Overspray" means water which is delivered beyond landscaped areas; wetting pavements, walks, structures, impermeable surfaces or other non-landscaped areas.

(u) "Responsible Person(s)" means a natural person or legal entity who causes, maintains or allows a violation of this Chapter to occur or continue by action or failure to act. A Responsible Person includes, but is not limited to: the owner, tenant, co-tenant, lessee, sub-lessee or other person with any right to possession of the property/premises where a violation of this Chapter occurs; the on-site manager

who normally works daily at the site when the business is open and is responsible for the activities at such premises; and the owner, majority stockholders, corporate officers, trustees and general partners of a legal entity. There may be more than one Responsible Person for a violation.

(v) "Person" means a natural person or entity, an individual, firm, association, business, trust, organization, corporation, partnership, company or any other entity which is recognized by laws as the subject of rights or duties.

(w) "Reclaimed or Recycled Water" means water which has been processed by a municipal or comparable wastewater treatment plant and/or otherwise made available for reuse which meets California Code of Regulations Title 22 requirements and has been approved by all applicable Federal, State or local regulatory agencies.

(x) "Residential" means any type of dwelling or domiciling unit or units suitable or designed for human habitation, including, but not limited to, single family homes, condominiums, townhomes, apartment or manufactured homes, but not including hotels, motels, licensed convalescent homes, commercially operated retirement homes, time share units or the like.

(y) "Right-of-Way" means land which by deed, conveyance, agreement, easement, dedication, usage or process of law is reserved for or dedicated to the general public for street, highway, alley, public utility or pedestrian walkway purposes.

(z) "Shall" or "will" means any act, service, or performance that is mandatory or otherwise required.

(aa) "Station" means an area or Zone served by one water valve or by a set of water valves that operate simultaneously.

(bb) "Total Potable Water Production" means all potable water that enters into the District's distribution system, excluding water placed into storage and not withdrawn for use during a SWRCB-mandated reporting period, or water exported outside the District's service area.

(cc) "Turf" means a surface layer of earth containing grass with its roots.

(dd) "Water-intensive Landscape" means an area of land that is watered with a permanent water application system (such as in-ground sprinklers) and planted primarily with plants not listed in the District's adopted Water-wise Plant list. Included is the total surface area of all water features *(i.e.* swimming pools of any size, fountains, ponds, water courses, waterfalls and other artificial water structures) filled or refilled with water from any source.

(ee) "Water Reduction Plan" or "Reduction Plan" means a written plan submitted to the General Manager that insures a minimum monthly potable water use reduction of twenty-five percent (25%) for any of the facilities listed in Subsection 10.05.090(b)(1)c of this Chapter with Large Systems, compared to the amount used for the same months in 2013, or such other baseline year as may be revised from time-to-time by District resolution. The General Manager will provide facilities with Large Systems with information regarding the average monthly water use by the facility for the baseline year, and the General Manager's decision to approve or disapprove a Reduction Plan is final. Water Users with approved Reduction Plans are subject to the investigation and enforcement provisions of this Chapter and must be in full compliance with such Reduction Plans at all times.

(ff) "Water Supply Shortage" means any water shortage caused by drought or any other threatened or existing water shortage, disaster or facility failure, earthquake, extended loss of electrical power, pipeline failure or other condition which results in or threatens to result in the District's inability to meet the water demands of its customers.

(gg) "Water User" means any person, firm, partnership, association, corporation, political entity, customer, property owner, or property owner agent/assignee whose premises are supplied water by the District.

(hh) "Water Waste" means any unreasonable or non-beneficial use of water, or any unreasonable method of use of water, any excessive dissipation of water, intentional or unintentional, including, but not limited to; the use of water for any purpose which allows flooding or runoff over sidewalks, in gutters, driveways, streets or adjacent lands; the use of water in violation of any of the specific uses prohibited and restricted by this Chapter as hereinafter set forth.

(ii) "Water-wise Plants" means plants that perform well in the District's service area and have been selected according to their ability to withstand the extreme hot/cold desert climate and fluctuating temperatures; adaptability to drought conditions; and ability to survive once established with a limited amount of supplemental water. The District has adopted the list developed by the Alliance for Water Awareness and Conservation as its Water-wise Plant List (the "WWP List").

(jj) "Xeriscaping" means a water conservation concept that stresses the use of the appropriate plant material and irrigation techniques which are well suited for the local micro-climate. This concept incorporates native plants, selected Hardscapes, and proper planting and irrigation techniques that improve the overall water efficiency of a landscape system.

(kk) "Zone" means an area served by one valve or by a set of valves that operate simultaneously, sometimes also referred to as a Station.

10.05.040 Year Reund Veluntary Conservation and Public Education Measures.

(a) Even when there is no Water Supply Shortage, all Water Users must use water wisely, take reasonable steps to prevent the waste or unreasonable use of water, and reduce water consumption necessary for ordinary domestic and commercial purposes.

(b) The District will provide new Water Users with: information about: designing, installing and maintaining water efficient landscapes; proper water uses; water conservation methods; a full copy of the ordinance creating this Chapter (or a summary thereof); and notification of any stage of the District's Water Supply Shortage Contingency Plan currently in effect.

(c) Voluntary measures are encouraged at all times to reduce water usage and to use water wisely. Such measures include:

(1) Converting lawns to drought tolerant, low water use or native plants, incorporating the principals of Xeriscaping.

(2) Using low volume irrigation systems for ground cover, gardens, shrubs and trees.

(3) Performing a self-audit and/or an assessment of water consumption history.

(4) Providing proper installation and use of pool covers.

(5) Incorporating Hardscapes and/or permeable/porous surfaces into landscape design.

(6) Winterizing pipes and valves.

(7) Installation and use of water saving devices such as rain sensors, low-flow showerheads, faucet aerators and sprinkler and irrigation watering valves; low-flow or waterless toilets; high-efficiency, low water use washing machines and dishwashers; and automated irrigation timers and/or Controllers.

(8) Adjusting sprinklers and irrigation systems to avoid Overspray; avoiding sprinkler irrigation watering on windy days.

(9) Minimizing shower times and shutting off water while brushing teeth or shaving.

(10) Installing and proporly using mulch as a substitution for ground cover.

10.05.050 The Water-wise Plant List ("WWP List").

Many factors determine whether a Water-wise Plant will adapt or perform well, and even though a plant appears on the WWP List, there is no assurance it will adapt or thrive. Therefore, from time to time, the General Manager will amend the WWP List as necessary to add or remove plants. The currently effective WWP List will be posted on the District's website and will be available in printed form in the District offices.

10.05.050 Year-Reund Prohibited Water Waste - Conservation Stage 1.

(a) Year-Round Water Conservation Stage 1 ("Conservation Stage 1") (when the District is able to meet all the water demands of its customers in the immediate future) shall be in effect at all times, unless the District Board otherwise declares under the provisions of Section 10.05.070 of this Chapter that one or more of the District's Water Supply Shortage Contingency Plan ("WSSCP") stages are in effect.

(b) During Conservation Stage 1, all voluntary water conservation measures specified in Section 10.050.040 of this Chapter, and the following additional mandatory measures and prohibitions on water use shall be in effect:

(1) Water Waste (as defined in this Chapter) is prohibited.

(2) The irrigation/watering of lawns, gardens, landscaped areas, trees, shrubs, ground cover or other plants utilizing sprinkler systems except in accordance with the following provisions is prohibited:

a. Summer Outdoor Sprinkler Restrictions: From June 1 through September 30, irrigation/watering is permitted only between the hours of 10:00 p.m. and 6:00 a.m.

b. Winter Outdoor Sprinkler Restrictions: From October 1 through May 31, irrigation/watering is permitted only between the hours of 9:00 a.m. and 3:00 p.m.

c. Summer Outdoor Sprinkler Restrictions (Large Systems): From June 1, through September 30, irrigation/watering for facilities with Large Systems is only permitted between the hours of 10:00 p.m. and 9:00 a.m.

d. Winter Outdoor Sprinkler Restrictions (Large Systems): From October 1, through May 31, irrigation/watering for facilities with Large Systems is only permitted between the hours of 9:00 a.m. and 3:00 p.m.

(3) Irrigation/watering is permitted at any time if a handheld hose fitted with a positive shut-off nozzle is used or a Low-Volume Irrigation System is used,

provided that the Low-Volume Irrigation System is not on an irrigation Station which operates at the same time as a sprinkler system.

(4) Water Users are prohibited from causing or permitting any water furnished to their properties/premises by the District to run or to escape from any hose, pipe, valve, faucet, sprinkler or irrigation device onto any sidewalk, parking lot, adjacent property, street or gutter or to otherwise escape, if such running or escaping can be prevented.

(5) Excessive use, loss or escape of water through breaks, leaks or other malfunctions in the Water User's plumbing or distribution system for any period of time after such escape of water should have reasonably been discovered and corrected is prohibited. Upon receiving notice from the District of the existence of any such break, leak or other malfunction, Water Users shall identify the source of the water and within 48 hours, stop the source, by turning off the valve that supplies the water, and within 7 days, evaluate the extent of the problem and. repair or correct same.

(6) Use of potable water in fountains or other decorative water features, except where the water is part of a recirculating system, is prohibited.

(7) Washing down of impervious surfaces, including but not limited to: walkways, patios, tennis courts, driveways, sidewalks or other paved surfaces (except in emergencies to remove spills of hazardous materials or eliminate dangerous conditions) is prohibited.

(8) Using a hose that dispenses potable water for any outside purpose (including the washing of a motor vehicle), except where the hose is fitted with a positive shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use, is prohibited.

(9) Watering of turf, ground cover, open ground, shrubbery, crops, gardens and trees, including agricultural irrigation, or any outdoor dispensing of water in a manner or to an extent which allows Excess Runoff is prohibited. However, a minimum amount of runoff, which is a natural consequence of conservative watering, either by hand or by mechanical or automated sprinkling facilities, is permitted, so long as such runoff does not amount to Excess Runoff as defined in this Chapter.

(10) Providing glasses of drinking water (except upon request) to customers in restaurants or other public places where food is routinely served is prohibited.

(11) Application of potable water to outdoor landscapes during and within forty-eight (48) hours after measurable rainfall is prohibitod.

(12) Irrigation with potable water of ornamental turf on public street medians is prohibited.

(13) Irrigation with potable water of landscapes outside of newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission and the Department of Housing and Community Development.

(14) It is prohibited to plant any Water-intensive Landscape or Turf:

a. In any Right-of-Way, narrow pathway, parking strip, roadway median, or along foundations of buildings.

b. Having a width of less than five (5) feet, unless adjacent to a planter bed or other landscaped area which will catch Overspray.

(15) All rehabilitated or New Non-residential Facilities shall limit Water-intensive Landscape and Turf within landscaped area to the following percentages of the total Lot area, and all other areas required to be landscaped with plants shall consist of plants on the WWP List as set forth in Section 10.05.050 of this Chapter:

a. Churches: Twenty five percent (25%) of total lot area.

b. Resorts, including hotels and motels: Ten percent (10%) of the total lot area.

c. Commercial and industrial uses, fewer than nine thousand square feet: Ten percent (10%) of the total lot area.

d. Commercial and industrial uses, nine thousand square feet and greater: Ten percent (10%) of the first nine theusand square feet, and five percent (5%) of the remaining lot area.

e. Common areas in residential developments: Ten percent (10%) of the first acre and five percent (5%) of each additional acre up to five acres. Residential developments larger than five acres shall not plant any additional water intensive landscape and turf in common areas.

f. Active Recreational Area shall not be considered in calculating the percentage of the total Lot area and shall not be considered in determining compliance with this Section.

(16) Any rehabilitated or New Model Homes and/or rehabilitated or New Residential Develepments shall limit Water-intensive Landscape and Turf area at

the following percentages of the total Lot area, and all remaining landscaped area, as required by the City's development standards, shall consist of Water-wise Plants described in Section 10.05.050 of this Chapter:

a. Nine thousand square feet or less: Ten percent (10%) of the total lot area.

b. Greater than nine thousand square feet to one acre: Ten percent (10%) of the first nine thousand square feet and five percent (5%) of the remainder of the lot area.

c. Water intensive landscape or turf shall only be located in rear yards.

d. No Water-Intensive Landscape or Turf shall be planted in any Right-of-Way.

e. Prior to closing on a new residential unit, the developer shall provide the homeowner with a copy of the District's water conservation ordinance. Upon receipt, the homeowner shall sign an affidavit of acceptance. The developer shall permanently maintain the signed affidavit and submit a copy to the General Manager.

(c) During Conservation Stage 1, it shall be unlawful and a violation of this Chapter for any Water User to make, cause, use or permit the use of water in any manner contrary to the provisions of this Section.

10.05.070 Water Supply Shortage Contingency Plan; Declaration of Water Supply Shortage Conditions and /Stages.

(a) In accordance with this Section, the District Board shall require or impose water use reduction measures as are necessary for the District to comply with water use restrictions imposed by Federal, State or regional water agencies, or to respond to local or regional water shortage conditions and emergencies. Depending on the expected duration and severity of the shortage, such measures may include, but are not limitod to, some or all of the actions listed in the District's WSSCP Stages 2 through 4 in Sections 10.05.090, 10.05.100 and 10.05.110 of this Chapter. Each elevated stage will include all of the elements of the previous stage(s), and are intended to be more restrictive than the previous stage(s). The Water Supply Shortage condition, response and use reduction percentages for each WSSCP stage are shown in the table in Section 10.05.080 of this Chapter.

(b) Based on changing conditions and the severity of the Water Supply Shortage, the General Manager will determine when Water Supply Shortage conditions exist and notify the District Board of the necessity to declare Water Supply Shortage emergencies and enact or rescind WSSCP Stages 2, 3 or 4 (collectively hereinafter "WSSCP Stages").

(c) Acting upon the recommendation of the General Manager, the District Board is authorized to enact or rescind any or all WSSCP Stages by adopting resolutions setting forth the criteria for implementation or termination of such WSSCP Stages, following publication of the declaration and notice of the public hearing to be held thereon, at least seven (7) days prior to the date of the hearing.

(d) Each declaration implementing or terminating a WSSCP Stage shall be published in a newspaper of general circulation in accordance with Government Code section 6061 and shall designate the entire area of the District or the affected portion thereof if the shortage is not District-wide. A notice shall also be included in the water customer bills mailed for the billing cycle immediately following the date a resolution declaring or implementing a WSSCP Stage change is adopted.

(e) It is the responsibility of all property owners to notify any Person(s) that use their premises, including, but not limited to, weekend rentals, multi-unit apartments, motels and commercial buildings, of any water use restrictions and the WSSCP Stage currently in effect.

(f) The General Manager will review Water User data District-wide based on gallons per capita per day (GPDC) for at least the past twelve (12) consecutive months in order to calculate the baseline water usage amount for purposes of determining the reduction demand requirements as a percentage.

10.05.080 WSSCP TABLE - Condition/Response Stages; Reduction Requirement.

Water Supply Condition/ Demand Reduction Requirement	*Year-round Water Conservation*	*Water Shortage Response Stage*
Year-Round Water Conservation Water waste prohibitions/mandatory restrictions in effect.	**Stage 1**	
Threatened Water Supply Shortage Ten percent (10%) to twenty-eight percent (28%) reduction.		**Stage 2**
Critical Water Supply Shortage Twenty-nine percent (29%) to forty percent (40%) reduction.		**Stage 3**
Emergency Water Supply Shortage Forty-one percent (41%) or more required.		**Stage 4**

10.05.090 WSSCP Threatened Water Supply Shertage – Shertage Stage 2.

(a) A Stage 2 Threatened Water Supply Shortage ("Shortage Stage 2") shall be in effect when the District's ability to provide water for ordinary domestic and commercial uses may be adversely impaired or threatened. Shortage Stage 2 will be implemented when a ten percent (10%) to twenty-eight percent (28%) reduction in Total Potable Water Production or water usage must be met. The actual percentage reduction required (based on State conservation mandates and other contributing factors) will be indicated in the District resolution enacting Shortage Stage 2.

(b) During Shortage Stage 2, all prohibitions contained in Section 10.05.060 (Conservation Stage 1) shall continue, and the following additional provisions and prohibitions shall also be in effect:

(1) Summer Outdoor Sprinkler Restrictions - From June 1, through September 30, it shall be prohibited to:

a. Apply potable water to any outdoor landscape at properties with street addresses ending in an even number (0,2,4,6, or 8) except on Tuesdays, Thursdays, or Saturdays between the hours of 10:00 pm and 6:00 am.

b. Apply potable water to any outdoor landscape at properties with street addresses ending in an odd number (1,3,5,7, or 9) except on Wednesdays, Fridays, and Sundays between the hours of 10:00 pm and 6:00 am.

c. Apply potable water to any outdoor landscape at facilities such as schools, parks, cemeteries, golf courses or industrial sites and areas without street address numbers, such as landscape maintenance assessment districts ("LMADS"), except on Mondays, Tuesdays, Thursdays, Fridays and Sundays, between the hours of 10:00 p.m. and 9:00 a.m., unless such facilities have Large Systems with approved Reduction Plans. Water Users at facilities with approved Reduction Plans may water in accordance with the provisions of those Reduction Plans so long as the Water Users maintain full compliance with the provisions of such Reduction Plans. Water Users which fail to meet the minimum required Reduction Plan percentage during any one (1) billing cycle more than two (2) times in one twelve-month period, shall not be considered in full compliance and must immediately resume watering in accordance with the first sentence of this Subsection c. Failure to immediately resume watering in accordance therewith shall constitute a violation of this Chapter.

(2) Winter Outdoor Sprinkler Restrictions - from October 1 through May 31, it shall be prohibited to:

a. Apply potable water to any outdoor landscape at properties with street addresses ending in an even number (0,2,4,6, or 8) except on Tuesdays, Thursdays, or Saturdays between the hours of 9:00 a.m. and 3:00 p.m.

b. Apply potable water to any outdoor landscape at properties with street addresses ending in an odd number (1,3,5,7, or 9) except on Wednesdays, Fridays, and Sundays between the hours of 9:00 a.m. and 3:00 p.m.

c. Apply potable water to any outdoor landscape at facilities such as schools, parks, cemeteries, golf courses or industrial sites and areas without street address numbers, such as landscape maintenance assessment districts ("LMADS") except on Mondays, Tuesdays, Thursdays, Fridays and Sundays, between the hours of 9:00 a.m. and 3:00 p.m., unless such facilities have Large Systems with approved Reduction Plans. Water Users at facilities with approved Reduction Plans may water in accordance with the provisions of those Reduction Plans so long as the Water Users maintain full compliance with the provisions of such Reduction Plans. Water Users which fail to meet the minimum required Reduction Plan percentage during any one (1) billing cycle more than two (2) times in one twelve-month period, shall not be considered in full compliance and must immediately resume watering in accordance with the first sentence of this Subsection c. Failure to immediately resume watering in accordance therewith shall constitute a violation of this Chapter.

(3) Fall overseeding of Turf areas, unless irrigated with Reclaimed Water for non-residential water intensive landscape, shall be prohibited.

(4) Using water for washing of motor vehicles is prohibited, except when done by commercial car wash facilities equipped with a recirculation system.

(5) All swimming pools, spas and hot tubs must be covered when not in use.

(6) Exterior landscape plans for all new multi-family, commercial and industrial development must be presented to and approved by the District prior to issuance of a will serve letter.

(c) During Shortage Stage 2, it shall be unlawful and a violation of this Chapter for any Water User to make, cause, use or permit the use of water in any manner contrary to the provisions of this Section.

10.05.100 WSSCP Critical Water Supply Shortage – Shortage Stage 3.

(a) A Stage 3 Critical Water Supply Shortage ("Shortage Stage 3") shall be in effect when the District's ability to provide water for ordinary domestic and commercial uses may be critically impaired or threatened. Shortage Stage 3 will be implemented when a twenty-nine percent (29%) te forty percent (40%) reduction in

Total Potable Water Production or water usage must be met. The actual percentage reduction required (based on State conservation mandates and other contributing factors) will be indicated in the District resolution enacting Shortage Stage 3.

(b) During Shortage Stage 3, all prohibitions contained in Section 10.05.060 (Conservation Stage 1) and Section 10.05.090 (Shortage Stage 2) shall continue, and the additional provisions and prohibitions set forth below shall also be in effect:

(1) Use of water from fire hydrants shall be limited to firefighting or other authorized or approved water uses that are necessary to maintain health, safety, and welfare.

(2) The use of water from fire hydrants and dispersed for purposes other than those shown in paragraph (1), above, is prohibited. All existing construction meters shall be removed and no installation of or new construction meters shall be permitted.

(3) Outdoor irrigation is only permitted during the specified months and on such days and hours as specified in the subdivision of Sections 10.05.090(b)(1) and (2) of this Chapter if a handheld hose fitted with a positive shut-off nozzle is used or a Low-Volume Irrigation System is used, provided such system is not on an irrigation Station which operates at the same time as a sprinkler system. Reduction Plans will not be available for facilities with Large Systems unless otherwise specified in the District resolution enacting Stage 3.

(4) It shall be unlawful to use a sprinkler system in the irrigation of outdoor landscaping of any kind.

(c) During Shortage Stage 3, it shall be unlawful and a violation of this Chapter for any Water User to make, cause, use or permit the use of water in any manner contrary to the provisions of this Section.

10.05.110 WSSCP Emergency Water Supply Shortage – Shortage Stage 4.

(a) An Emergency Water Supply Shortage Stage 4 ("Shortage Stage 4") shall be in effect when a disaster or other major disruption in the water supply or any emergency that prevents the District from meeting the water demands of water users is threatened or exists. Shortage Stage 4 will be implemented when a Total Potable Water Production or water usage reduction in excess of forty-one percent (41%) is needed.. The actual percentage reduction required (based on State conservation mandates and other contributing factors) will be indicated in the District resolution enacting Shortage Stage 4.

(b) During Shortage Stage 4, no new will serve letters or hydrant flow meter permits will be issued, and all prohibitions contained in Section 10.05.060 (Conservation Stage 1), Section 10.05.090 (Shortage Stage 2), and Section

10.05.100 (Shortage Stage 3) shall continue. In addition, the following provisions and prohibitions shall also be in effect during Shortage Stage 4:

(1) The watering of Turf, lawns, grass, shrubbery, ground cover or other outdoor landscaping with potable water at any time is prohibited; the watering of parks, school grounds and golf courses with potable water also is prohibited.

(2) The use, filling or adding of water to swimming pools or spas of any size, fountains, ponds, water courses, waterfalls and other artificial water structures filled or refilled with water from any source is prohibited.

(3) The washing of vehicles, trucks, trailers, boats, airplanes, and other types of mobile equipment with potable water, is prohibited unless such washing is necessary for the immediate interest of the public health or safety, and such washing occurs upon the immediate premises of commercial vehicle washes using recirculated water.

(4) All existing nurseries shall discontinue all potable irrigation watering.

(c) During Shortage Stage 4, it shall be unlawful and a violation of this Chapter for any Water User to make, cause, use or permit the use of water in any manner contrary to the provisions of this Section.

10.05.120 Hardship Exceptiens.

(a) The General Manager may grant exceptions ("Hardship Exceptions") for uses of water otherwise prohibited under the provisions of this Chapter if he/she finds that special circumstances make compliance impossible or that applying the restrictions herein would cause an emergency condition affecting the health, sanitation, fire protection ability or safety of the Water User (or the public) or would create an unnecessary and undue hardship to the Water User.

(b) Hardship Exceptions may be granted only upon written application by the Water User made to the General Manager on a form provided by the District. The application must state the nature of the hardship and include all facts and circumstances supporting the requested exception. The General Manager shall review such applications and provide a written determination to the Water User advising of his/her decision, which written determination shall include the reasons supporting the determination. If a Hardship Exemption is granted, the General Manager may impose in the written determination any conditions and/or terms he/she finds to be just and proper under the circumstances. If the General Manager determines no Hardship Exception is warranted, the Water User may appeal the General Manager's decision in the manner set forth in Section 10.05.200.

10.05.130 Reclaimed water pipelines.

(a) Reclaimed water pipelines in new residential tract developments shall be installed in accordance with the provisions of District's Recycled Water Ordinance. Such pipelines shall be connected to the District's Reclaimed water system, where available and/or appropriate. The foregoing requirements are not applicable to individual residential Lots.

(b) It is District policy to encourage the use of Reclaimed water, whenever such use is appropriate and safe, in order to conserve potable water. To further these efforts, all Water Users with Reclaimed water pipelines should make reasonable efforts to use Reclaimed water for landscaping purposes, whenever Reclaimed water is readily available and will not pose a danger to human health and safety.

10.05.140 Limited exemptien te restrictions for users of Reclaimed water.

To the extent that users of Reclaimed or Recycled Water are exempted from restrictions under the WSSCP Stages set forth in this Chapter, such users shall clearly post notices stating that the water being used is not potable, not from the public drinking water supply, and is in conformance with the District's WSSCP.

10.05.150 Enfercement.

Enforcement Officers (as defined in Section 10.05.030 of this Chapter) shall be empowered to investigate instances of Water Waste and enforce all provisions of this Chapter. Enforcement Officers will issue any notice of violation ("NOV") or administrative citation in accordance with the provisions of this Chapter.

10.05.150 Administrative Citatiens and Administrative Fines.

(a) Any Person or Water User violating any provision of this Chapter may be issued an administrative citation by an Enforcement Officer as provided for in this Chapter.

(b) Each and every day a violation of any provision of this Chapter exists constitutes a separate and distinct violation. Each provision of this Chapter which is violated also constitutes a separate violation.

(c) An Administrative Fine for violations of any provisions of this Chapter may be assessed by means of an administrative citation issued by an Enforcement Officer. Administrative Fines so assessed shall be payable directly to the District.

(d) Administrative Fines assessed by means of administrative citations shall be due and payable as set forth in the administrative citation and shall be collected in accordance with the District's currently-effective Water Regulations and Service provisions as adopted by ordinance (presently codified in Chapter 10.04 of this Code).

10.05.170 Notices of Violation and Administrative citations; service and posting.

(a) Upon discovery or observing any violation of this Chapter for which an Administrative Fine has been prescribed, the Enforcement Officer may issue a NOV prior to an administrative citation to the Responsible Person(s), which NOV shall be delivered in accordance with the provisions of this Section. The NOV and administrative citation shall be issued on forms prescribed by the General Manager.

(b) The Enforcement Officer may obtain the signature of the Responsible Person(s) on the NOV or administrative citation. If the Responsible Person(s) refuses or fails to sign the NOV or administrative citation, the failure or refusal to sign shall not affect the validity of the NOV or administrative citation or any subsequent proceedings.

(c) The Enforcement Officer shall hand-deliver the NOV or administrative citation to the Responsible Person(s) at the premises where the violation occurred, or if no Responsible Person(s) are present, shall post the NOV or administrative citation by affixing it to a surface in a conspicuous place on the premises where the violation occurred. Failure of a NOV or administrative citation to remain in place after posting shall in no way affect the validity of the NOV or administrative citation or any subsequent proceedings.

(d) The Enforcement Officer shall also mail a copy of the NOV or administrative citation (by first class mail, postage prepaid and by certified mail, return receipt requested) to the address of the Water User (customer) account associated with the premises where the violation occurred, and to the address of any other Responsible Person(s) known to the District. The failure of the person to whom the NOV or administrative citation is addressed to receive the NOV or administrative citation shall not affect the validity of the NOV, the administrative citation or any subsequent proceedings.

(e) The NOV and administrative citation shall include all of the following:

(1) A brief description of the violation(s) or repeat of violation(s);

(2) The date and approximate time of the violation and the location at which the violation(s) was observed;

(3) The Section of this Chapter violated;

(4) The corrective action required;

(5) The time frame in which the violation(s) must be corrected or abated (not less than twenty-four (24) hours after delivery of the NOV or administrative citation or within such time as the Enforcement Officer determines is reasonable

under the circumstances); but in no event later than fourteen (14) days from the date the violation was first observed;

(6) The consequences of the failure to correct the violation, including the amount of any Administrative Fine to be imposed for the violations(s), and a statement explaining that each day violation(s) are not abated after the specified deadline constitute new violation(s) for which additional NOVs and administrative citations may be issued, and for which additional Administrative Fines may be assessed;

(7) A statement advising that any Administrative Fines shall be placed on the water utility bill of the Water User (customer) account associated with the premises upon which the violation occurred, to be paid and collected in accordance with the District's currently-effective Water Regulations and Service provisions as adopted by ordinance (currently codified in Chapter 10.04 of this Code); and

(8) A statement describing the rights of appeal.

10.05.180 Administrative Fine Schedule.

(a) Administrative Fines shall be assessed as follows:

(1) For a first violation of any prohibition of this Chapter prior to the issuance of an administrative citation, a NOV shall be issued in accordance with the procedures for service and posting set forth in Section 10.05.170 of this Chapter. The NOV will include a copy of this Chapter (or a summary thereof).

(2) For violation(s) of any prohibitions during Conservation Stage 1, Administrative Fines may be assessed for each violation of the provisions of Section 10.05.060 in the amount of one hundred dollars ($100.00).

(3) For violation(s) of any prohibitions during Shortage Stage 2, Administrative Fines may be assessed for each violation of the provisions of Section 10.05.090 in the amount of two hundred dollars ($200.00).

(4) For violation(s) of any prohibitions during Shortage Stage 3, Administrative Fines may be assessed for each violation of the provisions of Section 10.05.100 in the amount of three hundred dollars ($300.00).

(5) For violation(s) of any prohibitions during Shortage Stage 4, Administrative Fines may be assessed for each violation of the provisions of Section 10.05.110 in the amount of five hundred dollars ($500.00).

(b) The General Manager or his/her designee may waive any Administrative Fine or portion thereof assessed under this Section pursuant to written procedures (to be

developed by the General Manager) wherein mitigating circumstances or other conditions make the imposition of the Administrative Fine unreasonable.

(c) If the Responsible Person(s) fails to correct the violation(s), subsequent NOVs, administrative citations and fines may be issued for the same violation(s).

(d) Payment of the Administrative Fine shall not excuse the failure to correct the violation nor shall it bar further enforcement action up to and including discontinuance of water service (following the notice specified in Section 10.05.190(c) of this Chapter.

(e) Any fines imposed under this Section shall be collected in accordance with the District's currently-effective Water Regulations and Service provisions as adopted by ordinance (presently codified in Chapter 10.04 of this code). Such fines shall be deposited in the District's general fund.

10.05.190 Other Enforcement Remedies; Penalties Cumulative.

(a) Misdemeanor. In lieu of the Administrative Fines and other enforcement measures provided in this Chapter, or any other applicable remedies available to the District, pursuant to Water Code section 377, violations of this Chapter may be prosecuted as a misdemeanor, punishable by imprisonment in the county jail for not more than thirty (30) days, or by a fine not exceeding one thousand dollars ($1,000), or by both.

(b) Civil suits and Injunctive Relief. In addition to any other remedies provided in this Chapter or available under applicable law, the District may alternatively file a civil suit and/or seek injunctive relief in a court of competent jurisdiction.

(c) Discontinuation of Water Service. In addition to Administrative Fines or other remedies, the District, after providing a fifteen (15) day written advance notification (to be served in the manner set forth in Section 10.05.170), may disconnect a Water User's service for repeated violations of this Chapter occurring during Shortage Stages 2 through 4, subject to the appeal process in Section 10.05.200.

(d) Penalties Cumulative. Penalties for failure to comply with any of the provisions of this Chapter are cumulative and each day that a violation of this Chapter occurs is a separate violation and may be treated as such.

10.05.200 Appeals.

(a) Recipients of NOVs, administrative citations and such other Persons as are provided a right of appeal by Sections 10.05.120(b) and 10.05.190(c) of this Chapter shall have the appeal rights set forth herein. An appeal must:

(1) Be submitted and received by the General Manager at the District Offices located at 14343 Civic Drive, Victorville, CA 92393-5001 within ten (10) calendar days from date of delivery or mailing of the NOV (or other written notice), or within ten days of the date a Hardship Exception under Section 10.05.120 is denied. If the deadline falls any day the District Offices are closed, then the deadline shall be extended until the next regular business day when the District Offices are open.

(2) Be in writing, legible and indicate a return address;

(3) Be accompanied by the amount of the Administrative Fine (or an appeal fee amount to be set by resolution of the District Board for appeals not associated with an Administrative Fine) or a hardship waiver request;

(4) Specify the basis for the appeal in detail and include a copy of the NOV, administrative citation or other notice/decision and any supporting evidence or mitigating circumstances.

(b) Upon a timely receipt of the written notice of appeal, the General Manager shall transmit same to the Hearing Officer, who shall as soon as practicable, fix a date, time, and place for appeal hearing. Written notice of the date, time, and place of the hearing will be served by first class mail to the Appellant, postage prepaid at the return address indicated on the written appeal. Service of the appeal notice must be made on the Appellant at least ten (10) calendar days prior to the date of the hearing.

(c) Appellant 's timely submitted written request for an appeal hearing shall not stay the imposition of an Administrative Fine, and during the pendency of the appeal violations may still be cited and the District may take any action under this Chapter or provided for at law to address, abate, or otherwise remedy any ongoing violations. However, if it is determined by the Hearing Officer that the Administrative Fine was wrongly charged and paid, the District shall credit any amount due to the Water User's next bill and issue a check for any surplus should the Water User so request.

(d) Appellant's timely submitted written request for an appeal hearing shall stay the discontinuation of water service during the pendency of the appeal; however, violations may still be cited during the pendency of the appeal and the District may take any action under this Chapter or provided for at law to address, abate, or otherwise remedy any ongoing violations.

(e) The failure of Appellant or any other Person with an interest in the matter to receive a properly addressed notice of the hearing shall not affect the validity of any proceedings under this Chapter. Service by first class mail, postago prepaid, and via certified mail, return receipt requested shall be effective on the date of mailing.

(f) The failure of Appellant, or any other Person with an interest in the matter, to file an appeal in accordance with the provisions of this Section shall constitute a

waiver of those Persons' rights to an administrative determination of the merits of the NOV, administrative citation (or other written notice or decision) and a waiver of the right to contest the amount of the Administrative Fine. If no appeal is filed, the NOV, administrative citation, written notice ordering discontinuation of water service and/or the General Manager's written denial of a Hardship Exception shall each be deemed a final administrative order.

(g) In addition to the provisions below, the General Manager may establish other administrative regulations for implementing this Section, conducting hearings and rendering decisions:

(1) The Hearing Officer shall conduct all appeal hearings held in connection with this Chapter.

(2) The Appellant may request the General Manager excuse the Hearing Officer for reasons of actual prejudice against the Appellant's cause.

(3) The Hearing Officer shall conduct an orderly, fair hearing and accept evidence on which persons would commonly rely in the conduct of their ordinary business affairs as follows:

a. The Hearing Officer shall accept testimony by declaration under penalty of perjury relating to the violation;

b. The Responsible Person(s) or any other interested Person may present testimony or evidence concerning the violation.

(h) The Hearing Officer may reduce, waive, or conditionally reduce the Administrative Fines assessed pursuant to an administrative citation or any late fees assessed, if mitigating circumstances are shown and the Hearing Officer states specific grounds for reduction or waiver in the written decision. The Hearing Officer may impose conditions and deadlines for correction of violations, payment of outstanding fines, resumption of water service and other appropriate relief.

(i) The Hearing Officer shall make findings based on the record of the hearing and make a written decision based on the findings. The Hearing Officer shall preserve all exhibits submitted by the parties and shall serve the decision by first class mail on the Appellant within ten (10) working days after the hearing. The decisions of the Hearing Officer are final and conclusive administrative orders, subject only to review by the Superior Court. There are no appeals to the District Board.

10.05.210 Review of Final Order.

After receipt of the Hearing Officer's decision, the Appellant may file for de novo review in the Superior Court in accordance with the provisions of Government Code section 53069.4(b).

SECTION 3. SEVERABILITY.

The District Board declares that, should any provision, section, paragraph, sentence or word of this Ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words of this Ordinance as hereby adopted shall remain in full force and effect.

SECTION 4. CONFLICTING PROVISIONS.

The provisions of this Ordinance are in addition to all other District Regulations for Water Service, and in the event of a conflict between this Ordinance and other rules and regulations relating to the same subject matter, the conflict shall, insofar as practical, be resolved to implement the purposes of this Ordinance.

SECTION 6. EFFECTIVE DATE.

This Ordinance shall become effective immediately upon the date of adoption as set forth in Water Code section 376.

SECTION 6. PUBLICATION.

Following its adoption, the District Secretary shall certify to the passage of and publish this Ordinance in accordance with the provisions of Water Code section 376.

Ordinance No. VWD-012

THIS ORDINANCE SHALL BE IN FULL FORCE AND EFFECT ON MAY 19, 2015.

PASSED, APPROVED AND ADOPTED THIS 19th DAY OF MAY, 2015

Gloria Garcia
CHAIRMAN OF THE BOARD OF DIRECTORS

ATTEST:

Carolee Bates
BOARD SECRETARY/CITY CLERK

APPROVED AS TO FORM:

CITY ATTORNEY

I, CAROLEE BATES, Board Secretary to the Victorville Water District of the City of Victorville and ex-officio Clerk to the City Council of said City, DO HEREBY CERTIFY that the foregoing is a true and correct copy of Ordinance No. VWD-012 which was introduced at a meeting held on May 19, 2015 and duly adopted at a meeting held on the 19th day of May 2015 by the following roll call vote, to wit:

AYES: Board Members Garcia, Kennedy and McEachron

NOES: None

ABSENT: Board Members Cox and Negrete

ABSTAIN: None

Carolee Bates
BOARD SECRETARY/CITY CLERK

ORDINANCE NO. VWD-013

AN ORDINANCE OF THE BOARD OF DIRECTORS OF THE VICTORVILLE WATER DISTRICT MAKING CERTAIN CLARIFYING AND HARMONIZING AMENDMENTS TO ORDINANCE NO. VWD-012 WHICH CREATED A NEW CHAPTER 10.5 IN TITLE 10 OF THE VICTORVILLE MUNICIPAL CODE TITLED "VICTORVILLE WATER DISTRICT CONSERVATION PROGRAM AND WATER SHORTAGE CONTINGENCY PLAN"

WHEREAS, the Victorville Water District ("District") is a county water district and a subsidiary district of the City of Victorville ("City"); and

WHEREAS, the District and the City have an interest in maintaining landscape standards that support water conservation and have coordinated (and will continue to coordinate) their conservation efforts; and

WHEREAS, on May 19, 2015, in response to Governor Brown's April 1, 2015 Executive Order No. B-29-15 and the final conservation regulations of the State Water Resources Control Board (Sections 863, 864, 865 and 866 of Title 23 of California Code of Regulations, adopted on May 5, 2015); the Board of Directors of the District ("District Board") adopted Ordinance No. VWD-012; and

WHEREAS, Ordinance No. VWD-012 ("VWD-012") regulates (among other things) conservation landscaping standards for water users served by the District, which standards were formerly regulated by Chapter 13.60 of the Victorville Municipal Code ("VMC"); and

WHEREAS, it was originally contemplated by District and City staff that an ordinance to repeal VMC Chapter 13.60 would be brought to the City Council for consideration following passage of VWD-012; and

WHEREAS, following confirmation that some properties located within the City's territorial boundaries <u>were not</u> served by the District, but were still subject to the City's conservation landscaping requirements, City staff brought Ordinance No. 2338 ("Ord. 2338") to the City Council for consideration on June 2, 2015 to: (1) harmonize the conservation landscaping standards in VMC Chapter 13.60 with those VWD-012; and (2) remove certain provisions inapplicable to non-District served properties; and

WHEREAS, a public hearing on Ord. 2338 was opened on June 2, 2015 and subsequently continued to July 21, 2015 so that this Ordinance No. VWD-013 could be brought to the District Board to amend and harmonize certain provisions of VWD-012 with Ord. No. 2338 and ensure that any subsequent State conservation mandates were appropriately accounted for; and

WHEREAS, the District Board finds that the adoption of this Ordinance is exempt from the provisions of Public Resources Code section 21000 *et seq.* (the California Environmental Quality Act) as a project undertaken to assure the maintenance, restoration or enhancement of a natural resource pursuant to Title 14, California Code of Regulations section 15307; and

WHEREAS, the District Board finds it is necessary to adopt Ordinance No. VWD-013 to clarify and harmonize its water conservation landscape provisions with those of Ord. 2338 in the interest of protecting the health, safety and welfare of the District's water users and other residents of the City.

NOW, THEREFORE, THE BOARD OF DIRECTORS OF THE VICTORVILLE WATER DISTRICT DOES HEREBY ORDAIN AS FOLLOWS:

SECTION 1. RECITALS.

The recitals and findings set forth above are true and correct, and are hereby incorporated by this reference as if set forth in their entirety.

SECTION 2. AMENDMENT TO SECTIONS 10.05.030(ii), 10.05.050, 10.05.060(b)(15), 10.05.060(b)(16), 10.05.090(b)(6) AND 10.05.170(d) OF TITLE 10, CHAPTER 10.05 OF THE VICTORVILLE MUNICIPAL CODE, TITLED "VICTORVILLE WATER DISTRICT CONSERVATION PROGRAM AND WATER SHORTAGE CONTINGENCY PLAN"

A. Subsection (ii) of Section 10.05.030 (Definitions) shall be amended in its entirety to read as follows:

(ii) "Water-wise Plants" means plants that perform well in the District's service area and have been selected according to their ability to withstand the extreme hot/cold desert climate and fluctuating temperatures; adaptability to drought conditions; and ability to survive once established with a limited amount of supplemental water. The District will compile a list of Water-wise Plants into a comprehensive Water wise Plant List (the "WWP List.").

B. Section 10.05.050 (The Water-wise Plant List ("WWP List")) shall be amended in its entirety to read as follows:

(a) Many factors determine whether a Water-wise Plant will adapt or perform well, and even though a plant appears on the WWP List, there is no assurance it will adapt or thrive. Therefore, from time to time, the General Manager or his/her designee will amend the WWP List as necessary to add or remove plants. The currently effective WWP List will be posted on the District's website and will be available in printed form in the District offices.

(b) The General Manager, or his/her designee, may allow Water Users to use other drought tolerant plants not contained on the WWP List, provided that, upon request, such user (or Person acting on his/her behalf) provides adequate proof that such plant(s) are suitable for use in the area at issue, are water-efficient and have a drought tolerance level equal or greater to those on the WWP List. Any such permitted deviation for use of plants not on the currently-effective WWP List shall only be effective when authorized by the General Manager, or his/her designee.

C. Subsection (b)(15) of Section 10.05.060 (Year-Round Prohibited Water Waste - Conservation Stage 1) shall be revised in its entirety to read as follows:

(15) All rehabilitated or New Non-residential Facilities shall limit Water-intensive Landscape and Turf within landscaped area to the following percentages of the total Lot area, and all other areas required to be landscaped with plants shall consist of plants on the WWP List, unless deviation therefrom has been authorized by the General Manager or his/her designee in accordance with Section 10.05.050(b) of this Chapter:

a. Churches: Twenty five percent (25%) of total lot area.

b. Resorts, including hotels and motels: Ten percent (10%) of the total lot area.

c. Commercial and industrial uses, fewer than nine thousand square feet: Ten percent (10%) of the total lot area.

d. Commercial and industrial uses, nine thousand square feet and greater: Ten percent (10%) of the first nine thousand square feet, and five percent (5%) of the remaining lot area.

e. Common areas in residential developments: Ten percent (10%) of the first acre and five percent (5%) of each additional acre up to five acres. Residential developments larger than five acres shall not plant any additional water intensive landscape and turf in common areas.

f. Active Recreational Area shall not be considered in calculating the percentage of the total Lot area and shall not be considered in determining compliance with this Section.

D. Subsection (b)(16) of Section 10.05.060 (Year-Round Prohibited Water Waste - Conservation Stage 1) shall be revised in its entirety to read as follows:

(16) Any rehabilitated or New Model Homes and/or rehabilitated or New Residential Developments shall limit Water-intensive Landscape and Turf area at the following percentages of the total Lot area, and all remaining landscaped area, as required by the City's development standards, shall consist of plants on the WWP List, unless deviation therefrom has been authorized by the General Manager or his/her designee in accordance with Section 10.05.050(b) of this Chapter:

a. Nine thousand square feet or less: Ten percent (10%) of the total lot area.

b. Greater than nine thousand square feet to one acre: Ten percent (10%) of the first nine thousand square feet and five percent (5%) of the remainder of the lot area.

c. Water intensive landscape or turf shall only be located in rear yards.

d. No Water-Intensive Landscape or Turf shall be planted in any Right-of-Way.

e. Prior to closing on a new residential unit, the developer shall provide the homeowner with a copy of the District's water conservation ordinance. Upon receipt, the homeowner shall sign an affidavit of acceptance. The developer shall permanently maintain the signed affidavit and submit a copy to the General Manager.

E. Subsection (b)(6) of Section 10.05.090 (WSSCP Threatened Water Supply Shortage – Shortage Stage 2) shall be revised in its entirety to read as follows:

(6) Exterior landscape plans for all new multi-family, commercial and industrial development must be presented to and approved by the District prior to issuance by the City of a building permit.

F. Subsection (d) of Section 10.05.170 (Notices of Violation and Administrative citations; service and posting) shall be revised in its entirety to read as follows:

(d) The Enforcement Officer shall also mail a copy of the NOV or administrative citation (by first class mail, postage prepaid or by certified mail, return receipt requested) to the address of the Water User (customer) account

associated with the premises where the violation occurred, and to the address of any other Responsible Person(s) known to the District. The failure of the person to whom the NOV or administrative citation is addressed to receive the NOV or administrative citation shall not affect the validity of the NOV, the administrative citation or any subsequent proceedings.

SECTION 3. SEVERABILITY.

The District Board declares that, should any provision, section, paragraph, sentence or word of this Ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words of this Ordinance as hereby adopted shall remain in full force and effect.

SECTION 4. CONFLICTING PROVISIONS.

The provisions of this Ordinance are in addition to all other District Regulations for Water Service, and in the event of a conflict between this Ordinance and other rules and regulations relating to the same subject matter, the conflict shall, insofar as practical, be resolved to implement the purposes of this Ordinance.

SECTION 5. EFFECTIVE DATE.

This Ordinance shall take effect thirty (30) days after its final passage.

SECTION 6. CERTIFICATION.

The District Secretary is hereby directed to certify to the passage and adoption of this Ordinance and to cause it to be published as required by law.

NOW, THEREFORE, THE BOARD OF DIRECTORS OF THE VICTORVILLE WATER DISTRICT DOES HEREBY RESOLVE AS FOLLOWS:

Section 1. That the findings and facts set forth in the above Recitals are true and correct are incorporated into and made part of this Resolution No. VWD 15-006 ("this Resolution") by this reference.

Section 2. That a water shortage emergency is hereby declared, and that the Stage 2 Threatened Water Supply Shortage ("Shortage Stage 2") provisions and prohibitions as set forth in Ordinance No. VWD-012 ("VWD-012") are hereby implemented and will become effective immediately upon the adoption of this Resolution.

Section 3. That nothing in this Resolution shall restrain or inhibit the District's ability to declare further water shortage emergencies, activate higher Water Supply Shortage Stages and/or adopt additional measures and prohibitions under VWD-012 and/or other applicable provisions of State law.

Section 4. That this Resolution shall take effect immediately upon its adoption (provided that the District Board of Directors shall have first passed, approved and adopted VWD-012).

Section 5. That the Secretary to the Board shall certify to the passage and adoption of this Resolution; shall enter the same in the book of original Resolutions of the Victorville Water District; and shall make a minute of passage and adoption thereof in the records of the proceedings of the Victorville Water District, in the minutes of the meeting at which this Resolution is passed and adopted.

[END OF PAGE]

Resolution No. VWD 15-006

PASSED, APPROVED AND ADOPTED this 19th day of MAY 2015.

Solonia Garcia
CHAIRMAN OF THE BOARD OF DIRECTORS

ATTEST:

Carolee Bates
BOARD SECRETARY

APPROVED AS TO FORM:

LEGAL COUNSEL FOR VICTORVILLE WATER DISTRICT

I, CAROLEE BATES, City Clerk of the City of Victorville and ex-officio Clerk to the Victorville Water District of said City, DO HEREBY CERTIFY that the foregoing is a true and correct copy of Resolution No. VWD 15-006 and was adopted at a meeting held on the 19th day of May 2015, by the following roll call vote, to wit:

AYES: Board Members Garcia, Kennedy and McEachron

NOES: NONE

ABSENT: Board Members Cox and Negrete

ABSTAIN: NONE

Carolee Bates
CITY CLERK

CITY OF
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AGENDA ITEM

PUDLIC HEARING

VICTORVILLE WATER DISTRICT BOARD OF DIRECTORS

MEETING OF: May 19, 2015

DATE: May 12, 2015

SUBMITTED BY: Douglas B. Robertson, District General Manager
Donna McCormick, Water Conservation Supervisor
Reviewed by: District Counsel

SUBJECT: Consideration of Proposed Resolution No. VWD 15-006: **A RESOLUTION OF THE DOARD OF DIRECTORS OF THE VICTORVILLE WATER DISTRICT DECLARING A WATER SHORTAGE EMERGENCY AND CALLING FOR IMMEDIATE IMPLEMENTATION OF STAGE 2 THREATENED WATER SUPPLY SHORTAGE ("SHORTAGE STAGE 2") PURSUANT TO ORDINANCE NO. VWD-012**

RECOMMENDATION: That the Honorable Board of Directors: (1) Open the Public Hearing; (2) Take Testimony; (3) Close the Public Hearing; and (4) adopt Proposed Resolution No. VWD 15-006.

ATTACHMENTS: Resolution No. VWD 15-006

FISCAL IMPACT: Undetermined at this time; but enforcement costs are anticipated to be supplemented by administrative fines.

PROJECT BUDGET: $
PROJECT COST: $
PROJECT BALANCE: $

BUDGET ACCT NO: None

--Finance Use Only--
Additional Expense:
_____ No
_____ Yes/$Amount:
Additional Revenue:
_____ No
_____ Yes/$Amount:
CFO Review
_____

SUMMARY: Ordinance No. VWD-012 ("VWD-012") established the Victorville Water District ("District") standards, guidelines and procedures for year-round water conservation to prevent the waste or unreasonable use of water; and (2) specified restrictions, prohibitions and limitations on water use pursuant to the State Water Resources Control Board ("SWRCB") final regulations implemented in response to the Governor's Executive Order B-29-15 calling for action to address the State's escalating drought and water shortage conditions.

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Upon its adoption, VWD-012 immediately activated a number of water conservation measures and prohibitions on water waste as part of its "Conservation Stage 1." However, to promote flexibility and provide for increasingly more stringent water use prohibitions and conservation requirements when drought and water supply shortage conditions intensify; VWD-012 contains three Water Supply Shortage Stages (Shortage Stages 2, 3 and 4) which can be activated by resolutions adopted by the District Board of Directors ("District Board") when the District's General Manager so recommends (following noticed public hearings). These Shortage Stages can likewise be deactivated in the same fashion when drought and water supply shortage conditions cease or become less severe.

Because of the current drought state of emergency and the final emergency water conservation regulations adopted by the SWRCB on May 5, 2015 ("Final Regs."); the District must reduce its total potable water production by twenty-eight percent (28%) each month (over 2013 water usage figures for the same months) beginning as of June 1, 2015.

Although Conservation Stage 1 measures are now in effect, the General Manager and District staff know that additional water use restrictions are needed to reach the 28% reduction required by the Final Regs. It is therefore recommended that the District Board adopt Resolution No. VWD 15-006 which both: (1) declares a water shortage emergency; and (2) immediately implements/activates Water Supply Shortage Stage 2 ("Shortage Stage 2"). Shortage Stage 2 prohibitions are in Section 10.05.090 of VWD-012 and read, in pertinent part, as follows:

> (b) During Shortage Stage 2, all prohibitions contained in Section 10.05.060 (Conservation Stage 1) shall continue, and the following additional provisions and prohibitions shall also be in effect:
>
> (1) Summer Outdoor Sprinkler Restrictions - From June 1, through September 30, it shall be prohibited to:
>
> a. Apply potable water to any outdoor landscape at properties with street addresses ending in an even number (0,2,4,6, or 8) except on Tuesdays, Thursdays, or Saturdays between the hours of 10:00 pm and 6:00 am.
>
> b. Apply potable water to any outdoor landscape at properties with street addresses ending in an odd number (1,3,5,7, or 9) except on Wednesdays, Fridays, and Sundays between the hours of 10:00 pm and 6:00 am.
>
> c. Apply potable water to any outdoor landscape at facilities such as schools, parks, cemeteries, golf courses or industrial sites and areas without street address numbers, such as landscape maintenance assessment districts ("LMADS"), except on Mondays, Tuesdays, Thursdays, Fridays and Sundays, between the hours of 10:00 p.m. and 9:00 a.m., unless such facilities have Large

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Systems with approved Reduction Plans. Water Users at facilities with approved Reduction Plans may water in accordance with the provisions of those Reduction Plans so long as the Water Users maintain full compliance with the provisions of such Reduction Plans. Water Users which fail to meet the minimum required Reduction Plan percentage during any one (1) billing cycle more than two (2) times in one twelve-month period, shall not be considered in full compliance and must immediately resume watering in accordance with the first sentence of this Subsection c. Failure to immediately resume watering in accordance therewith shall constitute a violation of this Chapter.

(2) Winter Outdoor Sprinkler Restrictions - from October 1 through May 31, it shall be prohibited to:

a. Apply potable water to any outdoor landscape at properties with street addresses ending in an even number (0,2,4,6, or 8) except on Tuesdays, Thursdays, or Saturdays between the hours of 9:00 a.m. and 3:00 p.m.

b. Apply potable water to any outdoor landscape at properties with street addresses ending in an odd number (1,3,5,7, or 9) except on Wednesdays, Fridays, and Sundays between the hours of 9:00 a.m. and 3:00 p.m.

c. Apply potable water to any outdoor landscape at facilities such as schools, parks, cemeteries, golf courses or industrial sites and areas without street address numbers, such as landscape maintenance assessment districts ("LMADS") except on Mondays, Tuesdays, Thursdays, Fridays and Sundays, between the hours of 9:00 a.m. and 3:00 p.m., unless such facilities have Large Systems with approved Reduction Plans. Water Users at facilities with approved Reduction Plans may water in accordance with the provisions of those Reduction Plans so long as the Water Users maintain full compliance with the provisions of such Reduction Plans. Water Users which fail to meet the minimum required Reduction Plan percentage during any one (1) billing cycle more than two (2) times in one twelve-month period, shall not be considered in full compliance and must immediately resume watering in accordance with the first sentence of this Subsection c. Failure to immediately resume watering in accordance therewith shall constitute a violation of this Chapter.

(3) Fall overseeding of Turf areas, unless irrigated with Reclaimed Water for non-residential water intensive landscape, shall be prohibited.

(4) Using water for washing of motor vehicles is prohibited, except when done by commercial car wash facilities equipped with a recirculation system.

(5) All swimming pools, spas and hot tubs must be covered when not in use.

(6) Exterior landscape plans for all new multi-family, commercial and industrial development must be presented to and approved by the District prior to issuance of a will serve letter.

Ordinance No. VWD-013

THIS ORDINANCE SHALL BE IN FULL FORCE AND EFFECT ON SEPTEMBER 17, 2015.

PASSED, APPROVED AND ADOPTED THIS 18th DAY OF AUGUST, 2015

Gloria Garcia
CHAIRMAN OF THE BOARD OF DIRECTORS

ATTEST:

Marcie Wolters, Assistant
BOARD SECRETARY/CITY CLERK

8-19-15
DATE

APPROVED AS TO FORM:

CITY ATTORNEY

I, CAROLEE BATES, Board Secretary to the Victorville Water District of the City of Victorville and ex-officio Clerk to the City Council of said City, DO HEREBY CERTIFY that the foregoing is a true and correct copy of Ordinance No. VWD-013 which was introduced at a meeting held on July 21, 2015 and duly adopted at a meeting held on the 18th day of August 2015 by the following roll call vote, to wit:

AYES: Board Members Garcia, Cox, Kennedy, McEachron and Negrete

NOES: None

ABSENT: None

ABSTAIN: None

Marcie Wolters, Assistant
BOARD SECRETARY/CITY CLERK

Victorville Water District Water-wise Plant Coverage List

Water-wise Plants means plants that perform well in the District's service area and have been selected according to their ability to withstand the extreme hot/cold desert climate and fluctuating temperatures; adaptability to drought conditions; and ability to survive once established with a limited amount of supplemental water.

Many factors determine whether a Water-wise Plant will adapt or perform well, and even though a plant appears on the WWP List, there is no assurance it will adapt or thrive. Therefore, from time to time, the General Manager or his/her designee will amend the WWP List as necessary to add or remove plants.

The Water-wise plant list is a tool for use whether designing a new landscape or converting from traditional turf to a desert wise water efficient landscape. The plant canopy coverage is derived mathematically by multiplying the mature diameter of the plant by a formula to provide the square footage number. Determining the mature width of plants can be tricky. It may take many years or even decades for a plant to reach its ultimate width.

Check out our Plant data base for additional resources on selecting Desert-friendly Plants for Victorville Landscapes by visiting www.victorvilleca.gov/waterconservation/

Common Name	Genus	Species	Variety	Cultivar Name	Other Plant Names	Height (feet)	Width (feet)	Plant Coverage (Sq. Ft)
Plant Type: Tree								
Mulga Acacia	*Acacia*	*aneura*				20	20	**314**
Guijillo	*Acacia*	*berlandieri*				15	12	**113**
White Thorn Acacia	*Acacia*	*constricta*				10	15	**177**
Leatherleaf Acacia	*Acacia*	*craspedocarpa*				10	8	**50**
Sweet Acacia	*Acacia*	*farnesiana*			*(Acacia smallii,A. minuta)*	25	20	**314**
Cat-claw Acacia	*Acacia*	*greggii*				15	12	**113**
Weeping Acacia	*Acacia*	*pendula*				40	25	**368**
Blackbrush Acacia	*Acacia*	*rigidula*				12	15	**177**
Willow Acacia	*Acacia*	*salicina*				30	20	**314**
Blue Leaf Wattle	*Acacia*	*saligna*				20	20	**314**
Twisted Acacia	*Acacia*	*schaffneri*				20	25	**368**
Shoestring Acacia	*Acacia*	*stenophylla*				30	20	**314**
Palo Blanco	*Acacia*	*willardiana*				20	10	**79**
Silk Tree	*Albizia*	*julibrissin*				40	40	**1,257**
Hong Kong Orchid Tree	*Bauhinia*	*blakeana*				20	20	**314**
White Orchid Tree	*Bauhinia*	*lunarioides*				8	6	**28**
Purple Orchid Tree	*Bauhinia*	*variegata*				25	30	**707**
Bismarck Palm	*Bismarckia*	*nobilis*				30	10	**314**
Bottle Tree	*Brachychiton*	*populneus*				50	20	**314**

Common Name	Genus	Species	Variety	Cultivar Name	Other Plant Names	Height (feet)	Width (feet)	Plant Coverage (Sq. Ft)
Mexican Blue Palm	*Brahea*	*armata*				15	10	**79**
Pindo Palm	*Butia*	*capitata*				20	20	**314**
Cascalote	*Caesalpinia*	*cacalaco*				15	15	**177**
Weeping Bottle Brush	*Callistemon*	*viminalis*				30	15	**177**
Blue Atlas Cedar	*Cedrus*	*atlantica*		'Glauca'		60	30	**707**
Cedar	*Cedrus*	*deodora*				80	40	**1,257**
Canyon Hackberry	*Celtis*	*reticulata*				25	25	**368**
Chinese Hackberry	*Celtis*	*sinensis*				40	40	**1,257**
Carob Tree	*Ceratonia*	*siliqua*				40	40	**1,257**
Western Redbud	*Cercis*	*occidentalis*				15	15	**177**
Mediterranean Fan Palm	*Chamaerops*	*humilis*				10	8	**50**
Desert Willow	*Chilopsis*	*linearis*				25	20	**314**
Chitalpa	*Chitalpa*	*x tashkentensis*				25	30	**707**
Silk floss Tree, Kapok	*Chorisia*	*speciosa*				40	30	**707**
Smoke Tree	*Cotinus*	*coggygria*				15	15	**177**
Arizona Cypress	*Cupressus*	*arizonica*				40	20	**314**
Italian Cypress	*Cupressus*	*sempervirens*				60	8	**50**
Indian Rosewood	*Dalbergia*	*sisso*				40	30	**707**
Texas Ebony	*Ebenopsis*	*ebano*			*(Pithecellobium flexicaule)*	20	20	**314**
Loquat	*Eriobotyra*	*japonica*				15	15	**177**
Argyle Apple, Silver Dollar Gum	*Eucalyptus*	*cinerea*				25	25	**368**
Coolibah	*Eucalyptus*	*microtheca*				35	25	**368**
Ghost Gum, Blue Ghost Eucalyptus	*Eucalyptus*	*papuana*				30	30	**707**
Silver Dollar Gum	*Eucalyptus*	*polyanthemos*				35	25	**368**
Swamp Mallee	*Eucalyptus*	*spathulata*				25	30	**707**
Kidneywood	*Eysenhardtia*	*orthocarpa*				15	10	**79**
Fig Tree	*Ficus*	*carica*				20	20	**314**
Desert Olive	*Forestiera*	*neomexicana*				12	8	**50**
Littleleaf Ash	*Fraxinus*	*greggii*				10	8	**50**
Raywood Ash	*Fraxinus*	*oxycarpa*		'Raywood'		30	25	**368**
Majestic Beauty Ash	*Fraxinus*	*uhdei*		Majestic Beauty'		60	50	**1,963**
Arizona Ash	*Fraxinus*	*velutina*				25	30	**707**
Modesto Ash	*Fraxinus*	*velutina*		'Modesto'		50	40	**1,257**
Australian Willow	*Geijera*	*parviflora*				25	20	**314**

Common Name	Genus	Species	Variety	Cultivar Name	Other Plant Names	Height (feet)	Width (feet)	Plant Coverage (Sq. Ft)
Maidenhair Tree	*Ginkgo*	*biloba*				50	40	**1,257**
Honey Locust	*Gleditsia*	*triacanthos inermis*				50	35	**962**
Mexican Ebony	*Havardia*	*mexicana*			*(Pithecellobium mexicanum)*	30	30	**707**
Jacaranda	*Jacaranda*	*mimosifolia*			*(Jacaranda acutifolia)*	40	30	**707**
Goldenrain Tree	*Koereuteria*	*paniculata*				35	35	**962**
Crape Myrtle	*Lagerstroemia*	*indica*				25	20	**314**
Sweet Gum, Liquid Amber Tree	*Liquidambar*	*styraciflua*				60	25	**368**
Feather Tree	*Lysiloma*	*watsonii*	var. *thornberi*		*(Lysiloma microphylla* var. *thornberi)*	20	15	**177**
Crabapple	*Malus*			x 'Prairifire'		20	20	**314**
Cajeput Tree	*Melaleuca*	*quinquenervia*				20	15	**177**
Fruitless Olive	*Olea*	*europaea*				25	30	**707**
Ironwood	*Olneya*	*tesota*				25	30	**707**
Blue Palo Verde	*Parkinsonia*	*florida*			*(Cercidium floridum)*	30	30	**707**
Hybrid Palo Verde	*Parkinsonia*			'Desert Museum'	*(Cercidium hybrid)*	25	25	**368**
Foothills Palo Verde	*Parkinsonia*	*microphylla*			*(Cercidium microphyllum)*	15	15	**177**
Palo Brea	*Parkinsonia*	*praecox*			*(Cercidium praecox)*	25	25	**368**
Canary Island Date Palm	*Phoenix*	*canariensis*				40	30	**7077**
Date Palm	*Phoenix*	*dactylifera*				60	25	**368**
Piñon Pine	*Pinus*	*edulis*				20	15	**177**
Afghan Pine, Mondell Pine	*Pinus*	*eldarica*			*(Pinus brutia eldarica)*	50	25	**368**
Aleppo Pine	*Pinus*	*halepensis*				50	25	**368**
Singleleaf Piñon Pine	*Pinus*	*monophylla*				20	15	**177**
Stone Pine	*Pinus*	*pinea*				60	40	**1,257**
Chir Pine	*Pinus*	*roxburghii*				80	40	**1,257**
Chinese Pistache	*Pistacia*	*chinensis*				40	35	**962**
Mastic Tree	*Pistacia*	*lentiscus*				15	20	**314**
Willow Pittosporum	*Pittosporum*	*phillyraeoides*				25	15	**177**
Sycamore	*Platanus*	*racemosa*				80	50	**1,963**
Yew Pine	*Podocarpus*	*macrophyllus*				20	10	**79**
Fremont Cottonwood, Poplar	*Populus*	*fremontii*				60	30	**707**
South American Hybrid Mesquite	*Prosopis*	*hybrid*				30	30	**707**
Texas Honey Mesquite	*Prosopis*	*glandulosa*	var. glandulosa			30	30	**707**
Screwbean Mesquite	*Prosopis*	*pubescens*				15	30	**314**
Velvet Mesquite	*Prosopis*	*velutina*			*(Prosopis juliflora)*	30	30	**707**

Common Name	Genus	Species	Variety	Cultivar Name	Other Plant Names	Height (feet)	Width (feet)	Plant Coverage (Sq. Ft)
Purple Leaf Plum	*Prunus*	*cerasifera*		'Atropurpurea'		20	15	**177**
Desert Smoke Tree	*Psorothamnus*	*spinosus*				15	15	**177**
Pomegranate	*Punica*	*granatum*				12	12	**113**
Bradford Pear	*Pyrus*	*calleryana*		'Bradford'		50	35	**962**
California Coastal Live Oak	*Quercus*	*agrifolia*				40	50	**1,963**
Escarpment Live Oak	*Quercus*	*fusiformis*				50	50	**1,963**
Holly Oak	*Quercus*	*ilex*				50	50	**1,963**
California Black Oak	*Quercus*	*kelloggii*				40	40	**1,257**
Valley Oak	*Quercus*	*lobata*				70	80	**5,027**
Chinquapin Oak	*Quercus*	*muehlenbergii*				50	60	**2,827**
Cork Oak	*Quercus*	*suber*				40	40	**1,257**
Live Oak	*Quercus*	*virginiana*		'Heritage'		60	60	**2,827**
Slender Lady Palm	*Rhapis*	*excelsa*				8	10	**79**
African Sumac	*Rhus*	*lancea*				25	40	**1,257**
Common Locust	*Robinia*	*x ambigua*				40	30	**707**
Black Locust	*Robinia*	*pseudoacacia*				75	60	**2,827**
Mountain Laurel	*Sophora*	*secundiflora*				15	15	**177**
Silver Peso Mountain Laurel	*Sophora*	*secundiflora*		'Silver Peso'		15	15	**177**
Queen Palm	*Syagrus*	*romanzoffianum*			*(Arecastrum romanzoffianum)*	40	20	**314**
Tipu Tree	*Tipuana*	*tipu*				30	40	**1,257**
Windmill Palm	*Trachycarpus*	*fortunei*				15	8	**50**
Evergreen Elm	*Ulmus*	*parvifolia*				35	35	**962**
Lacebark Elm, Siberian Elm	*Ulmus*	*pumila*				50	40	**1,257**
Chaste Tree	*Vitex*	*agnus-castus*				20	25	**368**
California Fan Palm	*Washingtonia*	*filifera*				40	15	**177**
Mexican Fan Palm	*Washingtonia*	*robusta*				50	10	**79**
Plant Type: Shrub								
Glossy Abelia	*Abelia*	*x grandiflora*				8	5	**20**
Desert Abutilon, Indian Mallow	*Abutilon*	*palmerii*				4	3	**20**
Pineapple Guava	*Acca*	*sellowiana*			*(Feijoa sellowiana)*	12	10	**79**
Blue Hibiscus	*Alyogyne*	*huegelii*				5	4	**13**
Triangle Leaf Bursage	*Ambrosia*	*deltoidea*				2	2	**3**
Burrobush,White Bursage	*Ambrosia*	*dumosa*				3	3	**7**
Flame Honeysuckle	*Anisacanthus*	*quadrifidus var. wrightii*				3	5	**20**

Common Name	Genus	Species	Variety	Cultivar Name	Other Plant Names	Height (feet)	Width (feet)	Plant Coverage (Sq. Ft)
Howard McMinn Manzanita	*Arctostaphylos*	*densiflorus*		'Howard McMinn'		6	8	**50**
Powis Castle Wormwood	*Artemisia*			'Powis Castle'		3	6	**28**
Silver Sage	*Artemisia*	*filifolia*				5	5	**20**
Prairie Sagewort, Fringed Sage	*Artemisia*	*frigida*				2	2	**3**
Silver King Artemisia	*Artemisia*	*ludoviciana albula*		'Silver King'		3	3	**7**
Bigleaf Sage	*Artemisia*	*tridentata*				6	5	**20**
Foxtail Fern	*Asparagus*	*densiflorus*		'Myers'		2	3	**7**
Four-Wing Saltbush	*Atriplex*	*canescens*				5	8	**50**
Centennial Broom, Coyote Bush	*Baccharis*			x 'Centennial'		8	6	**28**
Crimson Pygmy Barberry	*Berberis*	*thunbergii*		'Crimson Pygmy'	(Berberis 'Atropurpurea Nana')	2	3	**7**
Butterfly Bush	*Buddleja*	*davidii*			*(Buddleia davidii)*	6	8	**50**
Wooly Butterfly Bush	*Buddleja*	*marrubifolia*				5	5	**20**
Japanese Boxwood	*Buxus*	*microphylla*	var. *japonica*			6	6	**28**
Yellow Bird of Paradise	*Caesalpinia*	*gilliesii*				6	6	**28**
Mexican Bird of Paradise	*Caesalpinia*	*mexicana*				10	10	**79**
Red Bird of Paradise	*Caesalpinia*	*pulcherrima*				6	6	**28**
Baja Fairy Duster	*Calliandra*	*californica*			*(Calliandra peninsularis)*	6	6	**28**
Pink Fairy Duster	*Calliandra*	*eriophylla*				3	3	**7**
Pink Powder Puff	*Calliandra*	*haematocephala*				10	10	**79**
Weeping Bottle Brush	*Callistemon*	*viminalis*		Little John'		3	3	**7**
Natal Plum	*Carissa*	*macrocarpa*			*(Carissa grandiflora)*	8	8	**50**
Desert Hackberry	*Celtis*	*pallida*				8	10	**79**
Curl-leaf Mountain Mahogany	*Cercocarpus*	*ledifolius*				15	10	**79**
Mountain Mahogany	*Cercocarpus*	*montanus*				5	5	**20**
Rabbitbrush	Chrysothamnus	nauseosus				4	4	**13**
Orchid Rock Rose	*Cistus*	*x purpureus*				4	4	**13**
Bladderpod	*Cleome*	*isomeris*			*(Isomeris arborea)*	4	6	**28**
Texas Olive	*Cordia*	*boissieri*				10	10	**79**
Little Leaf Cordia	*Cordia*	*parvifolia*				6	6	**28**
False Heather, Mexican Heather	*Cuphea*	*hyssopifolia*				2	2	**3**
Black Dalea	*Dalea*	*frutescens*				3	4	**13**
Pink Indigo Bush	*Dalea*	*pulchra*				5	5	**20**

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Hopseed Bush	*Dodonaea*	*viscosa*				10	10	**79**
Brittlebush	*Encelia*	*farinosa*				3	4	**13**
Mormon Tea	*Ephedra*	*viridis*				3	3	**7**
Hummingbird Trumpet	*Epilobium*	*canum*			*(Zauschneria californica)*	2	4	**13**
Red Eremophila	*Eremophila*	*maculata*	var. *brevifolia*			4	4	**13**
Turpentine Bush	*Ericameria*	*laricifolia*				2	3	**7**
California Buckwheat	*Eriogonum*	*fasciculatum*	var. *polifolium*			1	2	**3**
Apache Plume	*Fallugia*	*paradoxa*				6	4	**13**
Guayacan	*Guaiacum*	*coulteri*				5	5	**20**
Scarlet Bush, Fire Bush	*Hamelia*	*patens*				5	5	**20**
Toyon	*Heteromeles*	*arbutifolia*				15	15	**177**
Hibiscus	*Hibiscus*	*rosa-sinensis*				10	8	**50**
Desert Lavender	*Hyptis*	*emoryi*				8	8	**50**
Yaupon Holly	*Ilex*	*vomitoria*				15	10	**79**
Juniper	*Juniperus*	*chinensis*		'Torulosa'	(*Juniperus chinensis* 'Kaizuka')	15	10	**79**
Shrimp Plant	*Justicia*	*brandegeana*			*(Beloperone guttata)*	3	3	**7**
Chuparosa	*Justicia*	*californica*				4	6	**28**
Mexican Honeysuckle	*Justicia*	*spicigera*				4	4	**13**
Winterfat	*Krascheninnikovia*	*lanata*			*(Ceratoides lanata)*	3	3	**7**
Creosote Bush	*Larrea*	*tridentata*				6	10	**79**
Violet Silverleaf	*Leucophyllum*	*candidum*		'Thundercloud'		3	3	**7**
Texas Ranger	*Leucophyllum*	*frutescens*				8	8	**50**
Texas Ranger	*Leucophyllum*	*frutescens*		'Compacta'		3	4	**13**
Chihuahuan Sage	*Leucophyllum*	*laevigatum*				4	4	**13**
Cinnamon Sage	*Leucophyllum*	*langmaniae*				5	5	**20**
Wolfberry	*Lycium*	*fremontii*				10	10	**79**
Oregon Grape	*Mahonia*	*aquifolium*				6	5	**20**
Mangle Dulce	*Maytenus*	*phyllanthoides*				10	10	**79**
True Myrtle	*Myrtus*	*communis*				10	10	**79**
Heavenly Bamboo	*Nandina*	*domestica*				6	4	**13**
Oleander	*Nerium*	*oleander*				10	10	**79**
Little Ollie Olive	*Olea*	*europaea*		'Little Ollie'		6	6	**28**

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Redtip Photinia	*Photinia*	*x fraseri*				10	5	**20**
Wheeler's Dwarf	*Pittosporum*	*tobira*		'Wheeler's Dwarf'		2	3	**7**
Golden Arborvitae	*Platycladus*	*orientalis*		'Aureus'		18	10	**79**
White Desert Plumbago	*Plumbago*	*scandens*				3	4	**13**
Lavender Spice	*Poliomintha*	*maderensis*			*(Poliomentha longiflora)*	3	3	**7**
Western Sandcherry	*Prunus*	*pumila*	var. *besseyi*			6	6	**28**
Dwarf Pomegranate	*Punica*	*granatum*		'Nana'		3	3	**7**
Mexican Cliffrose	*Purshia*	*mexicana*			*(Cowania mexicana)*	6	6	**28**
Pyracantha	*Pyracantha*	*crenatoserrata*			*(Pyracantha fortuneata)*	10	10	**79**
Formosa Pyracantha	*Pyracantha*	*koidzumii*				10	6	**28**
Desert Scrub Oak	*Quercus*	*turbinella*				4	6	**28**
Indian Hawthorn	*Rhaphiolepis*	*indica*				8	6	**28**
Flame-leaf Sumac	*Rhus*	*lanceolata*				20	20	**314**
Sugar Bush	*Rhus*	*ovata*				10	10	**79**
Squaw Bush	*Rhus*	*trilobata*				12	12	**113**
Evergreen Sumac	*Rhus*	*virens*				9	9	**64**
Matilija Poppy	*Romneya*	*coulteri*				6	6	**28**
Shrub Rose	*Rosa*	*species*				6	6	**28**
Rosemary	*Rosmarinus*	*officinalis*				3	4	**13**
Ruellia	*Ruellia*	*brittoniana*				4	4	**13**
Ruellia	*Ruellia*	*peninsularis*				2	4	**13**
Chaparral Sage	*Salvia*	*clevelandii*				3	5	**20**
Mojave Desert Sage	*Salvia*	*dorrii*	var. *dorrii*			2	2	**3**
Autumn Sage	*Salvia*	*greggii*				4	3	**7**
Mexican Bush Sage	*Salvia*	*leucantha*				3	4	**13**
Lavender Cotton	*Santolina*	*chamaecyparis*				2	4	**13**
Green Santolina	*Santolina*	*virens*				5	6	**28**
Feathery Senna	*Senna*	*artemisioides*	var. *filifola*		*(Cassia artemisioides)*	6	6	**28**
Shrubby Senna	*Senna*	*wislizenii*			*(Cassia wislizenii)*	8	8	**50**
Jojoba	*Simmondsia*	*chinensis*				8	8	**50**
Tecoma Hybrid	*Tecoma*			'Orange Bells'		10	8	**50**
Yellow Bells	*Tecoma*	*stans*				10	8	**50**

Common Name	Genus	Species	Variety	Cultivar Name	Other Plant Names	Height (feet)	Width (feet)	Plant Coverage (Sq. Ft)
Cape Honeysuckle	*Tecomaria*	*capensis*	var. *angustata*			10	10	**79**
Silver Germander, Bush Germander	*Teucrium*	*fruticans*			*(Teucrium chamaedrys)*	8	8	**50**
Lucky Nut	*Thevetia*	*peruviana*				10	15	**177**
Mexican Buckeye	*Ungnadia*	*speciosa*				10	8	**50**
Goldeneye	*Viguiera*	*deltoidea*				3	3	**7**
Skeleton Leaf Goldeneye	*Viguiera*	*stenoloba*				2	2	**3**
Arizona Rosewood	*Vauquelinia*	*californica*				10	15	**177**
Skeleton Leaf Goldeneye	*Viguiera*	*stenoloba*				2	2	**3**
Arabian Lilac	*Vitex*	*trifolia*				15	15	**177**
Xylosma	*Xylosma*	*congestum*				8	10	**79**
Gray Thorn	*Zizyphus*	*obtusifolia*				6	6	**28**
Plant Type: Groundcover								
Trailing Acacia	*Acacia*	*redolens*		'Prostrata', 'Desert Carpet'		2	10	**79**
Asparagus Fern	*Asparagus*	*densiflorus*		'Sprengeri'		3	3	**7**
Calylophus, Sundrops	*Calylophus*	*hartweggii*	var. *fendleri*			1	2	**3**
Snow-in-Summer	*Cerastium*	*tomentosum*				1	1	**1**
Damianta	*Chrysactinia*	*mexicana*				2	2	**3**
Bush Morning Glory	*Convolvulus*	*cneorum*				2	3	**7**
Ground Morning Glory	*Convolvulus*	*mauritanicus*				1	2	**3**
Creeping Cotoneaster	*Cotoneaster*	*adpressus*				2	6	**28**
Rock Cotoneaster	*Cotoneaster*	*horizontalis*				3	15	**177**
Sierra Gold Dalea	*Dalea*	*capitata*				1	3	**7**
Prostrate Indigo Bush	*Dalea*	*greggii*				1	15	**177**
Treasure Flower, Gazania	*Gazania*	*linearis*				1	2	**3**
Trailing Gazania	*Gazania*	*rigens*	*leucolaena*			1	2	**3**
Goodding Verbena	*Glandularia*	*gooddingii*			*(Verbena gooddingii)*	1	2	**3**
Moss Verbena	*Glandularia*	*pulchella*			*(Verbena pulchella)*	1	3	**7**
Sandpaper Verbena	*Glandularia*	*rigida*				1	3	**7**
Blue Chip Juniper	*Juniperus*	*horizontalis*		'Blue Chip'		1	6	**28**
Shore Juniper	*Juniperus*	*rigida*	*conferta*			1	6	**28**
Trailing Lantana	*Lantana*	*montevidensis*				1	3	**7**
New Gold Lantana	*Lantana*			'New Gold'		2	3	**7**
Copper Ice Plant	*Malephorea*	*crocea*				1	6	**28**

Common Name	Genus	Species	Variety	Cultivar Name	Other Plant Names	Height (feet)	Width (feet)	Plant Coverage (Sq. Ft)
Prostrate Myoporum	*Myoporum*	*parvifolium*				1	9	**64**
Mexican Evening Primrose	*Oenothera*	*berlandieri*			*(Oenothera speciosa)*	1	3	**13**
Tufted Evening Primrose	*Oenothera*	*caespitosa*				1	2	**7**
Saltillo Primrose	*Oenothera*	*stubbei*				1	3	**7**
Pyracantha, Firethorn	*Pyracantha*	*koidzumii*		'Santa Cruz'	*('Santa Cruz Prostrata')*	4	4	**13**
Prostrate Rosemary	*Rosmarinus*	*officinalis*		'Prostratus'		2	8	**50**
Lamb's Ear	*Stachys*	*byzantina*				1	3	**7**
Scarlet Betony, Texas Betony	*Stachys*	*coccinea*				1	2	**3**
Creeping Germander	*Teucrium*	*chamaedrys*		'Prostratum'		1	3	**7**
Creeping Thyme	*Thymus*	*serpyllum*				1	3	**7**
Periwinkle	*Vinca*	*major*				1	6	**28**
Vinca,Dwarf Periwinkle	*Vinca*	*minor*				1	4	**13**
Wedelia	*Wedelia*	*texana*			*(Zexmenia hispida)*	3	3	**7**
Yellow Dot	*Wedelia*	*trilobata*				1	6	**28**
Plant Type: Vine								
Coral Vine, Queen's Wreath	*Antigonon*	*leptopus*				15	30	**707**
Bougainvillea	*Bougainvillea*	*species*				15	30	**707**
Trumpet Creeper Vine	*Campsis*	*radicans*				20	25	**368**
Grape Ivy, Arizona Grape Ivy	*Cissus*	*trifoliata*				40	40	**1,257**
Wintercreeper	*Euonymus*	*fortunei*				1	15	**177**
Creeping Fig	*Ficus*	*pumila*				30	30	**707**
Carolina Jessamine	*Gelsemium*	*sempervirens*				20	20	**314**
Lilac Vine	*Hardenbergia*	*violacea*				15	10	**79**
Primrose Jasmine	*Jasminum*	*mesnyi*				10	10	**79**
Hall's Honeysuckle	*Lonicera*	*japonica*		'Halliana'		25	25	**368**
Cat's Claw	*Macfadyena*	*unguis-cati*				30	30	**707**
Yellow Orchid Vine	*Mascagnia*	*macroptera*				15	15	**177**
Merremia	*Merremia*	*aurea*				10	10	**79**
Virginia Creeper	*Parthenocissus*	*quinquefolia*				50	50	**1,963**
Boston Ivy	*Parthenocissus*	*tricuspidata*				50	50	**1,963**
Hacienda Creeper Vine	*Parthenocissus*	*tricuspidata*		'Hacienda Creeper'		25	25	**368**
Passion Flower Vine	*Passiflora*	*x alatocaerulea*				30	30	**707**
Baja Passion Flower vine	*Passiflora*	*foetida*	*longipedunculata*			10	10	**79**
Pink Trumpet Vine	*Podranea*	*ricasoliana*				20	20	**314**
Lady Bank's Rose	*Rosa*	*banksiae*				20	25	**368**

Common Name	Genus	Species	Variety	Cultivar Name	Other Plant Names	Height (feet)	Width (feet)	Plant Coverage (Sq. Ft)
Potato Vine	*Solanum*	*laxum*				30	10	**79**
Star Jasmine	*Trachelospermum*	*jasminoides*				25	30	**707**
Snail Vine	*Vigna*	*caracalla*			*(Phaseolus caracalla)*	30	30	**707**
Grape Vine	*Vitis*	species				20	20	**314**
Japanese Wisteria	*Wisteria*	*floribunda*				20	20	**314**
Chinese Wisteria	*Wisteria*	*sinensis*				20	20	**314**
Plant Type: Grass-like								
Sideoats Grama	*Bouteloua*	*curtipendula*				2	2	**3**
Blue Grama Grass	*Bouteloua*	*gracilis*				2	2	**3**
Feather Reed Grass	*Calamagrostis*	*acutiflora*		'Karl Forester'		4	2	**3**
Mexican Grass Tree	*Dasylirion*	*longissimum*				5	5	**20**
Canyon Prince Wild Rye	*Elymus*	*condemsatus*		'Canyon Prince'		1	1	**1**
Blue Fescue	*Festuca*	*glauca*				1	1	**1**
Blue Oat Grass	*Helictotrichon*	*sempervirens*				1	2	**3**
Japanese Blood Grass	*Imperata*	*cylindrica*		'Rubra'		2	1	**1**
Japanese Silver Grass	*Miscanthus*	*sinensis*				6	4	**13**
Pink Muhly	*Muhlenbergia*	*capillaris*				3	4	**13**
Bamboo Muhly	*Muhlenbergia*	*dumosa*				5	5	**20**
Bull Grass	*Muhlenbergia*	*emersleyi*				5	4	**13**
Autumn Glow Muhly	*Muhlenbergia*	*lindheimeri*		'Autumn Glow'		5	5	**20**
Deer Grass	*Muhlenbergia*	*rigens*				4	4	**13**
Mexican Feather Grass	*Nasella*	*tenuissima*			*(Stipa tenuissima)*	2	2	**3**
Devil's Shoestring	*Nolina*	*lindheimeriana*				3	3	**7**
Tree Beargrass	*Nolina*	*matapensis*				15	6	**28**
Beargrass	*Nolina*	*microcarpa*				6	8	**50**
Texas Beargrass	*Nolina*	*texana*				3	3	**13**
Switch Grass	*Panicum*	*virgatum*				5	5	**20**
Red Fountain Grass	*Pennisetum*	*setaceum*		'Rubrum'		5	4	**13**
Plant Type: Cacti								
Saguaro	*Carnegiea*	*gigantea*				50	6	**50**
Hildmann's Cereus	*Cereus*	*hildmannianus*			*(Cereus peruvianus)*	15	10	**79**
Buckhorn Cholla	*Cylindropuntia*	*acanthocarpa*			*(Opuntia acanthocarpa)*	4	5	**20**
Staghorn Cholla	*Cylindropuntia*	*versicolor*			*(Opuntia versicolor)*	10	8	**50**
Golden Barrel Cactus	*Echinocactus*	*grusonii*				1	3	**7**

Common Name	Genus	Species	Variety	Cultivar Name	Other Plant Names	Height (feet)	Width (feet)	Plant Coverage (Sq. Ft)
Strawberry Hedgehog	*Echinocereus*	*engelmannii*				1	2	**3**
Claret Cup	*Echinocereus*	*triglochidiatus*				1	3	**7**
Compass Barrel	*Ferocactus*	*cylindraceus*			*(Ferocactus acanthodes)*	3	2	**3**
Fishhook Barrel	*Ferocactus*	*wislizenii*				3	2	**3**
Senita	*Lophocereus*	*schottii*				10	10	**79**
Totem Pole	*Lophocereus*	*schottii*	*monstrosus*		*(Pachcereus schottii)*	10	10	**79**
Beavertail Cactus	*Opuntia*	*basilaris*				1	4	**13**
Teddy Bear Cholla	*Opuntia*	*bigelovii*				6	3	**7**
Engelmann's Prickly Pear	*Opuntia*	*engelmannii*				4	8	**50**
Texas Prickly Pear	*Opuntia*	*engelmannii*	*lindheimeri*			5	10	**79**
Indian Fig Prickly Pear	*Opuntia*	*ficus-indica*				12	15	**177**
Cow's Tongue Prickly Pear	*Opuntia*	*lindheimeri*	var. *linguiformis*			6	6	**28**
Bunny Ears	*Opuntia*	*microdasys*				3	5	**20**
Prickly Pear	*Opuntia*	*phaeacantha*				3	8	**50**
Giant Prickly Pear	*Opuntia*	*robusta*				10	10	**79**
Purple Prickly Pear	*Opuntia*	*santa-rita*			*(Opuntia violacea santa-rita)*	4	5	**20**
Mexican Fencepost	*Pachycereus*	*marginatus*			*(Stenocereus marginatus)*	10	6	**28**
Organ Pipe Cactus	*Stenocereus*	*thurberi*				10	10	**79**
Spruce Cones	*Tephrocactus*	*articulatus*	*inermis*			1	3	**7**
Argentine Hedgehog	*Trichocereus*	*huascha*				2	3	**7**
Plant Type: Succulent								
Century Plant, American Agave	*Agave*	*americana*				10	12	**113**
Blue Glow Agave	*Agave*			'Blue Glow'		2	3	**7**
Cow's Horn Agave	*Agave*	*bovicornuta*				4	5	**20**
Mescal Ceniza	*Agave*	*colorata*				3	4	**13**
Desert Agave	*Agave*	*deserti*				2	2	**3**
Smooth Agave	*Agave*	*desmettiana*				3	3	**7**
Threadleaf Agave	*Agave*	*filifera*				2	2	**3**
Twin-Flowered Agave	*Agave*	*geminiflora*				3	3	**7**
Harvard Agave	*Agave*	*havardiana*				3	3	**7**
Thorn-Crested Agave, Holly Agave	*Agave*	*lophantha*				3	5	**20**
Murphey's Agave	*Agave*	*murpheyi*				3	3	**7**

Common Name	Genus	Species	Variety	Cultivar Name	Other Plant Names	Height (feet)	Width (feet)	Plant Coverage (Sq. Ft)
Artichoke Agave	*Agave*	*parryi*				3	3	**7**
Utah Agave	*Agave*	*utahensis*				1	2	**3**
Queen Victoria Agave	*Agave*	*victoria-reginae*				1	2	**3**
Octopus Agave	*Agave*	*vilmoriniana*				4	5	**20**
Weber's Agave	*Agave*	*weberi*				6	5	**20**
Tree Aloe	*Aloe*	*arborescens*				10	6	**28**
Blue Elf Aloe	*Aloe*			'Blue Elf'		2	2	**3**
Ferox Agave	*Aloe*	*ferox*				12	5	**20**
African Aloe	*Aloe*	*saponaria*				1	10	**50**
Variegated Aloe	*Aloe*	*variegata*				1	1	**1**
Aloe Vera	*Aloe*	*vera*			*(Aloe barbadensis)*	2	3	**7**
Threadleaf Milkweed	*Asclepias*	*linearis*				3	3	**7**
Desert Milkweed	*Asclepias*	*subulata*				4	3	**7**
Pony Tail Palm	*Beaucarnea*	*recurvata*				15	10	**79**
Yellow Bulbine	*Bulbine*	*frutescens*				1	2	**3**
Japanese Sago Palm	*Cycas*	*revoluta*				5	5	**20**
Green Desert Spoon	*Dasylirion*	*acrotriche*				6	5	**20**
Desert Spoon	*Dasylirion*	*wheeleri*				6	5	**20**
Crown of Thorns	*Euphorbia*	*milli*				4	2	**3**
Gopher Plant	*Euphorbia*	*rigida*				2	4	**13**
Ocotillo	*Fouquieria*	*splendens*				20	15	**177**
Giant Hesperaloe	*Hesperaloe*	*funifera*				6	6	**28**
Red Yucca	*Hesperaloe*	*parviflora*				3	5	**20**
Our Lord's Candle	*Hesperoyucca*	*whipplei*				2	3	**7**
Madagascar Palm	*Pachypodium*	*lamerei*				15	4	**13**
Lady's Slipper	*Pedilanthus*	*macrocarpus*				3	2	**3**
Elephant's Food	*Portulacaria*	*afra*				3	4	**13**
Spanish Bayonet	*Yucca*	*aloifolia*				10	4	**13**
Banana Yucca	*Yucca*	*baccata*				3	5	**20**
Joshua Tree	*Yucca*	*brevifolia*				30	30	**707**
Soaptree Yucca	*Yucca*	*elata*				20	8	**50**
Adam's Needle	*Yucca*	*filamentosa*				3	4	**13**
Faxon Yucca	*Yucca*	*faxoniana*				15	10	**79**
Soapweed Yucca, Narrowleaf Yucca	*Yucca*	*glauca*				4	4	**13**
Spanish Dagger	*Yucca*	*gloriosa*				10	8	**50**

Common Name	Genus	Species	Variety	Cultivar Name	Other Plant Names	Height (feet)	Width (feet)	Plant Coverage (Sq. Ft)
New Mexico Yucca	*Yucca*	*harrimaniae*				1	1	**1**
Pale Leaf Yucca	*Yucca*	*pallida*				2	3	**7**
Weeping Yucca	*Yucca*	*recurvifolia*				6	6	**28**
Blue Yucca	*Yucca*	*rigida*				12	5	**20**
Beaked Yucca, Thompson's Yucca	*Yucca*	*rostrata*			*(Yucca thompsoniana)*	12	10	**79**
Twisted Leaf Yucca	*Yucca*	*rupicola*				2	2	**3**
Mojave Yucca	*Yucca*	*schidigera*				4	3	**7**
Plant Type: Perennial								
Common Yarrow	*Achillea*	*millefolium*				3	2	**3**
Woolly Yarrow	*Achillea*	*tomentosa*				2	2	**3**
Lily of the Nile	*Agapanthus*	*praecox*	*orientalis*			2	2	**3**
Anise Hyssop	*Agastache*	*foeniculum*				3	3	**7**
Hummingbird Mint	*Agastache*	*rupestris*				3	2	**3**
Golden Columbine	*Aquilegia*	*chrysantha*				3	2	**3**
Marguerite	*Argyranthemum*	*frutescens*			*(Chrysanthemum frutescens)*	3	3	**7**
Desert Marigold	*Baileya*	*multiradiata*				1	1	**1**
Chocolate Flower	*Berlandiera*	*lyrata*				1	2	**3**
Dusty Miller	*Centaurea*	*cineraria*				2	2	**3**
Kaffir Lily	*Clivia*	*miniata*				2	2	**3**
Lanceleaf Coreopsis	*Coreopsis*	*lanceolata*				2	2	**3**
Sunray Coreopsis	*Coreopsis*	*verticillata*				1	2	**3**
Bat-faced Cuphea	*Cuphea*	*laevea*				2	3	**7**
Peacock Flower	*Dietes*	*bicolor*				2	2	**3**
Purple Coneflower	*Echinacea*	*purpurea*				4	2	**3**
Green Gold	*Euryops*	*pectinatus*		'Viridis'		4	3	**7**
Blanket Flower	*Gaillardia*	*aristata*			*(Gallardia grandiflora)*	2	2	**3**
Gaura	*Gaura*	*lindheimeri*				1	2	**3**
Gazania	*Gazania*	*splendens*				1	1	**1**
Snakeweed	*Gutierrezia*	*sarothrae*				1	2	**3**
Baby's Breath	*Gypsophila*	*paniculata*				3	3	**7**
Maximilian Sunflower	*Helianthus*	*maximilianii*				10	2	**3**
Daylily	*Hemerocallis*	*hybrid*				2	3	**7**
Coral Bells	*Heuchera*	*sanguinea*				1	1	**1**
Bearded Iris	*Iris*	*germanica*				2	2	**3**

Common Name	Genus	Species	Variety	Cultivar Name	Other Plant Names	Height (feet)	Width (feet)	Plant Coverage (Sq. Ft)
Red-Hot Poker	*Kniphofia*	*uvaria*				3	3	**7**
English Lavender	*Lavandula*	*angustifolia*		'Munstead'		3	3	**7**
French Lavender	*Lavandula*	*dentata*				3	3	**7**
Blue Lavandin	*Lavandula*	*x intermedia*		'Grosso'		2	3	**7**
Spanish Lavender	*Lavandula*	*stoechas*				4	3	**7**
Shasta Daisy	*Leucanthemum*	*x superbum*			*(Chrysanthemum maximum)*	3	2	**3**
Blackfoot Daisy	*Melampodium*	*leucanthum*				1	2	**3**
Missouri Evening Primrose	*Oenothera*	*macrocarpa*			*(Oenethera missouriensis)*	1	2	**3**
Oregano	*Origanum*	*laevigatum*				2	3	**3**
Oriental Poppy	*Papaver*	*orientale*				3	2	**3**
Rock Penstemon	*Penstemon*	*baccharifolius*				2	3	**7**
Firecracker Penstemon	*Penstemon*	*eatonii*				1	2	**3**
Parry's Penstemon	*Penstemon*	*parryi*				2	2	**3**
Pineleaf Penstemon	*Penstemon*	*pinnifolius*				1	2	**3**
Royal Beardtongue	*Penstemon*	*spectibilis*				1	1	**1**
Coral Penstemon	*Penstemon*	*superbus*				2	3	**7**
Star Flower	*Pentas*	*lanceolata*				3	3	**7**
Russian Sage	*Perovskia*	*atriplicifolia*				3	4	**13**
Jerusalem Sage	*Phlomis*	*fruticosa*				3	3	**7**
Paperflower	*Psilostrophe*	*cooperi*				1	3	**7**
Wooly Paperflower	*Psilostrophe*	*tagetina*				1	3	**7**
Mexican Hat	*Ratibida*	*columnifera*				2	2	**3**
Black-eyed Susan	*Rudbeckia*	*hirta*				3	3	**7**
Dwarf Ruellia, Desert Petunia	*Ruellia*	*brittoniana*		'Katie'		1	1	**1**
Mealy Cup Sage	*Salvia*	*farinacea*				2	2	**3**
Royal Purple Autumn Sage	*Salvia*	*muelleri*				2	2	**3**
Compact Indigo Spires Sage	*Salvia*			'Mystic Spires Blue'		3	3	**7**
Blue Queen Sage	*Salvia*		x *superba*			2	2	**3**
Desert Senna	*Senna*	*covesii*				3	3	**7**
Globe Mallow	*Sphaeralcea*	*ambigua*				3	3	**7**
Mountain Marigold	*Tagetes*	*lemmonii*				5	5	**20**
Licorice Marigold	*Tagetes*	*lucida*				4	4	**13**
Angelita Daisy	*Tetraneuris*	*acaulis*			*(Hymenoxys acaulis)*	1	1	**1**
Golden Dyssodia	*Thymophylla*	*pentachaeta*			*(Dyssodia pentachaeta)*	1	1	**1**
Society Garlic	*Tulbaghia*	*violacea*				1	1	**1**

Common Name	Genus	Species	Variety	Cultivar Name	Other Plant Names	Height (feet)	Width (feet)	Plant Coverage (Sq. Ft)
Goldeneye	*Viguiera*	*deltoidea*				2	2	**3**
Fairy Lily	*Zephyranthes*	*grandiflora*				1	1	**1**
Desert Zinnia	*Zinnia*	*acerosa*				1	1	**1**
Prairie Zinnia	*Zinnia*	*grandiflora*				1	1	**1**
Plant Type: Annuals	**(NO CANOPY COVERAGE)**							
Desert Sand Verbena	*Abronia*	*vilosa*						
Hollyhock	*Alcea*	*rosea*						
Snapdragon	*Antirrhinum*	*majus*						
Calendula	*Calendula*	*officinalis*						
Periwinkle, Vinca	*Catharanthus*	*roseus*			*(Vinca rosea)*			
Bachelor's Button	*Centaurea*	*cyanthus*						
Garden Chrysanthemum, Mum	*Chrysanthemum*	*x morifolium*						
Southwestern Cosmos	*Cosmos*	*bipinnatus*						
Dianthus, Sweet William	*Dianthus*	*species*						
California Poppy	*Eschscholzia*	*californica*						
Mexican Gold Poppy	*Eschscholzia*	*californica*	*mexicana*					
Blanket Flower	*Gaillardia*	*pulchella*						
Sunflower	*Helianthus*	*annuus*						
Impatiens	*Impatiens*	*species*						
Sweet Pea	*Lathyrus*	*odoratus*						
Tidy-Tips	*Layia*	*platyglossa*	*compestris*					
Red Flax	*Linum*	*grandiflorum*		'Rubrum'				
Blue Flax	*Linum*	*perenne*	*lewisii*					
Lobelia	*Lobelia*	*erinus*						
Sweet Alyssum	*Lobularia*	*maritima*						
Arroyo Lupine	*Lupinus*	*succulentus*						
Texas Bluebonnet	*Lupinus*	*texensis*						
Forget Me Not	*Myosotis*	*sylvatica*						
Owl's Clover	*Orthocarpus*	*purpurascens*			*(Castilleja exertia)*			
Flanders Field Poppy	*Papaver*	*rhoeas*						
Garden Geranium	*Pelargonium*	*x hortorum*						

Common Name	Genus	Species	Variety	Cultivar Name	Other Plant Names	Height (feet)	Width (feet)	Plant Coverage (Sq. Ft)
Petunia	*Petunia*	*hybrid*						
Desert Bluebell	*Phacelia*	*campanularia*						
Scarlet Sage	*Salvia*	*coccinea*						
Catchfly	*Silene*	*armeria*						
Marigold	*Tagetes*	*erecta*						
Mexican Sunflower	*Tithonia*	*rotundifolia*						
Viola	*Viola*	*cornuta*						
Pansy	*Viola*	*x wittrockiana*						
Zinnia	*Zinnia*	*elegans*						

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APPENDIX J. NOT USED

APPENDIX K. ENERGY INTENSITY TABLES

Urban Water Supplier: *Victorville Water Department*

Water Delivery Product (If delivering more than one type of product use Table O-1C)

Retail Potable Deliveries

Table O-1A: Voluntary Energy Intensity - Water Supply Process Approach

Enter Start Date for Reporting Period	1/1/2015	Urban Water Supplier Operational Control							
End Date	12/31/2015	Water Management Process						Non-Consequential Hydropower (if applicable)	
		Extract and Divert	Place into Storage	Conveyance	Treatment	Distribution	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process (AF)		*17340*	*0*	*0*	*1823*	*20843*	*20843*	*0*	*20843*
Energy Consumed (kWh)		*15132908*	*0*	*0*	*153431*	*10846*	*15297185*	*0*	*15297185*
Energy Intensity (kWh/AF)		*872.7*	*0.0*	*0.0*	*84.2*	*0.5*	*733.9*	*0.0*	*733.9*

Quantity of Self-Generated Renewable Energy

0 kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Metered Data

Data Quality Narrative:

All flow data was metered and kilowatt hours were recorded daily or monthly by the City.

Narrative:

The Victorville Water Department depends mostly on the local aquifer from the Mojave Groundwater Basin as the area's main water supply. Any demand not met by groundwater is imported purchased water from the R3 Project when supplies are avaliable. Most energy consumed in the water supply is from groundwater extraction. A portion of the groundwater is treated before being delivered to the system. Water from the storage tanks is gravity fed into the distribution system. Purchased water is received at sufficient pressure to be delivered to storage tanks and no additional energy is input into the water by the City. The "Distribution" storage water volume shown above is total water delivered to customers through the distribution system, but the energy shown is just for the booster stations that move water between various pressure zones of the system.

Booster Pumps:

Month, 2015	Acre-ft	KWH's
Jan	60	387
Feb	61	387
Mar	80	459
Apr	81	426
May	82	431
Jun	100	486
Jul	107	472
Aug	110	571
Sep	96	495
Oct	82	447
Nov	66	426
Dec	61	436
Total:	**986**	**5423**

2015 purchased water: 3503 AF

APPENDIX L. DWR UWMP TABLES

Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015
3610052	Victorville Water District	34,779	20,843
	TOTAL	34,779	20,843
NOTES:			

Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable* *drop down list*
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

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

Table 2-4 Retail: Water Supplier Information Exchange
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name *(Add additional rows as needed)*
Mojave Water Agency
NOTES:

Table 3-1 Retail: Population - Current and Projected						
Population Served	2015	2020	2025	2030	2035	2040*(opt)*
	128,005	139,151	155,657	172,143	188,896	204,986
NOTES:						

Table 4-1 Retail: Demands for Potable and Raw Water - Actual			
Use Type *(Add additional rows as needed)*	2015 Actual		
Drop down list *May select each use multiple times* *These are the only Use Types that will be recognized by the WUEdata online submittal tool*	Additional Description *(as needed)*	Level of Treatment When Delivered *Drop down list*	Volume
Single Family		Drinking Water	14,119
Multi-Family		Drinking Water	1,692
Other	Commercial/Institutional	Drinking Water	1,233
Landscape		Drinking Water	1,354
Other		Drinking Water	18
Losses		Drinking Water	1,436
Sales/Transfers/Exchanges to other agencies	Phelan/Pinon Hills Community Services District	Drinking Water	262
Industrial		Drinking Water	729
		TOTAL	20,843
NOTES:			

Table 4-2 Retail: Demands for Potable and Raw Water - Projected						
Use Type *(Add additional rows as needed)*	Additional Description *(as needed)*	Projected Water Use *Report To the Extent that Records are Available*				
Drop down list *May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool*		2020	2025	2030	2035	2040-opt
Single Family		16,554	18,291	20,199	22,049	23,867
Multi-Family		1,984	2,192	2,420	2,642	2,860
Other	Commercial/Institutional	1,446	1,598	1,764	1,926	2,085
Landscape		1,587	1,754	1,937	2,114	2,289
Other		7	8	8	9	10
Losses		1,793	1,981	2,188	2,388	2,585
Industrial		855	945	1,043	1,139	1,233
	TOTAL	24,226	26,767	29,560	32,268	34,928
NOTES:						

Table 4-3 Retail: Total Water Demands						
	2015	2020	2025	2030	2035	2040 *(opt)*
Potable and Raw Water *From Tables 4-1 and 4-2*	20,843	24,226	26,767	29,560	32,268	34,928
Recycled Water Demand* *From Table 6-4*	611	2,930	2,930	2,930	2,930	2,930
TOTAL WATER DEMAND	21,454	27,156	29,697	32,490	35,198	37,858
**Recycled water demand fields will be blank until Table 6-4 is complete.*						
NOTES:						

Table 4-4 Retail: 12 Month Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss*
01/2015	1458.363
** Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.*	
NOTES:	

Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *Drop down list (y/n)*	No
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, etc… utilized in demand projections are found.	
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes
NOTES:	

Table 5-1 Baselines and Targets Summary *Retail Agency or Regional Alliance Only*					
Baseline Period	Start Year	End Year	Average Baseline GPCD*	2015 Interim Target *	Confirmed 2020 Target*
10-15 year	*1996*	*2005*	*253*	*227.5*	*202.3*
5 Year	*2003*	*2007*	*252*		
*All values are in Gallons per Capita per Day (GPCD)					
NOTES:					

Table 5-2: 2015 Compliance
Retail Agency or Regional Alliance Only

Actual 2015 GPCD*	2015 Interim Target GPCD*	Optional Adjustments to 2015 GPCD Enter "0" if no adjustment is made *From Methodology 8*					2015 GPCD* *(Adjusted if applicable)*	Did Supplier Achieve Targeted Reduction for 2015? Y/N
		Extraordinary Events*	Economic Adjustment*	Weather Normalization*	TOTAL Adjustments*	Adjusted 2015 GPCD*		
143.4	227.5	0	0	0	0	143.4	143.4	Yes

**All values are in Gallons per Capita per Day (GPCD)*

NOTES:

Table 6-1 Retail: Groundwater Volume Pumped						
☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2011	2012	2013	2014	2015
Add additional rows as needed						
Alluvial Basin	Mojave Basin	22793.1969	23264.3953	19660.2019	17929.42	17339.84
	TOTAL	22,793	23,264	19,660	17,929	17,340
NOTES:						

Table 6-2 Retail: Wastewater Collected Within Service Area in 2015						
☐	There is no wastewater collection system. The supplier will not complete the table below.					
	Percentage of 2015 service area covered by wastewater collection system *(optional)*					
	Percentage of 2015 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected from UWMP Service Area 2015	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
Add additional rows as needed						
The City of Victorville	Metered	1,671	Victorville Water District	Victorville Wastewater Treatment Facility	Yes	Yes
The City of Victorville	Metered	7,328	Victor Valley Wastewater	Victor Valley Was	No	No
Total Wastewater Collected from Service Area in 2015:		8,999				
NOTES:						

Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2015										
☐	No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table below.									
							2015 volumes			
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level *Drop down list*	Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Add additional rows as needed										
Victorville Wastewater Treatment Facility	Mojave River	River		River or creek outfall	No	Tertiary	1,671	1,671	611	0
						Total	1,671	1,671	611	0
NOTES:										

Table 6-4 Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area

☐ Recycled water is not used and is not planned for use within the service area of the supplier.
The supplier will not complete the table below.

Name of Agency Producing (Treating) the Recycled Water:	Victor Valley Wastewater Reclamation Authority
Name of Agency Operating the Recycled Water Distribution System:	City of Victorville
Supplemental Water Added in 2015	
Source of 2015 Supplemental Water	

Beneficial Use Type	General Description of 2015 Uses	Level of Treatment *Drop down list*	2015	2020	2025	2030	2035	2040 (opt)
Agricultural irrigation								
Landscape irrigation (excludes golf courses)	Schmidt Park and the Ball Field	Tertiary		30	30	30	30	30
Golf course irrigation								
Commercial use								
Industrial use	HDPP	Tertiary	611	2,900	2,900	2,900	2,900	2,900
Geothermal and other energy production								
Seawater intrusion barrier								
Recreational impoundment								
Wetlands or wildlife habitat								
Groundwater recharge (IPR)*								
Surface water augmentation (IPR)*								
Direct potable reuse								
Other *(Provide General Description)*								
		Total:	611	2,930	2,930	2,930	2,930	2,930

**IPR - Indirect Potable Reuse*

NOTES:

Table 6-5 Retail: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual			
☐	Recycled water was not used in 2010 nor projected for use in 2015. The supplier will not complete the table below.		
Use Type		**2010 Projection for 2015**	**2015 Actual Use**
Agricultural irrigation			
Landscape irrigation (excludes golf courses)			
Golf course irrigation		300	0
Commercial use			
Industrial use		2,700	611
Geothermal and other energy production			
Seawater intrusion barrier			
Recreational impoundment			
Wetlands or wildlife habitat			
Groundwater recharge (IPR)			
Surface water augmentation (IPR)			
Direct potable reuse			
Other	*Type of Use*		
	Total	3,000	611

NOTES:

Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
☐	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Add additional rows as needed			
Industrial Use	High Desert Power Plant	2019	2,900
Landscape Irrigation	Schmidt Park and the Ball Field	2017	30
		Total	2,930
NOTES:			

Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☐	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other agencies?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Agency *This may be a range*
	Drop Down List (y/n)	*If Yes, Agency Name*				
Add additional rows as needed						
Regional Recharge and Recovery Project	Yes	Mojave Water Agency	Recharge and Recovery Project	2019	Average Year	40,000
Oro Grande Wash Project (Phase 1)	Yes	Mojave Water Agency	Groundwater Recharge	July, 2016	Average Year	4,000
Oro Grande Wash Project (Phase 2)	Yes	Mojave Water Agency	Groundwater Recharge	Unknown	Average Year	8,000
NOTES:						

Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2015		
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		Actual Volume	Water Quality *Drop Down List*	Total Right or Safe Yield *(optional)*
Add additional rows as needed				
Groundwater	Mojave Basin	17,340	Drinking Water	
Purchased or Imported Water	R3	3,503	Recycled Water	
	Total	20,843		0
NOTES:				

Table 6-9 Retail: Water Supplies — Projected											
Water Supply	Additional Detail on Water Supply	**Projected Water Supply** *Report To the Extent Practicable*									
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		**2020**		**2025**		**2030**		**2035**		**2040** *(opt)*	
		Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*
Add additional rows as needed											
Groundwater	Mojave Basin	24,226		26,767		29,560		32,268		34,928	
Recycled Water	Anticipated Use	2,930		2,930		2,930		2,930		2,930	
	Total	27,156	0	29,697	0	32,490	0	35,198	0	37,858	0
NOTES:											

Table 7-1 Retail: Basis of Water Year Data			
Year Type	**Base Year** *If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 1999-2000, use 2000*	**Available Supplies if Year Type Repeats**	
		☐ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____	
		☑ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available	**% of Average Supply**
Average Year	1970		100%
Single-Dry Year	1953		100%
Multiple-Dry Years 1st Year	2007		100%
Multiple-Dry Years 2nd Year	2008		100%
Multiple-Dry Years 3rd Year	2009		100%
Multiple-Dry Years 4th Year *Optional*			
Multiple-Dry Years 5th Year *Optional*			
Multiple-Dry Years 6th Year *Optional*			
Agency may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If an agency uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.			
NOAA Station 049325, 1940-2016			

Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 *(Opt)*
Supply totals *(autofill from Table 6-9)*	27,156	29,697	32,490	35,198	37,858
Demand totals *(autofill from Table 4-3)*	27,156	29,697	32,490	35,198	37,858
Difference	(0)	(0)	0	0	0
NOTES:					

Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals	27,156	29,697	32,490	35,198	37,858
Demand totals	27,156	29697	32,490	35,198	37,858
Difference	0	0	0	0	0
NOTES:					

Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	27,156	29,697	32,490	35,198	37,858
	Demand totals	27,156	29697	32,490	35,198	37,858
	Difference	0	0	0	0	0
Second year	Supply totals	27,156	29,697	32,490	35,198	37,858
	Demand totals	27,156	29697	32,490	35,198	37,858
	Difference	0	0	0	0	0
Third year	Supply totals	27,156	29,697	32,490	35,198	37,858
	Demand totals	27,156	29697	32,490	35,198	37,858
	Difference	0	0	0	0	0
Fourth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
Fifth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
NOTES:						

Table 8-1 Retail Stages of Water Shortage Contingency Plan		
Stage	Complete Both	
	Percent Supply Reduction[1] *Numerical value as a percent*	Water Supply Condition (*Narrative description)*
Add additional rows as needed		
1	10%	Normal Water Supply
2	28%	Threatened Water Supply Shortage
3	40%	Critical Water Supply Shortage
4	>40%	Emergency Water Supply Shortage
[1] *One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.*		
NOTES:		

Table 8-2 Retail Only: Restrictions and Prohibitions on End Uses			
Stage	Restrictions and Prohibitions on End Users ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? *Drop Down List*
Add additional rows as needed			
1	CII - Restaurants may only serve water upon request	Providing glasses of drinking water (except upon request) to customers in restaurants or other public places where food is routinely served is prohibited.	Yes
1	Landscape - Limit landscape irrigation to specific times	Summer Outdoor Sprinkler Restrictions: From June 1 through September 30, irrigation/watering is permitted only between the hours of 10:00 p.m. and 6:00 a.m. Winter Outdoor Sprinkler Restrictions: From October 1 through May 31, irrigation/watering is permitted only between the hours of 9:00 a.m. and 3:00 p.m. Summer Outdoor Sprinkler Restrictions (Large Systems): From June 1, through September 30, irrigation/watering for facilities with Large Systems is only permitted between the hours of 10:00 p.m. and 9:00 a.m.	Yes

1	Landscape - Other landscape restriction or prohibition	Irrigation with potable water of ornamental turf on public street medians is prohibited.	Yes
1	Landscape - Other landscape restriction or prohibition	Irrigation/watering is permitted at any time if a handheld hose fitted with a positive shut-off nozzle is used or a Low-Volume Irrigation System is used, provided that the Low-Volume Irrigation System is not on an irrigation Station which operates at the same time as a sprinkler system.	Yes
1	Landscape - Other landscape restriction or prohibition	Application of potable water to outdoor landscapes during and within forty-eight (48) hours after measurable rainfall is prohibited.	Yes
1	Landscape - Other landscape restriction or prohibition	It is prohibited to plant any Water-intensive Landscape or Turf: a. In any Right-of-Way, narrow pathway, parking strip, roadway median, or along foundations of buildings. b. Having a width of less than five (5) feet, unless adjacent to a planter bed or other landscaped area which will catch Overspray.	Yes

1	Landscape - Restrict or prohibit runoff from landscape irrigation	Water Users are prohibited from causing or permitting any water furnished to their properties/premises by the District to run or to escape from any hose, pipe, valve, faucet, sprinkler or irrigation device onto any sidewalk, parking lot, adjacent property, street or gutter or to otherwise escape, if such running or escaping can be prevented.	Yes
1	Landscape - Restrict or prohibit runoff from landscape irrigation	Watering of turf, ground cover, open ground, shrubbery, crops, gardens and trees, including agricultural irrigation, or any outdoor dispensing of water in a manner or to an extent which allows Excess Runoff is prohibited. However, a minimum amount of runoff, which is a natural consequence of conservative watering, either by hand or by mechanical or automated sprinkling facilities, is permitted, so long as such runoff does not amount to Excess Runoff.	Yes

1	Other	Irrigation with potable water of landscapes outside of newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission and the Department of Housing and Community Development.	Yes
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Excessive use, loss or escape of water through breaks, leaks or other malfunctions in the Water User's plumbing or distribution system for any period of time after such escape of water should have reasonably been discovered and corrected is prohibited. Upon receiving notice from the District of the existence of any such break, leak or other malfunction, Water Users shall identify the source of the water and within 48 hours, stop the source, by turning off the valve that supplies the water, and within 7 days, evaluate the extent of the problem and repair or correct same.	Yes

1	Other - Require automatic shut of hoses	Using a hose that dispenses potable water for any outside purpose (including the washing of a motor vehicle), except where the hose is fitted with a positive shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use, is prohibited.	Yes
1	Other water feature or swimming pool restriction	Use of potable water in fountains or other decorative water features, except where the water is part of a recirculating system, is prohibited.	Yes
1	Other - Prohibit use of potable water for washing hard surfaces	Washing down of impervious surfaces, including but not limited to: walkways, patios, tennis courts, driveways, sidewalks or other paved surfaces (except in emergencies to remove spills of hazardous materials or eliminate dangerous conditions) is prohibited.	Yes

2	Landscape - Limit landscape irrigation to specific days	Summer Outdoor Sprinkler Restrictions - From June 1, through September 30, it shall be prohibited to: a. Apply potable water to any outdoor landscape at properties with street addresses ending in an even number (0,2,4,6, or 8) except on Tuesdays, Thursdays, or Saturdays between the hours of 10:00 pm and 6:00 am. b. Apply potable water to any outdoor landscape at properties with street addresses ending in an odd number (1,3,5,7, or 9) except on Wednesdays, Fridays, and Sundays between the hours of 10:00 pm and 6:00 am. c. Apply potable water to any outdoor landscape at facilities such as schools, parks,	Yes
2	Landscape - Other landscape restriction or prohibition	Fall overseeding of Turf areas, unless irrigated with Reclaimed Water for non-residential water intensive landscape, shall be prohibited.	Yes
2	Landscape - Other landscape restriction or prohibition	Exterior landscape plans for all new multi-family, commercial and industrial development must be presented to and approved by the District prior to issuance of a will serve letter.	Yes

2	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Using water for washing of motor vehicles is prohibited, except when done by commercial car wash facilities equipped with a recirculation system.	Yes
2	Pools and Spas - Require covers for pools and spas	All swimming pools, spas and hot tubs must be covered when not in use.	Yes
3	Landscape - Other landscape restriction or prohibition	It shall be unlawful to use a sprinkler system in the irrigation of outdoor landscaping of any kind.	Yes
3	Other	Use of water from fire hydrants shall be limited to firefighting or other authorized or approved water uses that are necessary to maintain health, safety, and welfare.	Yes
3	Other - Prohibit use of potable water for construction and dust control	All existing construction meters shall be removed and no installation of or new construction meters shall be permitted.	Yes
4	Landscape - Prohibit all landscape irrigation	The watering of turf, lawns, grass, shrubbery, ground cover or other outdoor landscaping with potable water at any time is prohibited; the watering of parks, school grounds and golf courses with potable water is also prohibited.	Yes

4	Other water feature or swimming pool restriction	The use, filling or adding water to swimming pools or spas of any size, fountains, ponds, water courses, waterfalls and other artificial water structures filled or refilled with water from any source is prohibited.	Yes
4	Other	The washing of vehicles, trucks, trailers, boats, airplanes, and other types of mobile equipment with potable water, is prohibited unless such washing is necessary for the immediate interest of the public health or safety, and such washing occurs upon the immediate premises of commercial vehicle washes using recirculated water.	Yes
4	CII - Other CII restriction or prohibition	All existing nurseries shall discontinue all potable irrigation watering.	Yes
NOTES:			

Table 8-3 Retail Only: Stages of Water Shortage Contingency Plan - Consumption Reduction Methods		
Stage	Consumption Reduction Methods by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*
Add additional rows as needed		
All	Expand Public Information Campaign	
All	Offer Water Use Surveys	
All	Provide Rebates for Turf Replacement	
All	Provide Rebates on Plumbing Fixtures and Devices	
All	Reduce System Water Loss	
NOTES:		

Table 8-4 Retail: Minimum Supply Next Three Years			
	2016	2017	2018
Available Water Supply	21,520	22,219	22,940
NOTES:			

Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Mojave Water Agency	☑	☑
Town of Apple Valley	☑	☑
City of Adelanto, Cit	☑	☑
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
San Bernardino County	☑	☑
	☐	☐
Won't allow me to add additional rows		

APPENDIX M. RESOLUTION NO. VWD 16-002 ADOPTING NEW RATES, FEES AND CHARGES FOR WATER SERVICE

VICTORVILLE WATER DISTRICT
RESOLUTION NO. VWD 16-002

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE VICTORVILLE WATER DISTRICT ADOPTING NEW RATES, FEES AND CHARGES FOR WATER SERVICE

WHEREAS, the Victorville Water District (the "District") is a subsidiary district of the City of Victorville, organized and operating under the County Water District Law (California Water Code section 30000 *et seq.)*; and

WHEREAS, subject to the provisions of Article XIIID, Section 6 of the California Constitution (Cal. Const. Art. XIIID, §6) the Board of Directors of the District (the "Board of Directors") is authorized to fix and collect rates and charges for the provision of water service under California Water Code Section 31007 and 31025; and

WHEREAS, at its regular meeting on March 1, 2016, the Board of Directors adopted Resolution No. VWD 16-001 which: (1) initiated the process of adopting a proposed schedule of changes to the District's water service rates, fees and charges (the "New Water Rates") in accordance with Cal. Const. Art. XIIID, §6; (2) accepted the water rate/cost of service study prepared by NBS upon which such New Water Rates were based (the "Study"); (3) set a Public Hearing for May 17, 2016 to receive testimony and consider any protests against the proposed New Water Rates; and (4) authorized District staff to prepare and mail notices to the record owners of each identified parcel upon which the New Water Rates were to be imposed, advising them of the New Water Rates and the date for a Public Hearing thereon; and

WHEREAS, the notice of the May 17, 2016 Public Hearing was mailed to all record owners of identified parcels upon which the New Water Rates were to be imposed not less than forty-five (45) days prior to the Public Hearing; and

WHEREAS, such written notices contained the following information as required by Cal. Const. Art. XIIID, §6: (1) the amount of the New Water Rates proposed to be imposed upon each parcel; (2) the basis on which the amount of the proposed New Water Rates was calculated; (3) the reason for the New Water Rates; and (4) the date, time, and location of the Public Hearing on the New Water Rates; and

WHEREAS, the written notice further contained instructions on how to file a written protest against the New Water Rates; and

WHEREAS, the District mailed out notices to a total of 33,490 property owners. Pursuant to Cal. Const. Art. XIIID, §6, the District would be unable to adopt the proposed New Water Rates if 16,746 written protests were received; and

WHEREAS, in accordance with the District's standard practice for noticing resolutions to be adopted at public hearings, a notice relating to the adoption of this Resolution was published on May 6, 2016 in a newspaper of general circulation and a copy of this Resolution was made available on the District's Website; and

WHEREAS, the Board of Directors conducted a Public Hearing on May 17, 2016 at 6:00 p.m. at the Victorville City Council Chambers, 14343 Civic Drive, Victorville, California 92392 in order to receive oral and written testimony regarding the New Water Rates and to determine if a majority written protest existed; and

WHEREAS, the adoption of this Resolution is exempt from the California Environmental Quality Act (CEQA) because it approves and sets forth a procedure for determining fees for the purpose of meeting the operating expenses of the District, as set forth in Public Resources Code Section 21080 (b)(8) and 14 Cal. Code Regs. §15273; and

WHEREAS, based upon the findings, information and recommendations of the Study, and consistent with the requirements of Cal. Const. Art. XIIID, §6, if there is no majority written protest, the Board of Directors finds it to be in the best interests of the District and its customers to adopt this Resolution and the New Water Rates set forth in Section 3 hereof.

NOW, THEREFORE, THE BOARD OF DIRECTORS OF THE VICTORVILLE WATER DISTRICT DOES HEREBY RESOLVE AS FOLLOWS:

SECTION 1. RECITALS.

All of the foregoing recitals are true and correct and the Board of Directors so finds and determines. The recitals set forth above are incorporated herein; are made findings and determinations of the Board of Directors; and made an operative part of this Resolution.

SECTION 2. ADOPTION AND EFFECTIVE DATES OF NEW RATES AND CHARGES FOR WATER SERVICE.

The rates and charges for water service set forth in the rate tables in Section 3 of this Resolution are hereby adopted. With the exception of the Drought Rate Schedule in Section 3.d (which requires certain conservation levels be reached and prior notice before being imposed); the rates and charges designated to be effective on July 1, 2016 shall be fixed for all billings made on or after July 1, 2016, and thereafter shall be annually adjusted and fixed for all billings made on or after July 1 of each subsequent year, as indicated in the Section 3 rate tables below.

SECTION 3. SCHEDULE OF NEW RATES AND CHARGES FOR WATER SERVICE.

a. **Rate Structure.**

The rate structure for the District's water service charges is comprised of two components: a variable commodity charge (consumption rate) based on the amount of water consumed during a billing period; and a fixed monthly service (meter) charge.

b. **Consumption Rate.** The variable charge per hundred cubic feet (HCF) of water registered by a water service meter established to serve a specific property or otherwise taken or received from the District.

Rates (Commodity Charges) for All Water Consumed (per hcf)	New Water Rates and Effective Dates				
	July 1, 2016	*July 1, 2017*	*July 1, 2018*	*July 1, 2019*	*July 1, 2020*
Standard Domestic Water	$1.749	$1.882	$2.025	$2.180	$2.346
Public Benefit Use Water †	$1.749	$1.882	$2.025	$2.180	$2.346
Construction Flow Meter/Intertie	$2.768	$2.941	$3.124	$3.320	$3.506
Untreated (Well) Water *	$0.595	$0.640	$0.689	$0.741	$0.798
Recycled / Reclaimed Water **	$1.049	$1.129	$1.215	$1.308	$1.408
Public Benefit Recycled / Reclaimed Water ††	$1.049	$1.129	$1.215	$1.308	$1.408

† *Commodity customer type is discontinued as of July 1, 2016 and included in the Standard Domestic Water rate.*

* *Non-potable water produced from District wells for Municipal Irrigation. Pursuant to Resolution No. VWD 14-009, Section 3.a.iii., the consumption charge per hundred cubic feet will continue at a rate of thirty-four percent (34%) of the consumption charge of the Standard Domestic Water rate.*

** *Non-potable water purchased from the Industrial Wastewater Treatment Plant or other sources as available. Pursuant to Resolution No. VWD 12-002, Section 4.a.iv., the consumption charge per hundred cubic feet will continue at a rate of sixty percent (60%) of the consumption charge of the Standard Domestic Water rate.*

†† *Commodity customer type is discontinued as of July 1, 2016 and included in the Recycled/Reclaimed Water rate.*

c. **Fixed Water Service (Meter) Charge.** The periodic charge based on the size of the water meter serving a property. This charge is assessed on an approximately monthly basis and prorated for billing periods less than twenty (20) days or more than forty (40) days. Metered rates are based on the hydraulic capacity of each meter size. The meter charge is assessed to each property where water is made available, whether or not water is actually used.

Monthly Water Service Charges	New Service Charges and Effective Dates				
	July 1, 2016	*July 1, 2017*	*July 1, 2018*	*July 1, 2019*	*July 1, 2020*
Fixed Monthly Service Charges (based on service meter size):					
3/4 inch	$11.78	$12.23	$12.68	$13.15	$13.36
1 inch	$18.59	$19.30	$20.02	$20.75	$21.09
1.5 inch	$35.62	$36.99	$38.37	$39.76	$40.41
2 inch	$56.06	$58.21	$60.39	$62.58	$63.60
3 inch	$110.56	$114.80	$119.09	$123.42	$125.44
4 inch	$171.88	$178.47	$185.14	$191.87	$195.01
6 inch	$342.19	$355.32	$368.60	$382.00	$388.25
8 inch	$955.34	$991.99	$1,029.07	$1,066.48	$1,083.92
10 inch	$1,432.23	$1,487.17	$1,542.77	$1,598.85	$1,624.99
Fixed Fire Monthly Service Charges (based on service meter size):					
3 inch	$9.50	$10.06	$10.65	$11.27	$11.83
4 inch	$17.45	$18.50	$19.62	$20.80	$21.90
6 inch	$37.88	$40.21	$42.68	$45.31	$47.78
8 inch	$65.13	$69.16	$73.44	$77.99	$82.30
10 inch	$101.45	$107.75	$114.45	$121.56	$128.31

d. **Drought Rate Schedule.** Should extraordinary measures to combat drought result in water conservation reaching the percentages shown in the first column of the Drought Rate Schedule below, the Board of Directors may take action to impose the rates set forth in the table below to ensure the District receives sufficient revenues to recover costs of providing water service when consumption so decreases. Imposition, as well as subsequent annual adjustment or repeal, of any of the rates in the Drought Rate Schedule, will only occur following adoption of a resolution by the Board of Directors and the mailing of written notices to affected property owners at least thirty (30) days prior to the date any such new rate becomes effective.

Drought Rate Schedule	New Drought Rates and Effective Dates				
	July 1, 2016	*July 1, 2017*	*July 1, 2018*	*July 1, 2019*	*July 1, 2020*
Rates for Standard Domestic and Public Benefit Use Water Consumed (per hcf):					
Conservation Level Compared to FY 2013/14					
40%	$1.885	$2.029	$2.183	$2.350	$2.529
45%	$2.052	$2.207	$2.376	$2.557	$2.752
50%	$2.251	$2.422	$2.607	$2.806	$3.020
55%	$2.495	$2.684	$2.889	$3.110	$3.348
60%	$2.799	$3.011	$3.242	$3.490	$3.757
Rates for Construction Flow Meter/Inertie (per hcf)					
Conservation Level Compared to FY 2013/14					
40%	$3.108	$3.299	$3.502	$3.718	$3.922
45%	$3.385	$3.593	$3.815	$4.050	$4.271
50%	$3.718	$3.946	$4.189	$4.447	$4.691
55%	$4.125	$4.378	$4.647	$4.934	$5.204
60%	$4.633	$4.917	$5.220	$5.542	$5.845

SECTION 4. FINDINGS.

The Board of Directors of the Victorville Water District hereby further finds and determines all of the following:

a. That at the close of the Public Hearing, the District received _____ written protests against the proposed New Water Rates set forth in the written notice and in Section 3 of this Resolution. The District Secretary has certified the tabulation of written protests. As written protests were not presented by a majority of record owners of parcels upon which the proposed New Water Rates are to be imposed, the Board of Directors is authorized to adopt and impose the New Water Rates set forth in Section 3 of this Resolution.

b. That the revenues derived from the New Water Rates will be utilized to meet the costs of operation, maintenance, improvement, administration, and capital improvements necessary to provide water service within the District's service area, and shall not exceed the funds required to provide water services.

c. That the revenues derived from New Water Rates will not be used for any purpose other than providing water service, which service includes water capital projects that upgrade and/or repair infrastructure within the District's service area.

d. That the amounts of the New Water Rates imposed on any parcel or person as an incident of property ownership will not exceed the proportional cost of the service attributable to the parcel.

e. That the New Water Rates will be imposed only for water or water services actually used or immediately available for use by the parcels on which they are imposed.

f. That the revenues derived from the New Water Rates will not be used for general governmental services, including police, fire, ambulance or library services.

SECTION 5. SUPERSESSION OF PRIOR OR CONFLICTING RESOLUTIONS.

All resolutions or administrative actions by the Board of Directors, or parts thereof that are inconsistent with any provision of this Resolution are hereby superseded only to the extent of such inconsistency.

SECTION 6. COMPLIANCE WITH LAW; SEVERABILITY.

If any section, subsection, clause or phrase in this Resolution is for any reason held invalid, the validity of the remainder of this Resolution shall not be affected thereby.

SECTION 7. CERTIFICATION.

The District Secretary is directed to fill in the number of written protests received in Section 4.a, above; shall certify to the passage and adoption of this Resolution; shall enter the same in the book of original Resolutions of the District; and shall make a minute of passage and adoption thereof in the records of the proceedings of the District, in the minutes of the meeting at which this Resolution is passed and adopted.

SECTION 8. EFFECTIVE DATE.

This Resolution shall take effect immediately upon its adoption.

APPENDIX N. MOJAVE BASIN AREA JUDGMENT

JUDGMENT AFTER TRIAL

JANUARY 10, 1996

MOJAVE BASIN AREA ADJUDICATION
CITY OF BARSTOW, ET AL V. CITY OF ADELANTO, ET AL
RIVERSIDE COUNTY SUPERIOR COURT CASE NO. 208568

CHAMBERS OF
VICTOR MICELI
JUDGE OF THE SUPERIOR COURT

Superior Court

STATE OF CALIFORNIA
COUNTY OF RIVERSIDE

COURTHOUSE
4050 MAIN STREET
RIVERSIDE, CALIFORNIA 92501

January 10, 1996

TO: ALL PARTIES LISTED ON THE ATTACHED MAILING LIST

FROM: E. MICHAEL KAISER, JUDGE

SUBJECT: CITY OF BARSTOW VS CITY OF ADELANTO, Case No.: 208568

The Judgment in the above-entitled case was signed on January 10, 1996. Please find attached the amended two pages of Exhibit B, Table B-1.

Please find attached two amended pages of Exhibit B, Table B-1.

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
SAN BERNARDINO CO SERVICE AREA 70J	1,005	0.8213	1,005	954	904	854	804
SAN BERNARDINO CO SERVICE AREA 70L	355	0.2901	355	337	319	301	284
SAN FILIPPO, JOSEPH & SHELLEY	35	0.0286	35	33	31	29	28
SILVER LAKES ASSOCIATION	3,987	3.2583	3,987	3,787	3,588	3,388	3,189
SOUTHDOWN, INC	1,519	1.2414	1,519	1,443	1,367	1,291	1,215
SOUTHERN CALIFORNIA WATER COMPANY	940	0.7682	940	893	846	799	752
SPRING VALLEY LAKE ASSOCIATION	3,056	2.4974	3,056	2,903	2,750	2,597	2,444
SPRING VALLEY LAKE COUNTRY CLUB	977	0.7984	977	928	879	830	781
STORM, RANDALL	62	0.0507	62	58	55	52	49
SUDMEIER, GLENN W	121	0.0989	121	114	108	102	96
SUMMIT VALLEY RANCH	452	0.3694	452	429	406	384	361
TATRO, RICHARD K & SANDRA A	280	0.2288	280	266	252	238	224
TATUM, JAMES B	829	0.6775	829	787	746	704	663
TAYLOR, ALLEN C / HAYMAKER RANCH	456	0.3727	456	433	410	387	364
THOMAS, S DALE	440	0.3596	440	418	396	374	352
THOMAS, WALTER	36	0.0294	36	34	32	30	28
THOMPSON, JAMES A	418	0.3416	418	397	376	355	334
THOMPSON, RODGER	76	0.0621	76	72	68	64	60
THRASHER, GARY	373	0.3048	373	354	335	317	298
THUNDERBIRD COUNTY WATER DISTRICT	118	0.0964	118	112	106	100	94
TURNER, ROBERT	70	0.0572	70	66	63	59	56
VAIL, JOSEPH B & PAULA E	126	0.1030	126	119	113	107	100
☆ VAN BURGER, CARL	710	0.5802	710	674	639	603	568
VAN LEEUWEN FAMILY TRUST	341	0.2787	341	323	306	289	272

☆ Durston Well, location 06N/04W-18F, APN 468-151-11 - water production right of 357 acre/feet, claimed by Durston/Van Burger/CVB Investments and Industrial Asphalt. Product right to be determined in a subsequent severed proceeding, jurisdiction reserved.

~~12/10/92~~
~~01/20/93~~
~~02/02/93~~
~~04/10/93~~
~~04/28/93~~
09/25/95

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN CENTRO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
AGCON, INC	0	0.0000	0	0	0	0	0
AGUAYO, JEANETTE L	212	0.3742	212	201	190	180	169
ATCHISON, TOPEKA, SANTA FE RAILWAY CO	120	0.2118	120	114	108	102	96
AVDEEF, THOMAS	34	0.0600	34	32	30	28	27
AZTEC FARM DEVELOPMENT COMPANY (Now, Virgil Gorman)	220	0.3883	220	209	198	187	176
BARNES, FAY - EXECUTOR OF ESTATE OF WAYNE BARNES	243	0.4289	243	230	218	206	194
BROMMER, MARVIN	361	0.6372	361	342	324	306	288
BURNS, RITA J & PAMELA E	16	0.0282	16	15	14	13	12
CHAPA, LARRY R	96	0.1694	96	91	86	81	76
CHOI, YONG IL & JOUNG AE	38	0.0671	38	36	34	32	30
CHRISTISON, JOEL	75	0.1324	75	71	67	63	60
COOK, KWON W	169	0.2983	169	160	152	143	135
DE VRIES, NEIL	3,800	6.7070	3,800	3,610	3,420	3,230	3,040
DESERT COMMUNITY BANK	156	0.2753	156	148	140	132	124
DURAN, FRANK T	50	0.0883	50	47	45	42	40
GAINES, JACK	117	0.2065	117	111	105	99	93
GESIRIECH, WAYNE	121	0.2136	121	114	108	102	96
GORMAN, VIRGIL	138	0.2436	138	131	124	117	110
GRIEDER, RAYMOND H & DORISANNE	30	0.0530	30	28	27	25	24
GRILL, NICHOLAS P & MILLIE D	21	0.0371	21	19	18	17	16
GROEN, CORNELIS	1,043	1.8409	1,043	990	938	886	834
HANIFY, DBA - WHITE BEAR RANCH	152	0.2683	152	144	136	129	121
HARMSEN, JAMES & RUTH ANN	1,522	2.6863	1,522	1,445	1,369	1,293	1,217
HARPER LAKE COMPANY	1,433	2.5293	1,433	1,361	1,289	1,218	1,146

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MOJAVE WATER AGENCY

FILED
RIVERSIDE COUNTY
JAN 1 0 1996
ARTHUR A. SHAW, CLERK
By Y.A. Burns Y.A. Burns
Deputy

SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF RIVERSIDE

CITY OF BARSTOW, et al, Plaintiff, v. CITY OF ADELANTO, et al, Defendant.	CASE NO. 208568 ASSIGNED TO JUDGE KAISER DEPT.4 FOR ALL PURPOSES JUDGMENT AFTER TRIAL
MOJAVE WATER AGENCY, Cross-complainant, v. ANDERSON, RONALD H. et al, Cross-defendants.	

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Exhibit "A" - Map entitled, "Map showing Mojave Water Agency, Mojave River, Mojave Basin Area and Hydrologic Subareas and Limits of Adjudicated Area Together with Geologic and Other Pertinent Features."

Exhibit "B" - Tables entitled, "Table B-1: Table Showing Base Annual Production, Base Annual Production Right of Each Producer Within Each Subarea, and Free Production Allowance for Subareas for First Five Years of the Judgment" and "Table B-2: Table Showing Total Water Production for Aquaculture and Recreational Lake Purposes."

Exhibit "C" - Engineering Appendix.

Exhibit "D" - Time Schedules.

Exhibit "E" - List of Producers and Their Designees.

Exhibit "F" - Transfers of Base Annual Production Rights.

Exhibit "G" - Subarea Obligations.

Exhibit "H" - Biological Resource Mitigation.

Exhibit "I" - Map Showing Potential Groundwater Recharge Areas

I. INTRODUCTION

A. The Complaint. The original complaint herein was filed by the City of Barstow and Southern California Water Company (collectively "Plaintiffs") in San Bernardino Superior Court, North Desert District, on May 30, 1990 as Case No. BCV6672, and transferred to Riverside County Superior Court on November 27, 1990. Plaintiffs allege that the cumulative water Production upstream of the City of Barstow Overdrafted the Mojave River system, and request an average Annual flow of 30,000 acre-feet of surface water to the City of Barstow area. The complaint also includes a request for a writ of mandate to require the Mojave Water Agency ("MWA") to act pursuant to its statutory authority to obtain and provide Supplemental Water for use within the Mojave Basin Area.

B. The MWA Cross-Complaint. On July 26, 1991, the MWA filed its first amended cross-complaint in this case. The MWA first amended cross-complaint and its ROE amendments name Producers who collectively claim substantially all rights of water use within the Mojave Basin Area, including Parties downstream of the City of Barstow. The MWA cross-complaint, as currently amended, requests a declaration that the available native water supply to the Mojave Basin Area (not including water imported from the California State Water Project) is inadequate to meet the demands of the combined Parties and requests a determination of the water rights of whatever nature within the MWA boundaries and the Mojave Basin Area. The MWA has named as Parties several hundred Producers within the Basin Area.

///

C. The Arc Las Flores Cross-Complaint. On July 3, 1991, Arc Las Flores filed a cross-complaint for declaratory relief seeking a declaration of water rights of certain named cross-defendants and a declaration that the appropriative, overlying and riparian rights of Arc Las Flores be determined to be prior and paramount to any rights of the Plaintiffs and other appropriators.

D. Stipulation and Trial. On October 16, 1991, the Court ordered a litigation standstill. The purpose of the standstill was to give the parties time to negotiate a settlement and develop a solution to the overdraft existing in the Mojave River Basin.

A committee of engineers and attorneys, representing a variety of water users and interests throughout the Mojave River Basin, was created to develop a physical solution to the water shortage problem. The work of the committee resulted in a stipulated interlocutory order and judgment, which was entered by the court on September 23, 1993.

Several non-stipulating parties requested a trial. On April 20, 1994, the Court issued a memorandum setting forth the trial issues. This cause came on regularly for trial on February 6, 1995, and was tried in Department 4 of the above-entitled Court, the Honorable E. Michael Kaiser, Judge, Presiding, without a jury. Oral and documentary evidence was introduced on behalf of the respective parties and the cause was argued and submitted for decision.

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II. DECREE

NOW, THEREFORE, IT IS ORDERED, ADJUDGED AND DECREED:

A. JURISDICTION, PARTIES, DEFINITIONS.

1. Jurisdiction and Parties.

a. Jurisdiction. This Court has jurisdiction to enter Judgment declaring and adjudicating the rights to reasonable and beneficial use of water by the Parties in the Mojave Basin Area pursuant to Article X, Section 2 of the California Constitution. This Judgment constitutes an adjudication of water rights of the Mojave Basin Area pursuant to Section 37 of Chapter 2146 of Statutes of 1959 ("the MWA Act").

b. Parties. All Parties to the MWA cross-complaint are included in this Judgment. The MWA has notified those Persons claiming any right, title or interest to the natural waters within the Mojave Basin Area to make claims. Such notice has been given: 1) in conformity with the notice requirements of Water Code §§ 2500 et seq.; 2) pursuant to Section 37 of the MWA Act; and 3) pursuant to order of this Court. Subsequently, all Producers making claims have been or will be included as Parties. The defaults of certain Parties have been entered, and certain named cross-defendants to the MWA cross-complaint who are not Producers have been dismissed. All named Parties who have not been dismissed have appeared herein or have been given adequate opportunity to appear herein. The Court has jurisdiction of the subject matter of this action and of the Parties hereto.

c. Minimal Producers. There are numerous Minimal Producers in the Basin Area and their number is expected to increase in the future. In order to minimize the cost of

administering this Judgment and to assure that every Person producing water in the Basin Area participates fairly in the Physical Solution, MWA shall:

i. within one Year following entry of this Judgment, prepare a report to the Court: 1) setting forth the identity and verified Base Annual Production of each Minimal Producer in each Subarea of the Basin Area; and 2) recommending a proposed system of Minimal Producer Assessments. The system of Minimal Producer Assessments shall achieve an equitable allocation of the costs of the Physical Solution that are attributable to Production of verified Base Annual Production amounts by Minimal Producers in each Subarea to and among such Minimal Producers. Minimal Producer Assessments need not be the same for existing Minimal Producers as for future Minimal Producers.

ii. within one Year following entry of this Judgment, prepare a report to the Court setting forth a proposed program to be undertaken by MWA, pursuant to its statutory authority, to implement the proposed system of Minimal Producer Assessments. The Court may order MWA to implement the proposed program or, if MWA's statutory authority is inadequate to enable implementation, or if either the proposed program or the proposed system of Minimal Producer Assessments is unacceptable to the Court, the Court may then order MWA either to implement an alternative program or system, or in the alternative, to name all Minimal Producers as Parties to this litigation and to serve them for the purpose of adjudicating their water rights.

Any Minimal Producer whose Annual Production exceeds ten (10) acre-feet in any Year following the date of entry of Judgment shall be made a Party pursuant to Paragraph 12 and shall be subject to Administrative, Replacement Water, Makeup Water and Biological Resources Assessments. Any Minimal Producer who produced during the 1986-1990 period may become a Party pursuant to Paragraph 40 with a Base Annual Production Right based on such Minimal Producer's verified Base Annual Production. To account properly for aggregate Production by Minimal Producers in each Subarea, Table B-1 of Exhibit B shall include an estimated aggregate amount of Base Annual Production by all Minimal Producers in each Subarea. The Base Annual Production of any Minimal Producer who becomes a Party shall be deducted from the aggregate amount and assigned to such Minimal Producer.

2. Physical and Legal Complexity. The physical and legal issues of the case as framed by the complaint and cross-complaints are extremely complex. Production of more than 1,000 Persons producing water in the Basin Area has been ascertained. In excess of 1,000 Persons have been served. The water supply and water rights of the entire Mojave Basin Area and its hydrologic Subareas extending over 4000 square miles have been brought into issue. Most types and natures of water right known to California law are at issue in the case. Engineering studies by the Parties, jointly and severally, leading toward adjudication of these rights and a Physical Solution, have required the expenditure of over two Years' time and hundreds of thousands of dollars.

3. Need for a Declaration of Rights and Obligations and for Physical Solution. A Physical Solution for the Mojave Basin

Area based upon a declaration of water rights and a formula for Intra- and Inter-Subarea allocation of rights and obligations is necessary to implement the mandate of Article X, Section 2 of the California Constitution and California water policy. Such Physical Solution requires the definition of the individual rights of all Producers within the Basin Area in a manner which will equitably allocate the natural water supplies and which will provide for equitable sharing of costs for Supplemental Water. Nontributary supplemental sources of water are or will be available in amounts, which when combined with water conservation, water reclamation, water transfers, and improved conveyance and distribution methods within the Basin Area, will be sufficient in quantity and quality to assure implementation of a Physical Solution. Sufficient information and data are known to formulate a reasonable and just allocation of existing water supplies as between the hydrologic Subareas within the Basin Area and as among the water users within each Subarea. Such Physical Solution will allow the public water supply agencies and individual water users within each hydrologic Subarea to proceed with orderly water resource planning and development. It will be necessary for MWA to construct conveyance facilities to implement the Physical Solution. Absent the construction of conveyance facilities, some Subareas may be deprived of an equitable share of the benefits made possible by the Physical Solution. Accordingly, this Physical Solution mandates the acquisition or construction of conveyance facilities for importation and equitable distribution of Supplemental Water to the respective Subareas. Such construction is dependent on the availability of appropriate financing, and any such financing

assessed to the Parties will be based upon benefit to the Parties in accordance with the MWA Act.

4. Definitions. As used in this judgment, the following terms shall have the meanings herein set forth:

a. Afton - The United States Geological Survey gauging station "Mojave River at Afton, CA."

b. Annual or Year - As used in this Judgment refers to the Annual period beginning October 1 and ending September 30 of the following Year.

c. Aquaculture Water - Water so identified in Exhibit "B". Such water may be used only for fish breeding and rearing. The Annual Consumptive Use of such water in acre-feet is equal to the water surface area, in acres, of the fish rearing facilities multiplied by seven (feet).

d. Assessments - Those Assessments levied and collected pursuant to this judgment including Replacement Water, Makeup Water, Administrative and Biological Resource Assessments.

e. Barstow - The United States Geological Survey Gauging Station "Mojave River at Barstow, CA."

f. Base Annual Production - The verified maximum Year Production, in acre-feet, for each Producer for the five Year Period 1986-1990 as set forth in Table B-1 of Exhibit "B", except where otherwise noted therein. The maximum Year Production for each Producer was verified based on one or more of the following: flow meter readings, electrical power

or diesel usage records or estimated applied water duty. The Base Annual Production for recreational lakes in the Baja Subarea and for Aquaculture shall be equal either to the area of water surface multiplied by seven feet or to verified Production, whichever is less. The five Year period 1986-1990 shall also be the time period for which Base Annual Production for Minimal Producers shall be calculated.

g. Base Annual Production Right - The relative Annual right of each Producer to the Free Production Allowance within a given Subarea, expressed as a percentage of the aggregate of all Producers' Base Annual Production in the Subarea. The percentage for each Producer is calculated by multiplying that Producer's Base Annual Production in a Subarea times one hundred (100) and dividing the result by the aggregate Base Annual Production for all Producers in the Subarea. The percentage shall be rounded off to the nearest one ten-thousandth of one per cent.

h. Base Flow - That portion of the total surface flow measured Annually at Lower Narrows which remains after subtracting Storm Flow.

i. Carry Over Right - The right of a Producer to delay and accumulate the Production of such Producer's share of a Subarea Free Production Allowance until

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and only until the following Year free of any Replacement Water Assessment.

j. Consumption or Consumptive Use - The permanent removal of water from the Mojave Basin Area through evaporation or evapo-transpiration. The Consumptive Use rates resulting from particular types of water use are identified in Paragraph 2 of Exhibit "F".

k. Free Production Allowance - The total amount of water, and any Producer's share thereof, that may be Produced from a Subarea each Year free of any Replacement Obligation.

l. Groundwater - Water beneath the surface of the ground and within the zone of saturation; i.e., below the existing water table, whether or not flowing through known and definite channels.

m. Harper Lake Basin - That portion of the Centro Subarea identified as such on Exhibit "A".

n. Lower Narrows - The United States Geological Survey gauging station "Mojave River near Victorville, CA."

o. Makeup Water - Water needed to satisfy a Minimum Subarea Obligation.

p. Makeup Obligation - The obligation of a Subarea to pay for Makeup Water to satisfy its Subarea Obligation.

q. Minimal Producer - Any Person whose Base Annual Production, as verified by MWA is not greater than

ten (10) acre-feet. A Person designated as a Minimal Producer whose Annual Production exceeds ten (10) acre-feet in any Year following the date of entry of Judgment is no longer a Minimal Producer.

r. Minimum Subarea Obligation - The minimum Annual amount of water a Subarea is obligated to provide to an adjoining downstream Subarea or the Transition Zone or, in the case of the Baja Subarea, the minimum Annual Subsurface Flow at the MWA eastern boundary toward Afton in any Year, as set forth in Exhibit "G".

s. Mojave Basin Area or Basin Area - The area shown on Exhibit "A" that lies within the boundaries of the line labelled "Limits of Adjudicated Area" which generally includes the area tributary to the Mojave River and its tributaries except for such area not included within the Mojave Water Agency's jurisdiction.

t. MWA - Cross complainant Mojave Water Agency.

u. Overdraft - A condition wherein the current total Annual Consumptive Use of water in the Mojave Basin Area or any of its Subareas exceeds the long term average Annual natural water supply to the Basin Area or Subarea.

v. Party (Parties) - Any Person(s) named in this action who has intervened in this case or has

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become subject to this Judgment either through stipulation, default, trial or otherwise.

w. Person(s) - Any natural person, firm, association, organization, joint venture, partnership, business, trust, corporation, or public entity.

x. Produce - To pump or divert water.

y. Producer(s) - A Person, other than a Minimal Producer, who Produces water.

z. Production - Annual amount of water produced, stated in acre-feet of water.

aa. Production Safe Yield - The highest average Annual Amount of water that can be produced from a Subarea: (1) over a sequence of years that is representative of long-term average annual natural water supply to the Subarea net of long-term average annual natural outflow from the Subarea, (2) under given patterns of Production, applied water, return flows and Consumptive Use, and (3) without resulting in a long-term net reduction of groundwater in storage in the Subarea.

bb. Purpose of Use - The broad category of type of water use including but not limited to municipal, irrigation, industrial, aquaculture, and lakes purposes. A change in Purpose of Use includes any reallocation of water among mixed or sequential uses, excluding direct reuse of municipal wastewater.

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cc. Recirculated Water - Water that is Produced but not consumed by the Parties listed in Table B-2 of Exhibit "B" and then returned either to the Mojave River or to the Groundwater basin underlying the place of use.

dd. Replacement Obligation - The obligation of a Producer to pay for Replacement Water for Production from a Subarea in any Year in excess of the sum of such Producer's share of that Year's Free Production Allowance for the Subarea plus any Production pursuant to a Carry Over Right.

ee. Replacement Water - Water purchased by Watermaster or otherwise provided to satisfy a Replacement Obligation.

ff. Responsible Party - The Person designated by a Party as the Person responsible for purposes of filing reports and receiving notices pursuant to the provisions of this Judgment.

gg. Stored Water - Water held in storage pursuant to a Storage Agreement with Watermaster.

hh. Storm Flow - That portion of the total surface flow originating from precipitation and runoff without having first percolated to Groundwater storage in the zone of saturation and passing a particular point of reckoning, as determined annually by the Watermaster.

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ii. Subareas - The five Subareas of the Mojave Basin Area -- Este, Oeste, Alto, Centro and Baja -- as shown on Exhibit "A".

jj. Subarea Obligation - The average Annual amount of water that a Subarea is obligated to provide to an adjoining downstream Subarea or the Transition Zone or, in the case of the Baja Subarea, the average Annual Subsurface Flow toward Afton at the MWA eastern boundary as set forth in Exhibit "G".

kk. Subsurface Flow - Groundwater which flows beneath the earth's surface.

ll. Supplemental Water - Water imported to the Basin Area from outside the Basin Area, water that would otherwise be lost from the Basin Area but which is captured and made available for use in the Basin Area, or any Producer's share of Free Production Allowance that is not Produced and is acquired by Watermaster pursuant to this Judgment.

mm. Transition Zone - The portion of the Alto Subarea, shown on Exhibit "A", that lies generally between the Lower Narrows and the Helendale Fault.

nn. Watermaster - The Person(s) appointed by the Court to administer the provisions of this Judgment.

5. Exhibits. The following exhibits are attached to this Judgment and made a part hereof.

Exhibit "A" - Map entitled, "Map showing Mojave Water Agency, Mojave River, Mojave Basin Area and Hydrologic Subareas and

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Limits of Adjudicated Area Together with Geologic and Other Pertinent Features."

Exhibit "B" - Table entitled, "Table B-1: Table Showing Base Annual Production and Base Annual Production Right of Each Producer Within Each Subarea, and Free Production Allowances for Subareas for First Five Years after entry of the Interlocutory Judgment" and "Table B-2: Table Showing Total Water Production for Aquaculture and Recreational Lake Purposes."

Exhibit "C" - Engineering Appendix.

Exhibit "D" - Time Schedules.

Exhibit "E" - List of Producers and Their Designees.

Exhibit "F" - Transfers of Base Annual Production Rights.

Exhibit "G" - Subarea Obligations.

Exhibit "H" - Biological Resource Mitigation.

Exhibit "I" - Map Showing Potential Groundwater Recharge Areas

B. DECLARATION OF HYDROLOGIC CONDITIONS.

6. Mojave Basin Area as Common Source of Supply. The area shown on Exhibit "A" as the Mojave Basin Area is comprised of five Subareas. The waters derived from the Mojave River and its tributaries constitute a common source of supply of the five Subareas and of the Persons producing therefrom.

7. Existence of Overdraft. In each and every Year, for a period in excess of five (5) years prior to the May 30, 1990 filing date of Plaintiffs' Complaint, the Mojave Basin Area and each of its respective Subareas have been and are in a state of Overdraft, and it is hereby found that there is no water available

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for Production from the Basin Area or any Subarea therein except pursuant to this Judgment.

C. DECLARATION OF RIGHTS AND OBLIGATIONS.

8. Production Rights of the Parties. The Base Annual Production and Base Annual Production Right of each Party are declared as set forth in Table B-1 of Exhibit "B". Certain Parties also have the right to continue to Produce Recirculated Water in the amounts set forth in Table B-2 of Exhibit "B", subject to the following:

a. Aquaculture. Two of the Producers listed in Table B-2 of Exhibit "B", California Department of Fish and Game Mojave River Fish Hatchery (Hatchery) and Jess Ranch Water Company (Jess), Produce Recirculated Water for Aquaculture. The Hatchery and Jess or their successors or assignees shall have the right to continue to Produce up to the amounts listed in Table B-2 of Exhibit "B" as Recirculated Water for Aquaculture on the property where it was used in the Year for which Base Annual Production was verified. Production of such amount of Recirculated water by Jess shall be free of any Replacement Water Assessments, Makeup Water Assessments or Administrative Assessments but shall be subject to Biological Resources Assessments and each Jess well producing Recirculated Water shall be subject to an Annual administrative fee equal to the lowest Annual fee paid to MWA by a Minimal Producer. Neither the Hatchery nor Jess Recirculated Water may be transferred or used for any other purpose or transferred for use on any other property, except as provided in Paragraph 7 of Exhibit "F" for the Hatchery. Any Production of Recirculated Water by Jess in excess of the amount shown in Table B-2 shall be subject to all

Assessments. Production of Recirculated Water by the Hatchery will be subject to the rules set forth in Paragraph 7 of Exhibit "F". All Jess Aquaculture Recirculated Water shall be discharged immediately and directly to the Mojave River.

b. Camp Cady. One Producer listed in Table B-2 of Exhibit "B", California Department of Fish and Game-Camp Cady (Camp Cady), Produces Recirculated Water for Lakes containing Tui Chub, an endangered species of fish. Camp Cady or its successors or assignees shall have the right to continue to Produce up to the amount listed in Table-B-2 of Exhibit "B" as Recirculated Water at Camp Cady. Production of each amount of Recirculated water shall be free of any Assessments. Camp Cady Recirculated Water may not be transferred or used for any other purpose or transferred for use on any other property. Any Production of Recirculated Water by Camp Cady in excess of the amount shown in Table B-2 of Exhibit "B" shall be subject to all Assessments except Biological Resource Assessments. All Camp Cady Recirculated Water shall be allowed to percolate immediately and directly to the Groundwater basin underlying Camp Cady.

c. Recreational Lakes in Baja Subarea. All Producers listed in Table B-2 of Exhibit "B" except the Hatchery, Jess and Camp Cady Produce Recirculated Water for recreational lakes in the Baja Subarea. Such Producers or their successors or assignees shall have the right to continue to Produce up to the amounts identified in Table B-2 of Exhibit "B" as Recirculated Water for use in recreational lakes on the property where it was used in the Year for which Base Annual Production was verified, free of any Replacement Water Assessments, Makeup Water

Assessments, or Administrative Assessments, but such Production shall be subject to any Biological Resource Assessment. Each well producing such Recirculated Water shall be subject to an Annual administrative fee equal to the lowest Annual fee paid by a Minimal Producer. Recirculated Water cannot be transferred or used for any other purpose. All recreational lake Recirculated Water shall be allowed to percolate immediately and directly to the Groundwater basin underlying the recreational lake.

9. MWA Obligations. The Physical Solution is intended to provide for delivery and equitable distribution to the respective Subareas by MWA of the best quality of Supplemental Water reasonably available. MWA shall develop conveyance or other facilities to deliver this Supplemental Water to the areas depicted in Exhibit "I," unless prevented by forces outside its reasonable control such as an inability to secure financing consistent with sound municipal financing practices and standards.

a. Secure Supplemental Water. MWA, separate and apart from its duties as the initial Watermaster designated under this Judgment, shall exercise its authority under Sections 1.5 and 15 of the MWA Act to pursue promptly, continuously and diligently all reasonable sources to secure Supplemental Water as necessary to fully implement the provisions of this Judgment.

b. Supplemental Water Prices. The MWA shall establish fair and equitable prices for Supplemental Water delivered to the Watermaster under this Judgment.

c. Supplemental Water Delivery Plan. Not later than September 30, 1996, MWA shall prepare a report on potential alternative facilities or methods to deliver Supplemental Water to

the areas shown on Exhibit "I." The report shall include, for each alternative, a development time schedule, a summary of cost estimates, an analysis of the relative benefits to Producers in each Subarea and an analysis of alternative methods of financing and cost allocation, including any state or federal sources of funding that may be available.

d. Water Delivery Cost Allocation. The report required by subdivision (c) above shall recommend methods of financing and cost allocation that are based on benefits to be received. MWA's cost allocation plan shall be subject to Court review as provided in subdivision (f) below to verify that costs are allocated fairly and according to benefits to be received. The MWA financing and cost allocation plan may include a mix of revenue sources including the following:

(1) Developer or connection fees to the extent MWA can demonstrate a nexus, as required by law, between the fees and the impact of the development upon the water resources of the Mojave Basin Area and each subarea thereof;

(2) Other methods of financing available to MWA, including but not limited to property based taxes, assessments or standby charges;

(3) Water sales revenues, but only to the extent other sources are not available or appropriate, and in no event shall the water sales price to cover facility

capital costs exceed a rate equal to fifty percent of the variable cost rate charged to MWA under its contract for water delivery from the California State Water Project;

e. Legislative Changes. MWA shall seek promptly to have enacted amendments to the MWA Act (Water Code Appendix, Part 97) that allow MWA to implement any methods of governmental financing available to any public entity in California.

f. Court Review and Determination of Benefit. Not later than September 30, 1996, MWA shall submit its report to the Court in a noticed motion pursuant to Paragraph 36. The report shall set forth MWA's recommendations as to the following: (1) which alternatives should be implemented; (2) methods of cost allocation for the recommended alternatives; (3) financing for the recommended alternatives; and (4) a time schedule to complete the recommended alternatives. The Court may approve or reject the recommendations. The Court may further order the use of alternatives and time schedules or it may order additional studies and resubmittals, as it may deem proper.

10. Priority and Determination of Production Rights. The water rights involved herein are of differing types and commenced at different times. Many of the rights involved are devoted to public uses. The Declaration of Water Rights that is part of the judgment and the Physical Solution decreed herein takes into consideration the competing priorities which have been asserted in addition to the equitable principles applicable to apportionment of water in this situation. The following factors

have been considered in the formulation of each Producer's Base Annual Production Right:

a. The Mojave Basin Area and each of its hydrologic Subareas have continuously for many Years been in a state of system-wide Overdraft;

b. All Producers have contributed to the Overdraft;

c. None of the priorities asserted by any of the Producers is without dispute;

d. Under the complex scheme of California water law, the allocation of water and rights mechanically based upon the asserted priorities would be extremely difficult, if not impossible, and would not result in the most equitable apportionment of water;

e. Such mechanical allocation would, in fact, impose undue hardship on many Parties;

f. There is a need for conserving and making maximum beneficial use of the water resources of the State;

g. The economy of the Mojave Basin Area has to a great extent been established on the basis of the existing Production;

h. The Judgment and Physical Solution take into consideration the unique physical and climatic conditions of the Mojave Basin Area, the Consumptive Use of water in the several sections of the Basin, the character and rate of return flows, the extent of established uses, the availability of storage water, the relative benefits and detriments between upstream areas and downstream areas if a limitation is imposed on one and not the

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other, and the need to protect public interest and public trust concerns.

In consideration of the foregoing factors, and in accordance with the terms and conditions of this Judgment, the Parties are estopped and barred from asserting special priorities or preferences.

11. Exercise of Carry Over Rights. The first water Produced by a Producer during any Year shall be deemed to be an exercise of any Carry Over Right. Such Carry Over Right may be transferred in accordance with Exhibit "F".

12. Production Only Pursuant to Judgment. This Judgment, and the Physical Solution decreed herein, addresses all Production within the Mojave Basin Area. Because of the existence of Overdraft, any Production outside the framework of this Judgment and Physical Solution will contribute to an increased Overdraft, potentially damage the Mojave Basin Area and public interests in the Basin Area, injure the rights of all Parties, and interfere with the Physical Solution. Watermaster shall bring an action or a motion to enjoin any Production that is not pursuant to the terms of this Judgment.

13. Declaration of Subarea Rights and Obligations. In the aggregate, Producers within certain Subareas have rights, as against those in adjoining upstream Subareas, to receive average Annual water supplies and, in any one Year, to receive minimum Annual water supplies equal to the amounts set forth in Exhibit "G", in addition to any Storm Flows. In turn, in the aggregate, Producers within certain Subareas have an obligation to provide to adjoining downstream Subareas such average Annual water supplies in

the amounts and in the manner set forth in Exhibit "G". In any one Year, Producers within certain Subareas have an obligation to provide to adjoining downstream Subareas such minimum Annual water supplies in the amounts and in the manner set forth in Exhibit "G". The Producers in the Baja Subarea have an obligation to provide average and minimum Subsurface Flows toward Afton at the MWA eastern boundary equal to the amounts shown in Exhibit "G". Producers in each of the Subareas have rights in the aggregate, as against each adjoining downstream Subarea or, in the case of the Baja Subarea, as against flows at the MWA eastern boundary toward Afton, to divert, pump, extract, conserve, and use all surface water and Groundwater supplies originating therein or accruing thereto, and so long as the adjoining downstream Subarea Obligations are satisfied under this Judgment and there is compliance with all of its provisions. Watermaster shall maintain a continuing account of the status of each Subarea's compliance with its Subarea Obligation, including any cumulative credits or debits and any requirement for providing Makeup Water. The accounting and determinations relative to Subarea Obligations shall be made in accordance with procedures set forth in Exhibit "G".

III. INJUNCTION

14. Injunction Against Unauthorized Production. Each and every Party, its officers, agents, employees, successors, and assigns, is ENJOINED AND RESTRAINED from Producing water from the Basin Area except pursuant to the provisions of the Physical Solution in this Judgment.

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15. Injunction Re Change in Purpose of Use Without Notice Thereof to Watermaster. Each and every Party, its officers, agents, employees, successors, and assigns, is ENJOINED AND RESTRAINED from changing its Purpose of Use at any time without first notifying Watermaster of the intended change.

16. Injunction Against Unauthorized Recharge. Each and every Party, its officers, agents, employees, successors and assigns, is ENJOINED AND RESTRAINED from claiming any right to recapture Water that has been recharged in the Basin Area except pursuant to a Storage Agreement with Watermaster. This provision does not prohibit Parties from importing Supplemental Water into the Basin Area for direct use.

17. Injunction Against Transportation from Mojave Basin Area. Except upon further order of the Court, each and every Party, its officers, agents, employees, successors and assigns, is ENJOINED AND RESTRAINED from transporting water hereafter Produced from the Basin Area to areas outside the Basin Area.

18. Injunction Against Diverting Storm Flows. No Party may undertake or cause the construction of any project that will directly reduce the amount of Storm Flow that would otherwise go through the naturally occurring hydrologic regime to a downstream Subarea or that will reduce the surface area over which Storm Flow currently occurs by alteration to the bed of the Mojave River. This paragraph shall not prevent any flood control agency or municipality from taking such emergency action as may be necessary to protect the physical safety of its residents and its structures from flooding. Any such action shall be done in a manner that will minimize any reduction in the quantity of Storm Flows.

IV. CONTINUING JURISDICTION

19. Jurisdiction Reserved. Full jurisdiction, power and authority are retained by and reserved to the Court for purposes of enabling the Court upon the application of any Party, by a motion noticed in accordance with the notice procedures of Paragraph 36 hereof, to make such further or supplemental order or directions as may be necessary or appropriate for interim operation before the Physical Solution is fully operative, or for interpretation, enforcement or carrying out of this Judgement, and to modify, amend or amplify any of the provisions of this Judgment or to add to the provisions thereof consistent with the rights herein decreed; provided, that nothing in this paragraph shall authorize either a reduction of the Base Annual Production Right of any Party, except in accordance with the rules set forth in Exhibit "F", or a reduction of the Base Flow portion of any Subarea Obligation.

V. Physical Solution

A. GENERAL

20. Purpose and Objective. The Court hereby declares and decrees that the Physical Solution herein contained: 1) is a fair and equitable basis for satisfaction of all water rights in the Mojave Basin Area; 2) is in furtherance of the mandate of the State Constitution and the water policy of the State of California; and 3) takes into account applicable public trust interests; and therefore adopts and orders the Parties to comply with the Physical Solution. As noted in Paragraph 3 of this Judgment, the declaration of rights and obligations of the Parties and Subareas is a necessary component of this Physical Solution. The purpose of

the Physical Solution is to establish a legal and practical means for making the maximum reasonable beneficial use of the waters of the Basin Area by providing for the long-term conjunctive utilization of all water available thereto to meet the reasonable beneficial use requirements of water users therein.

21. Need for Flexibility. It is essential that this Physical Solution provide maximum flexibility and adaptability in order that the Court may be free to use existing and future technological, social, institutional and economic options in order to maximize reasonable beneficial use of the waters of the Basin Area. To that end, the Court's retained jurisdiction may be utilized where appropriate, to supplement the Physical Solution.

22. General Pattern of Operations. The Producers will be divided into five Subareas for purposes of administration. The Subarea rights and obligations are herein decreed. A fundamental premise of the Physical Solution is that all Parties will be allowed, subject to this Judgment, to Produce sufficient water to meet their reasonable beneficial use requirements. To the extent that Production by a Producer in any Subarea exceeds such Producer's share of the Free Production Allowance of that Subarea, Watermaster will provide Replacement Water to replace such excess Production according to the methods set forth herein. To the extent that any Subarea incurs a Makeup Obligation, Watermaster will provide Supplemental Water to satisfy such Makeup Obligation according to the methods set forth herein. For the initial five (5) full Years after entry of this Judgment (including any interlocutory Judgment), the Free Production Allowance for each Subarea shall be set as the amount of water equal to the following

percentages of the aggregate Base Annual Production for that Subarea:

	Judgment Year	Percentage
1993-1994	First Full Year	100
1994-1995	Second Full Year	95
1995-1996	Third Full Year	90
1996-1997	Fourth Full Year	85
1997-1998	Fifth Full Year	80

The extent of Overdraft now varies between Subareas and the reasonableness of any physical solution as applied to each Producer depends in part upon such Producer's foreseeable needs and the present and future availability of water within the Subarea in which each Producer is located. The Physical Solution described in this Judgment in part generally contemplates (i) initially allowing significant unassessed production on a substantially uniform basis for all Producers and Subareas and (ii) a phasing in of the monetary obligations necessary to obtain Supplemental Water. The above two provisions will affect each Subarea differently, may not be sufficient to ultimately eliminate the condition of Overdraft in each Subarea and could result in increased Overdraft within a Subarea. Any adverse impact to any Subarea caused by the implementation of the provisions shall be the responsibility of the Producers in each such Subarea.

B. ADMINISTRATION.

23. Administration by Watermaster. Watermaster shall administer and enforce the provisions of the Judgment and any subsequent instructions or orders of this Court.

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(a) Standard of Performance. Watermaster shall, in carrying out its duties, powers and responsibilities herein, act in an impartial manner without favor or prejudice to any Subarea, Producer, Party or Purpose of Use.

(b) Removal of Watermaster. Full jurisdiction, power and authority are retained and reserved by the Court for the purpose of enabling the Court on its own motion, or upon application of any Party, and upon notice in accordance with the notice procedures of paragraph 36 hereof, and after hearing thereon, to remove any appointed Watermaster and substitute a new Watermaster in its place. The Court shall find good cause for the removal of Watermaster upon a showing that Watermaster has failed to perform its duties, powers and responsibilities in an impartial manner, or has otherwise failed to act in the manner consistent with the provisions set forth in this Judgment or subsequent order of the Court.

(c) MWA Appointed as Initial Watermaster. The MWA is hereby appointed, until further order of the Court, as Watermaster to administer and enforce the provisions of this Judgment and any subsequent orders of this Court issued in the performance of its continuing jurisdiction. In carrying out this appointment, MWA shall segregate and separately exercise in all respects the Watermaster powers delegated by the Court under this Judgment from MWA's statutory powers. All funds received, held, and disbursed by MWA as Watermaster shall be by way of separate Watermaster accounts, subject to separate accounting and auditing. Meetings and hearings held by the MWA Board of Directors when acting as Watermaster shall be noticed and conducted separately from MWA

meetings. All Watermaster staff and consultant functions shall be separate and distinct from MWA staff and consultant functions; provided, however, that pursuant to duly adopted Watermaster rules, which shall be subject to review according to Paragraph 36 hereof, Watermaster staff and consultant functions may be accomplished by MWA staff and consultants, subject to strict time and cost accounting principles so that Watermaster functions, and the Assessments provided under this Judgment, do not subsidize, and are not subsidized by, MWA functions. Subject to these principles, MWA shall implement practicable cost efficiencies through consolidation of Watermaster and MWA staff and consultant functions.

24. Powers and Duties. Subject to the continuing supervision and control of the Court, Watermaster shall have and may exercise the following express powers, and shall perform the following duties, together with any specific powers, authority and duties granted or imposed elsewhere in this Judgement or hereafter ordered or authorized by the Court in the exercise of its continuing jurisdiction:

a. Rules and Regulations. To adopt any and all appropriate rules and regulations for conduct pursuant to this Judgment after public hearing. Notice of hearing and a copy of the proposed rules and regulations, and any amendments thereof, shall be mailed to all Parties thirty days prior to the date of the hearing thereon.

b. Employment of Experts and Agents. To employ such administrative personnel, engineering, legal, accounting, or other specialty services and consulting assistants as may be deemed appropriate in carrying out the terms of this Judgment.

c. Makeup and Replacement Obligations. To determine the Makeup Obligations for each Subarea and Replacement Obligations for each Producer and each Subarea, pursuant to the terms of the Judgment.

d. Measuring Devices, etc. To adopt rules and regulations regarding determination of amounts of Production and installation of individual water meters. The rules and regulations shall provide for approved devices or methods to measure or estimate Production. Producers who meter Production on the date of entry of this Judgment shall continue to meter Production. Thereafter, Producers who do not meter Production on the effective date of entry of this Judgment may be required by Watermaster rules and regulations to install water meters upon a showing that then employed measurement devices or methods do not accurately determine actual Production. The rules and regulations shall require that within three Years after the date of entry of this Judgment, any Producer who provides piped water for human Consumption to more than five service connections shall have installed an individual water meter on each service connection.

e. Hydrologic Data Collection. To install, operate and maintain such wells, measuring devices and/or meters necessary to monitor stream flow, precipitation and groundwater levels and to obtain such other data as may be necessary to carry out the provisions of this Judgment, including a study of the Basin Area phreatophyte consumptive use.

f. Assessments. To set, levy and collect all Assessments specified herein.

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g. Purchase of and Recharge with Supplemental Water. In accordance with Paragraph 27, to the extent Supplemental Water is available and is reasonably needed for Replacement Water or Makeup Water, to use Replacement Water Assessment proceeds to purchase Replacement Water, and to use Makeup Water Assessment proceeds to purchase Makeup Water and to have such Replacement Water and Makeup Water provided to the appropriate Subarea as soon as practicable. Watermaster may prepurchase Supplemental Water and apply subsequent Assessments towards the costs of such prepurchases.

h. Water Quality. To take all reasonable steps to assist and encourage appropriate regulatory agencies to enforce reasonable water quality regulations affecting the Basin Area, including regulation of solid and liquid waste disposal.

i. Notice List. To maintain a current list of Responsible Parties to receive notice hereunder.

j. Annual Administrative Budget. To prepare a proposed administrative budget for each Year, hold hearings thereon, and adopt an administrative budget according to the time schedule set forth in Exhibit "D". The administrative budget shall set forth budgeted items and Administrative Assessments in sufficient detail to show the allocation of the expense among the Producers. Following the adoption of the budget, expenditures within budgeted items may thereafter be made by Watermaster in the exercise of powers herein granted, as a matter of course.

k. Annual Report to Court.

(1) To file an Annual report with this Court not later than April 1 of each Year beginning April 1 following the

first full Year after entry of Judgment. Prior to filing the Annual report with the Court, Watermaster shall notify all Parties that a draft of the report is available for review and shall provide notice of a hearing to receive comments and recommendations for changes in the report. The public hearing shall be conducted on the same date and at the same place as the hearings required by Paragraphs 3 and 4 of Exhibit "D". The notice of hearing may include such summary of the draft report as Watermaster may deem appropriate. Watermaster shall also distribute the report to the Parties requesting copies.

(2) The Annual report shall include an Annual fiscal report of the preceding Year's operation and shall include details as to operation of each of the Subareas and an audit of all Assessments and expenditures pursuant to this Physical Solution and a review of Watermaster activities pursuant to this Judgment. The Annual report shall include a compilation of at least the following:

Determinations and data required by:

i) Paragraph 24(c) (Makeup and Replacement Obligations)

ii) Paragraph 24(e) (Hydrologic Data Collection)

iii) Paragraph 24(g) (Purchase of and Recharge with Supplemental Water)

iv) Paragraph 24(i) (Notice List)

Rules and regulations adopted pursuant to:

v) Paragraph 24(a) (Rules and Regulations)

vi) Paragraph 24(d) (Measuring Devices, etc.)

vii) Paragraph 24(s) (Storage Agreements)

Reports required by:

viii) Paragraph 24(j) (Annual Administrative Budget)

ix) Paragraph 24(n) (Transfers)

x) Paragraph 24(o) (Free Production Allowance)

xi) Paragraph 24(p) (Production Reports)

xii) Exhibit "D" (Prior Year Report)

xiii) Exhibit "F" (Transfers of Base Annual Production Rights)

xiv) Exhibit "G" (Status of Subarea Obligation)

xv) Exhibit "H" (Biological Resource Mitigation)

l. Investment of Funds. To hold and invest any funds in investments authorized from time to time for public agencies in the State of California.

m. Borrowing. To borrow in anticipation of receipt of Assessment proceeds in an amount not to exceed the Annual amount of Assessments levied but uncollected.

n. Transfers. To prepare on an Annual basis and maintain a report or record of any transfer of Base Annual Production Rights. Such report or record shall be available for inspection by any Party upon reasonable notice to the Watermaster.

o. Free Production Allowance. Not later than the end of the 1997-1998 Water Year, and Annually thereafter, to recommend in the Watermaster Annual Report an adjustment, if needed, to the Free Production Allowance for any Subarea. In making its recommendation, Watermaster shall be guided by the factors set forth in Exhibit "C", including but not limited to an annual calculation of the change of water in storage. The Annual report shall include all assumptions and calculations relied upon in making its recommendations. Following the 1997-1998 Water Year,

or any time thereafter, Watermaster shall obtain prior Court approval for any increase or reduction of any Subarea's Free Production Allowance. In no event shall a reduction in any Year for a Subarea exceed five percent of the aggregate Base Annual Production of that Subarea. In the event Watermaster recommends in its report to the Court that the Free Production Allowance for any Subarea may need to be increased or reduced, the Court shall conduct a hearing, after notice given by Watermaster according to paragraph 36, upon Watermaster's recommendations and may order such changes in Subarea Free Production Allowance. The most recent Subarea Free Production Allowances shall remain in effect until revised according to this Paragraph 24(o).

p. Production Reports. To require each Producer to file with Watermaster, pursuant to procedures and time schedules to be established by Watermaster, a report on a form to be prescribed by Watermaster showing the total Production of such Party for each reporting period rounded off to the nearest tenth of an acre foot, and such additional information and supporting documentation as Watermaster may require.

q. Production Adjustment for Change in Purpose of Use. If Watermaster determines, using the Consumptive Use rates set forth in Exhibit "F", that a new Purpose of Use of any Producer's Production for any Year has resulted in a higher rate of Consumption than the rate applicable to the original Purpose of Use of that Producer's Production in the Year for which Base Annual Production was determined, Watermaster shall use a multiplier (1) to adjust upward such Production for the purpose of determining the Producer's Replacement Water Assessment and, (2) to adjust upward

the Free Production Allowance portion of such Production for the purpose of determining the Producer's Makeup Water Assessment. The multiplier shall be determined by dividing the number of acre feet of Consumption that occurred under the new Purpose of Use by the number of acre feet of Consumption that would have occurred under the original Purpose of Use for the same Production.

r. Reallocation of Base Annual Production Rights. To reallocate annually the Base Annual Production Rights in each Subarea to reflect any permanent transfers of such Rights among Parties.

s. Storage Agreements. To enter into Storage Agreements with any Party in order to accommodate the acquisition of Supplemental Water. Watermaster may not enter into Storage Agreements with non-Parties unless such non-Parties become subject to the provisions of this Judgment and the jurisdiction of the Court. Such Storage Agreements shall by their terms preclude operations which will have a substantial adverse impact on any Producer. If a Party pursuant to a Storage Agreement has provided for predelivery or postdelivery of Replacement Water for the Party's use, Watermaster shall at the Party's request credit such water to the Party's Replacement Obligation. Watermaster shall adopt uniformly applicable rules for Storage Agreements. Watermaster shall calculate additions, extractions and losses of water stored under Storage Agreements and maintain an Annual account of all such water.

t. Subarea Advisory Committee Meetings. To meet on a regular basis and at least semi-annually with the Subarea Advisory Committees to review Watermaster activities pursuant to

this Judgment and to receive advisory recommendations from the Subarea Advisory Committees.

u. Unauthorized Production. To bring such action or motion as is necessary to enjoin unauthorized Production as provided in Paragraph 12 hereinabove.

v. Meetings and Records. To ensure that all meetings and hearings by Watermaster shall be noticed and conducted according to then current requirements of the Ralph M. Brown Act, Government Code Sections 54950, et seq. Watermaster files and records shall be available to any person according to the provisions of the Public Records Act, Government Code §§ 6200 et seq.

w. Data, Estimates and Procedures. To rely on and use the best available records and data to support the implementation of this Judgment. Where actual records of data are not available, Watermaster shall rely on and use sound scientific and engineering estimates. Watermaster may use preliminary records of measurements, and, if revisions are subsequently made, Watermaster may reflect such revisions in subsequent accounting. Exhibit "C" sets forth methods and procedures for determining surface flow components. Watermaster shall use either the same procedures or procedures that will yield results of equal or greater accuracy.

x. Biological Resource Mitigation. To implement the Biological Resource Mitigation measures set forth in Exhibit "H" herein.

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C. ASSESSMENTS

25. Purpose. Watermaster shall levy and collect Assessments from the Parties based upon Production in accordance with the time schedules set forth in Exhibit "D". Watermaster shall levy and collect such Assessments as follows:

a. Administrative Assessments. Administrative Assessments to fund the Administrative Budget adopted by the Watermaster pursuant to Paragraph 24(j) shall be levied uniformly against each acre foot of Production. A Producer who does not Produce in a given Year shall pay an Administrative Assessment in amount equal to the lowest MWA assessment for Minimal Producers for that Year.

b. Replacement Water Assessments. Replacement Water Assessments shall be levied against each Producer on account of such Producer's Production, after any adjustment pursuant to Paragraph 24(q), in excess of such Producer's share of the Free Production Allowance in each Subarea during the prior Year.

c. Makeup Water Assessments. Makeup Water Assessments shall be levied against each Producer in each Subarea on account of each acre-foot of Production therein which does not bear a Replacement Assessment hereunder, after any adjustment pursuant to Paragraph 24(q), to pay all necessary costs of satisfying the Makeup Obligation, if any, of that Subarea.

d. Biological Resource Assessment. To establish and, to the extent needed, to maintain the Biological Resource Trust Fund balance at one million dollars (in 1993 dollars) pursuant to Paragraph 24(x) and Exhibit "H", a Biological Resource Assessment in an amount not to exceed fifty cents (in 1993 dollars)

for each acre-feet of Production shall be levied uniformly against each producer except the California Department of Fish and Game.

e. MWA Assessment of Minimal Producers. The MWA shall identify and assess Minimal Producers through its own administrative procedures, and not acting as Watermaster.

26. Procedure. Each Party hereto is ordered to pay the Assessments herein provided for, which shall be levied and collected in accordance with the procedures and schedules set forth in Exhibit "D". Any Assessment which becomes delinquent, as defined in Paragraph 7 of Exhibit "D", shall bear interest at the then current San Bernardino County property tax delinquency rate Said interest rate shall be applicable to any said delinquent Assessment from the due date thereof until paid. Such delinquent Assessment, together with interest thereon, costs of suit, attorneys fees and reasonable costs of collection, may be collected pursuant to motion giving notice to the delinquent Party only, or Order to Show Cause proceeding, or such other lawful proceeding as may be instituted by the Watermaster; and shall, if provided for in the MWA Act, constitute a lien on the property of the Party as of the same time and in the same manner as does the tax lien securing County property taxes. The Watermaster shall Annually certify a list of all such unpaid delinquent Assessments to the MWA (in accordance with applicable provisions of the MWA Act). The MWA (in accordance with applicable provisions of the MWA Act) shall include the names of those Parties and the amounts of the liens in its list to the County Assessor's Office in the same manner and at the same time as it does its administrative assessments. MWA shall account for receipt of all collections of Assessments collected pursuant to

this Judgment, and shall pay such amounts collected pursuant to this Judgment to the Watermaster. The Watermaster shall also have the ability to enjoin production of those Persons who do not pay Assessments pursuant to this Judgment.

27. Availability of Supplemental Water. All Replacement and Makeup Water Assessments collected by the Watermaster shall be used to acquire Supplemental Water from MWA. Watermaster shall determine when to request Supplemental Water from MWA and shall determine the amount of Supplemental Water to be requested. MWA shall use its best efforts to acquire as much Supplemental Water as possible in a timely manner. If MWA encounters delays in the acquisition of Supplemental Water which, due to cost increases, results in collected assessment proceeds being insufficient to purchase all Supplemental Water for which the Assessments were made, MWA shall purchase as much water as the proceeds will allow when the water becomes available. If available Supplemental Water is insufficient to meet all Makeup and Replacement Water obligations, Watermaster shall allocate the Supplemental Water for delivery to the Subareas on an equitable and practicable basis pursuant to duly adopted Watermaster rules and regulations, giving preference to: First, Transition Zone Replacement Water Obligations as set forth in Exhibit "G"; Second, Makeup Water Obligations; and Third, other Replacement Water Obligations. MWA may acquire Supplemental Water at any time. MWA shall be entitled to enter into a Storage Agreement with Watermaster to store water MWA acquires prior to being paid to do so by Watermaster. Such water, including such water acquired and stored prior to the date of this Judgment or prior to the entry of

a Storage Agreement, may later be used to satisfy MWA's duty under this paragraph.

28. Use of Replacement Water Assessment Proceeds and Makeup Water Assessment Proceeds. The Proceeds of Replacement Water Assessments and any interest accrued thereon shall only be used for the purchase of Replacement Water for that Subarea from which they were collected. In addition, the proceeds of Replacement Water Assessments collected on account of Production in the Transition Zone, except as provided in Exhibit "G", shall only be used for the purchase of Replacement Water for the Transition Zone, and the proceeds of Replacement Water Assessments collected on account of Production in that portion of the Baja Subarea downstream of the Calico-Newberry fault shall only be used for the purchase of Replacement Water for that portion of the Baja Subarea downstream of the Calico-Newberry fault. The proceeds of Makeup Water Assessments and any interest accrued thereon shall only be used for the purchase of Makeup Water to satisfy the Makeup Obligation for which they are collected.

29. MWA Annual Report to the Watermaster. MWA shall Produce and deliver to Watermaster an Annual written report regarding actions of MWA required by the terms of this Judgment. The report shall contain: 1) a summary of the actions taken by MWA in identifying and assessing Minimal Producers, including a report of Assessments made and collected; 2) a summary of other MWA activities in collecting Assessment on behalf of Watermaster; 3) a report of water purchases and water distribution for the previous Year; 4) actions taken to implement its Regional Water Management Plan, including actions relating to conveyance facilities referred

to in this Judgment. The MWA report will be provided to Watermaster not less than 30 days prior to the Annual Watermaster report to the Court required by this Judgment.

D. SUBAREA ADVISORY COMMITTEES.

30. Authorization. The Producers in each of the five Subareas are hereby authorized and directed to cause committees of Producer representatives to be organized and to act as Subarea Advisory Committees.

31. Composition and Election. Each Subarea Advisory Committee shall consist of five (5) Persons who shall be called advisors. In the election of advisors, every Party shall be entitled to one vote for every acre-foot of Base Annual Production for that Party in that particular Subarea. Parties may cumulate their votes and give one candidate a number of votes equal to the number of advisors to be elected multiplied by the number of votes to which the Party is normally entitled, or distribute the Party's votes on the same principle among as many candidates as the Party thinks fit. In any election of advisors, the candidates receiving the highest number of affirmative votes of the Parties are elected. Elections shall be held upon entry of this Judgment and thereafter every third year. In the event a vacancy arises, a temporary advisor shall be appointed by unanimous decision of the other four advisors to continue in office until the next scheduled election. The California Department of Fish and Game shall serve as a permanent ex-officio member of the Alto and Baja Subarea Advisory Committees. Rules and regulations regarding organization, meetings and other activities shall be at the discretion of the individual

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Subarea Advisory Committees, except that all meetings of the committees shall be open to the public.

32. Compensation. The Subarea Advisory Committee members shall serve without compensation.

33. Powers and Functions. The Subarea Advisory Committee for each Subarea shall act in an advisory capacity only and shall have the duty to study, review and make recommendations on all discretionary determinations made or to be made hereunder by Watermaster which may affect that Subarea.

E. TRANSFERABILITY.

34. Assignment, Transfer, etc. of Rights. In order to further the purposes of this Judgment and Physical Solution, any Base Annual Production Right, or any portion thereof, may be sold, assigned, transferred, licensed or leased pursuant to the rules and procedures set forth in Exhibit "F".

F. MISCELLANEOUS PROVISIONS.

35. Water Quality. Nothing in this Judgment shall be interpreted as relieving any Party of its responsibilities to comply with state or federal laws for the protection of water quality or the provisions of any permits, standards, requirements, or orders promulgated thereunder.

36. Review Procedures. Any action, decision, rule or procedure of Watermaster pursuant to this Judgment shall be subject to review by the Court on its own motion or on timely motion by any Party, as follows:

a. Effective Date of Watermaster Action. Any order, decision or action of Watermaster pursuant to this Judgment on noticed specific agenda items shall be deemed to have occurred

on the date of the order, decision or action.

b. Notice of Motion. Any Party, may, by a regularly noticed motion, petition the Court for review of Watermaster's action or decision pursuant to this Judgment. The motion shall be deemed to be filed when a copy, conformed as filed with the Court, has been delivered to Watermaster together with the service fee established by Watermaster sufficient to cover the cost to photocopy and mail the motion to each Party. Watermaster shall prepare copies and mail a copy of the motion to each Party or its designee according to the official service list which shall be maintained by Watermaster according to Paragraph 37. A Party's obligation to serve notice of a motion upon the Parties is deemed to be satisfied by filing the motion as provided herein. Unless ordered by the Court, any such petition shall not operate to stay the effect of any Watermaster action or decision which is challenged.

c. Time for Motion. A motion to review any Watermaster action or decision shall be filed within ninety (90) days after such Watermaster action or decision, except that motions to review Watermaster Assessments hereunder shall be filed within thirty (30) days of mailing of notice of the Assessment.

d. De Novo Nature of Proceeding. Upon filing of a petition to review Watermaster action, the Watermaster shall notify the Parties of a date when the Court will take evidence and hear argument. The Court's review shall be de novo and the Watermaster decision or action shall have no evidentiary weight in such proceeding.

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e. Decision. The decision of the Court in such proceeding shall be an appealable Supplemental Order in this case. When the same is final, it shall be binding upon Watermaster and the Parties.

f. Payment of Assessments. Payment of Assessments levied by Watermaster hereunder shall be made pursuant to the time schedule in Exhibit "D"; notwithstanding any motion for review of Watermaster actions, decisions, rules or procedures, including review of Watermaster Assessments.

37. Designation of Address for Notice and Service. Each Party shall designate the name and address to be used for purposes of all subsequent notices and service herein, either by its endorsement on the Stipulation for Judgment or by a separate designation to be filed within thirty (30) days after Judgment has been entered. Said designation may be changed from time to time by filing a written notice of such change with Watermaster. Any Party desiring to be relieved of receiving notices of Watermaster activity may file a waiver of notice on a form to be provided by Watermaster. Watermaster shall maintain at all times a current list of Parties to whom notices are to be sent and their addresses for purposes of service. Watermaster shall also maintain a full current list of names and addresses of all Parties or their successors, as filed herein. Copies of such lists shall be available to any Person. If no designation is made, a Party's designee shall be deemed to be, in order of priority: i) the Party's attorney of record; ii) if the Party does not have an attorney of record, the Party itself at the address on the Watermaster list.

38. Service of Documents. Delivery to or service upon any Party by Watermaster, by any other Party, or by the Court, of any document required to be served upon or delivered to a Party under or pursuant to the Judgment shall be deemed made if made by Deposit thereof (or by copy thereof) in the mail, first class, postage prepaid, addressed to the designee of the Party and at the address shown in the latest designation filed by that Party.

39. No Abandonment of Rights. It is in the interest of reasonable beneficial use of the Basin Area and its water supply that no Party be encouraged to take and use more water in any Year than is actually required. Failure to Produce all of the water to which a Party is entitled hereunder shall not, in and of itself, be deemed or constitute an abandonment of such Party's right, in whole or in part.

40. Intervention After Judgment. Any person who is not a Party or successor to a Party and who proposes to Produce water from the Basin Area may seek to become a Party to this Judgment through a Stipulation for Intervention entered into with Watermaster. Watermaster may execute said Stipulation on behalf of the other Parties herein but such Stipulation shall not preclude a Party from opposing such Intervention at the time of the Court hearing thereon. Said Stipulation for Intervention must thereupon be filed with the Court, which will consider an order confirming said intervention following thirty (30) days' notice to the Parties. Thereafter, if approved by the Court, such intervenor shall be a Party bound by this Judgment and entitled to the rights and privileges accorded under the Physical Solution herein.

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41. Recordation of Notice. MWA shall within sixty (60) days following entry of this Judgment record in the Office of the County Recorder of the County of San Bernardino a notice substantially complying with the notice content requirements set forth in Section 2529 of the California Water Code.

42. Judgment Binding on Successors, etc. Subject to specific provisions hereinbefore contained, this Judgment and all provisions thereof are applicable to and binding upon and inure to the benefit of not only the Parties to this action, but as well to their respective heirs, executors, administrators, successors, assigns, lessees, licensees and to the agents, employees and attorneys in fact of any such Persons.

43. Costs. No Party stipulating to this Judgment shall recover any costs or attorneys fees in this proceeding from another stipulating Party.

44. Entry of Judgment. The Clerk shall enter this Judgment.

Dated: JAN 1 0 1996

E. MICHAEL KAISER

E. Michael Kaiser, Judge
Superior Court of the State
of California for the
County of Riverside

EXHIBIT A

MAP OF MOJAVE BASIN AREA

[INDEX MAP AND DETAIL SHEET CONSISTING OF 42 1" = 4,000' SCALE MAPS COVERING THE BASIN AREA; THE MAP IS ON DISPLAY AT THE OFFICE OF THE MOJAVE WATER AGENCY, 22450 HEADQUARTERS, APPLE VALLEY, CA 92307 AND ON FILE WITH THE COURT]

EXHIBIT B

PRODUCTION TABLES

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TABLE B-2: TABLE SHOWING TOTAL VERIFIED PRODUCTION, BASE ANNUAL PRODUCTION AND RECIRCULATED WATER PRODUCTION FOR AQUACULTURE AND FOR RECREATIONAL LAKES

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ESTE SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ESTE SUBAREA PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
ABSHIRE, DAVID V	24	0.1093	24	22	21	20	19
ANDERSON, ROSS C & BETTY J	34	0.1548	34	32	30	28	27
BAR H MUTUAL WATER COMPANY	53	0.2414	53	50	47	45	42
BELL, CHUCK	494	2.2497	494	469	444	419	395
BURNS, BOBBY J & EVELYN J	1,300	5.9204	1,300	1,235	1,170	1,105	1,040
CASA COLINA FOUNDATION	90	0.4099	90	85	81	76	72
CENTER WATER CO	40	0.1822	40	38	36	34	32
CLUB VIEW PARTNERS	1,276	5.8111	1,276	1,212	1,148	1,084	1,020
CROSS, LAWRENCE E	23	0.1047	23	21	20	19	18
CRYSTAL HILLS WATER COMPANY	194	0.8835	194	184	174	164	155
DAHLQUIST, GEORGE R	594	2.7052	594	564	534	504	475
DELPERDANG, ROBERT H	56	0.2550	56	53	50	47	44
DESERT DAWN MUTUAL WATER COMPANY	15	0.0683	15	14	13	12	12
GAETA, TRINIDAD	512	2.3317	512	486	460	435	409
GAYJIKIAN, SAMUEL & HAZEL	102	0.4645	102	96	91	86	81
GRACETOWN INVESTMENT CO - JETCO PROP FUND	752	3.4247	752	714	676	639	601
GUBLER, HANS	30	0.1366	30	28	27	25	24
HAL-DOR LTD	23	0.1047	23	21	20	19	18
HANDLEY, DON R & MARY ANN	73	0.3325	73	69	65	62	58
HART, MERRILL W	473	2.1541	473	449	425	402	378
HERT, SCOTT	276	1.2569	276	262	248	234	220
HI-GRADE MATERIALS	442	2.0129	442	419	397	375	353
HITCHIN LUCERNE, INC	16	0.0729	16	15	14	13	12
JAMS RANCH	28	0.1275	28	26	25	23	22

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ESTE SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ESTE SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
JUBILEE MUTUAL WATER COMPANY	142	0.6467	142	134	127	120	113
JUNIPER RIVIERA COUNTY WATER DISTRICT	37	0.1685	37	35	33	31	29
LEE, DOO HWAN	78	0.3552	78	74	70	66	62
LOPEZ, BALTAZAR	385	1.7533	385	365	346	327	308
LUA, ANTONIO	348	1.5848	348	330	313	295	278
LUCERNE VALLEY MUTUAL WATER COMPANY	54	0.2459	54	51	48	45	43
LUCERNE VALLEY PARTNERS	1,213	5.5242	1,213	1,152	1,091	1,031	970
LUCERNE VISTA WATER CO	21	0.0956	21	19	18	17	16
MITSUBISHI CEMENT CORPORATION	1,299	5.9158	1,299	1,234	1,169	1,104	1,039
MONACO INVESTMENT COMPANY	70	0.3188	70	66	63	59	56
MOSS, LAWRENCE W & HELEN J	43	0.1958	43	40	38	36	34
PARK, CHANHO	597	2.7188	597	567	537	507	477
PARK, JEONG, IL & HEA JA	96	0.4372	96	91	86	81	76
PEREZ, EVA	247	1.1249	247	234	222	209	197
PETTIGREW, DAN	1,422	6.4760	1,422	1,350	1,279	1,208	1,137
PETTIGREW, HOWARD L	1,500	6.8312	1,500	1,425	1,350	1,275	1,200
PLUESS-STAUFER CALIFORNIA INC	23	0.1047	23	21	20	19	18
REED, MIKE	58	0.2641	58	55	52	49	46
ROGERS, ROY	1,449	6.5990	1,449	1,376	1,304	1,231	1,159
SAN BERNARDINO CO SERVICE AREA 29	21	0.0956	21	19	18	17	16
SEALS, LAWRENCE	113	0.5146	113	107	101	96	90
SON'S RANCH	140	0.6376	140	133	126	119	112
SOUTHERN CALIFORNIA WATER COMPANY	178	0.8106	178	169	160	151	142
SPECIALTY MINERALS, INC	42	0.1913	42	39	37	35	33

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ESTE SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ESTE SUBAREA	BASE ANNUAL [1] PRODUCTION	BASE ANNUAL [2] PRODUCTION RIGHT	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
PRODUCER	(ACRE-FEET)	(PERCENT)	FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
SPILLMAN, JAMES R & NANCY J	23	0.1047	23	21	20	19	18
STEWART WATER COMPANY	54	0.2459	54	51	48	45	43
STRINGER, W EDWARD	573	2.6095	573	544	515	487	458
THE CUSHENBURY TRUST, C/O SPECIALTY MINERALS, INC	10	0.0455	10	9	9	8	8
TURNER, LOYD & CAROL	77	0.3507	77	73	69	65	61
VISOSKY, JOSEPH F JR	1,120	5.1006	1,120	1,064	1,008	952	896
WEISER, SIDNEY & RAQUEL	90	0.4099	90	85	81	76	72
WILLOW WELLS MUTUAL WATER COMPANY	30	0.1366	30	28	27	25	24

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ESTE SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ESTE SUBAREA PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
MINIMAL PRODUCER POOL	2,000	9.1083	2,000	1,900	1,800	1,700	1,600
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	1,485	6.7629					
ESTE SUBAREA TOTALS =	21,958	100					

1 Base Annual Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production Right expressed as a percentage of the Total Base Annual Production.

3 Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN OBSTE SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

OBSTE SUBAREA PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT (PERCENT) [2]	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
AEROCHEM, INC	660	5.3645	660	627	594	561	528
BROWN, DOUG & SUE	46	0.3739	46	43	41	39	36
CHAMISAL MUTUAL	96	0.7803	96	91	86	81	76
DAVIS, PAUL	19	0.1544	19	18	17	16	15
DOSSEY, D A	14	0.1138	14	13	12	11	11
MEADOWBROOK DAIRY	2,335	18.9791	2,335	2,218	2,101	1,984	1,868
RESSEGUE, JOHN & BILL	259	2.1052	259	246	233	220	207
SAN BERNARDINO CO SERVICE AREA 70G	110	0.8941	110	104	99	93	88
SAN BERNARDINO CO SERVICE AREA 70L	1,306	10.6153	1,306	1,240	1,175	1,110	1,044
THORESON, ROBERT F & A KATHLEEN	40	0.3251	40	38	36	34	32
TROEGER, RICHARD H	112	0.9103	112	106	100	95	89
VAN DAM BROTHERS	1,860	15.1183	1,860	1,767	1,674	1,581	1,488

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN OESTE SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

OESTE SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
MINIMAL PRODUCER POOL	1,500	12.1921	1,500	1,425	1,350	1,275	1,200
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	3,946	32.0735					
OESTE SUBAREA TOTALS =	12,303	100					

1 Base Annual Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production Right expressed as a percentage of the Total Base Annual Production.

3 Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
ABBOND, EDWARD & GRACE	28	0.0229	28	26	25	23	22
ABBOTT, LEONARD C	284	0.2321	284	269	255	241	227
ADELANTO, CITY OF	1,573	1.2855	1,573	1,494	1,415	1,337	1,258
ADELANTO, CITY OF - GEORGE A F B	3,433	2.8055	3,433	3,261	3,089	2,918	2,746
AGCON, INC	384	0.3138	384	364	345	326	307
APPLE VALLEY COUNTRY CLUB	709	0.5794	709	673	638	602	567
APPLE VALLEY DEVELOPMENT	724	0.5917	724	687	651	615	579
APPLE VALLEY FOOTHILL CO WATER DISTRICT	167	0.1365	167	158	150	141	133
APPLE VALLEY HEIGHTS COUNTY WATER DISTRICT	125	0.1022	125	118	112	106	100
APPLE VALLEY RANCHOS WATER COMPANY	13,022	10.6419	13,022	12,370	11,719	11,068	10,417
APPLE VALLEY RECREATION & PARKS	45	0.0368	45	42	40	38	36
APPLE VALLEY VIEW MUTUAL WATER CO	36	0.0294	36	34	32	30	28
APPLE VALLEY, TOWN OF	298	0.2435	298	283	268	253	238
ARC LAS FLORES	6,331	5.1739	6,331	6,014	5,697	5,381	5,064
BACA, ENRIQUE	74	0.0605	74	70	66	62	59
BALDY MESA WATER DISTRICT	1,495	1.2218	1,495	1,420	1,345	1,270	1,196
BASS, NEWTON T	514	0.4201	514	488	462	436	411
BASTIANON, REMO	77	0.0629	77	73	69	65	61
BASURA, STEVE	25	0.0204	25	23	22	21	20
BEINSCHROTH, A J	90	0.0736	90	85	81	76	72
BOYCE, KENNETH & WILLA	102	0.0834	102	96	91	86	81
BROWN, BOBBY G & VALERIA R	42	0.0343	42	39	37	35	33
BURNS, ULYSSES & ANNIE L	164	0.1340	164	155	147	139	131
CARDOZO, MANUEL & MARIA	909	0.7429	909	863	818	772	727

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
CDFG - MOJAVE NARROWS REGIONAL PARK	2,107	1.7219	2,107	2,001	1,896	1,790	1,685
CDFG - MOJAVE RIVER FISH HATCHERY	20	0.0163	20	19	18	17	16
CLARK, KENNETH R	223	0.1822	223	211	200	189	178
CLEAR VIEW FARMS	501	0.4094	501	475	450	425	400
COPELAND, ET AL (C/O DON W. LITTLE)	175	0.1430	175	166	157	148	140
CRAMER, MARGARET MUIR	280	0.2288	280	266	252	238	224
CUNNINGHAM, WILLIAM	29	0.0237	29	27	26	24	23
DEXTER, CLAIR F	175	0.1430	175	166	157	148	140
DEXTER, J P	515	0.4209	515	489	463	437	412
DIBERNARDO, JOHN	203	0.1659	203	192	182	172	162
DOLCH, ROBERT & JUDY	426	0.3481	426	404	383	362	340
DOMBROWSKI, MICHAEL W & SUSAN M	19	0.0155	19	18	17	16	15
DOWSE, PHILIP	20	0.0163	20	19	18	17	16
EVENSON, EDWIN H & JOYCELAINE	70	0.0572	70	66	63	59	56
FISHER, DOLORES DR	48	0.0392	48	45	43	40	38
FISHER, JEROME	633	0.5173	633	601	569	538	506
FITZWATER, R E	291	0.2378	291	276	261	247	232
GARCIA, SONIA L	288	0.2354	288	273	259	244	230
GOMEZ, CIRIL - LIVING TRUST	330	0.2697	330	313	297	280	264
GREEN ACRES ESTATES	25	0.0204	25	23	22	21	20
GULBRANSON, MERLIN	163	0.1332	163	154	146	138	130
HELENDALE SCHOOL DISTRICT	18	0.0147	18	17	16	15	14
HESPERIA GOLF AND COUNTRY CLUB	678	0.5541	678	644	610	576	542
HESPERIA WATER DISTRICT	12,213	9.9808	12,213	11,602	10,991	10,381	9,770

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TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
HI-GRADE MATERIALS	149	0.1218	149	141	134	126	119
HODGE, STANLEY W	67	0.0548	67	63	60	56	53
HOLWAY, ROBERT	88	0.0719	88	83	79	74	70
HRUBIK, THOMAS A	3,862	3.1561	3,862	3,668	3,475	3,282	3,089
INDUSTRIAL ASPHALT	109	0.0891	109	103	98	92	87
JESS RANCH WATER COMPANY	7,480	6.1129	7,480	7,106	6,732	6,358	5,984
JOHNSON, LARRY & CARLEAN	82	0.0670	82	77	73	69	65
JOHNSON, RONALD	31	0.0253	31	29	27	26	24
JOHNSTON, HARRIET AND LARRY W	127	0.1038	127	120	114	107	101
KEMPER CAMPBELL RANCH	473	0.3865	473	449	425	402	378
LAKE ARROWHEAD COMMUNITY SERVICES DISTRICT	658	0.5377	658	625	592	559	526
LAWSON, ERNEST & BARBARA	15	0.0123	15	14	13	12	12
LENHERT, RONALD & TONI	37	0.0302	37	35	33	31	29
LEWIS HOMES OF CALIFORNIA	1,693	1.3836	1,693	1,608	1,523	1,439	1,354
LONGMAN, JACK	115	0.0940	115	109	103	97	92
LOUNSBURY, J PETER & CAROLYN	208	0.1700	208	197	187	176	166
LOW, ROBERT	399	0.3261	399	379	359	339	319
LUCKEY, MANLEY J	800	0.6538	800	760	720	680	640
LUTH, KEN	27	0.0221	27	25	24	22	21
MARIANA RANCHOS COUNTY WATER DISTRICT	245	0.2002	245	232	220	208	196
MCCALL, REX	44	0.0360	44	41	39	37	35
MCINNIS, WILLIAM S	30	0.0245	30	28	27	25	24
MITCHELL, ROBIN & JUDITH	36	0.0294	36	34	32	30	28
MURPHY, BERNARD H	25	0.0204	25	23	22	21	20

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
MURPHY, BERNARD TRUST	162	0.1324	162	153	145	137	129
MURPHY, KENNETH	42	0.0343	42	39	37	35	33
MUTUAL FUNDING CORP	101	0.0825	101	95	90	85	80
NAVAJO MUTUAL WATER CO	88	0.0719	88	83	79	74	70
NUNN, DONALD & PEARL	66	0.0539	66	62	59	56	52
O'BRYANT, ROBERT C & BARBARA	107	0.0874	107	101	96	90	85
ORMSBY, HARRY G	386	0.3154	386	366	347	328	308
PALISADES RANCH	824	0.6734	824	782	741	700	659
PARKER, DAVID E	37	0.0302	37	35	33	31	29
PEARL, ALICE	147	0.1201	147	139	132	124	117
PEARSON, DERYL B	22	0.0180	22	20	19	18	17
PERRY, THOMAS A	35	0.0286	35	33	31	29	28
PETTIS TRUST	126	0.1030	126	119	113	107	100
PHENIX PROPERTIES LTD	652	0.5328	652	619	586	554	521
PITTMAN, LEROY W	148	0.1209	148	140	133	125	118
POLICH, LEE & DONNA	65	0.0531	65	61	58	55	52
RANCHERITOS MUTUAL WATER CO	169	0.1381	169	160	152	143	135
RIVERSIDE CEMENT CO - ORO GRANDE PLANT	3,452	2.8211	3,452	3,279	3,106	2,934	2,761
ROGERS, ROY (ORO GRANDE RANCH)	115	0.0940	115	109	103	97	92
RUDMAN, ROBERT T	300	0.2452	300	285	270	255	240
RUE RANCH	30	0.0245	30	28	27	25	24
SAN BERNARDINO CO SERVICE AREA 42	465	0.3800	465	441	418	395	372
SAN BERNARDINO CO SERVICE AREA 64	3,822	3.1234	3,822	3,630	3,439	3,248	3,057
SAN BERNARDINO CO SERVICE AREA 70C	2,346	1.9172	2,346	2,228	2,111	1,994	1,876

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TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
SAN BERNARDINO CO SERVICE AREA 70J	1,005	0.8213	1,005	954	904	854	804
SAN BERNARDINO CO SERVICE AREA 70L	355	0.2901	355	337	319	301	284
SAN FILIPPO, JOSEPH & SHELLEY	35	0.0286	35	33	31	29	28
SILVER LAKES ASSOCIATION	3,987	3.2583	3,987	3,787	3,588	3,388	3,189
SOUTHDOWN, INC	1,519	1.2414	1,519	1,443	1,367	1,291	1,215
SOUTHERN CALIFORNIA WATER COMPANY	940	0.7682	940	893	846	799	752
SPRING VALLEY LAKE ASSOCIATION	3,056	2.4974	3,056	2,903	2,750	2,597	2,444
SPRING VALLEY LAKE COUNTRY CLUB	977	0.7984	977	928	879	830	781
STORM, RANDALL	62	0.0507	62	58	55	52	49
SUDMEIER, GLENN W	121	0.0989	121	114	108	102	96
SUMMIT VALLEY RANCH	452	0.3694	452	429	406	384	361
TATRO, RICHARD K & SANDRA A	280	0.2288	280	266	252	238	224
TATUM, JAMES B	829	0.6775	829	787	746	704	663
TAYLOR, ALLEN C / HAYMAKER RANCH	456	0.3727	456	433	410	387	364
THOMAS, S DALE	440	0.3596	440	418	396	374	352
THOMAS, WALTER	36	0.0294	36	34	32	30	28
THOMPSON, JAMES A	418	0.3416	418	397	376	355	334
THOMPSON, RODGER	76	0.0621	76	72	68	64	60
THRASHER, GARY	373	0.3048	373	354	335	317	298
THUNDERBIRD COUNTY WATER DISTRICT	118	0.0964	118	112	106	100	94
TURNER, ROBERT	70	0.0572	70	66	63	59	56
VAIL, JOSEPH B & PAULA E	126	0.1030	126	119	113	107	100
VAN BURGER, CARL	710	0.5802	710	674	639	603	568
VAN LEEUWEN FAMILY TRUST	341	0.2787	341	323	306	289	272

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA	BASE ANNUAL [1] PRODUCTION	BASE ANNUAL [2] PRODUCTION RIGHT	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
PRODUCER	(ACRE-FEET)	(PERCENT)	FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
VANNI, MIKE	54	0.0441	54	51	48	45	43
VICTOR VALLEY COMMUNITY COLLEGE DIST	240	0.1961	240	228	216	204	192
VICTOR VALLEY WATER DISTRICT	13,354	10.9133	13,354	12,686	12,018	11,350	10,683
VICTORVILLE, CITY OF	12	0.0098	12	11	10	10	9
VOGLER, ALBERT H	132	0.1079	132	125	118	112	105
WACKEEN, CAESAR	1,635	1.3362	1,635	1,553	1,471	1,389	1,308
WAKULA, JOHN	291	0.2378	291	276	261	247	232
WARD, KEN & BARBARA	65	0.0531	65	61	58	55	52
WEBER, DAVE	80	0.0654	80	76	72	68	64
WEST, CAROLYN & SMITH, RICHARD	24	0.0196	24	22	21	20	19
WEST, HOWARD & SUZY	72	0.0588	72	68	64	61	57
WHITTINGHAM, RICHARD V	15	0.0123	15	14	13	12	12
YEAGER, E L - CONSTRUCTION COMPANY INC	34	0.0278	34	32	30	28	27

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TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
MINIMAL PRODUCER POOL	4,000	3.2689	4,000	3,800	3,600	3,400	3,200
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	4,967	4.0592					
ALTO SUBAREA TOTALS =	122,365	100					

1 Base Annual Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production Right expressed as a percentage of the Total Base Annual Production.

3 Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

~~12/10/92~~
~~01/20/93~~
~~02/02/93~~
~~04/18/93~~
~~04/28/93~~
09/25/95

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TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN CENTRO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
AGCON, INC	0	0.0000	0	0	0	0	0
AGUAYO, JEANETTE L	212	0.3742	212	201	190	180	169
ATCHISON, TOPEKA, SANTA FE RAILWAY CO	120	0.2118	120	114	108	102	96
AVDEEF, THOMAS	34	0.0600	34	32	30	28	27
AZTEC FARM DEVELOPMENT COMPANY	220	0.3883	220	209	198	187	176
BARNES, FAY - EXECUTOR OF ESTATE OF WAYNE BARNES	243	0.4289	243	230	218	206	194
BROMMER, HARVIN	361	0.6372	361	342	324	306	288
BURNS, RITA J & PAMELA E	16	0.0282	16	15	14	13	12
CHAFA, LARRY R	96	0.1694	96	91	86	81	76
CHOI, YONG IL & JOUNG AE	38	0.0671	38	36	34	32	30
CHRISTISON, JOEL	75	0.1324	75	71	67	63	60
COOK, KWON W	169	0.2983	169	160	152	143	135
DE VRIES, NEIL	3,800	6.7070	3,800	3,610	3,420	3,230	3,040
DESERT COMMUNITY BANK	156	0.2753	156	148	140	132	124
DURAN, FRANK T	50	0.0883	50	47	45	42	40
GAINES, JACK	117	0.2065	117	111	105	99	93
GESIRIECH, WAYNE	121	0.2136	121	114	108	102	96
GORMAN, VIRGIL	138	0.2436	138	131	124	117	110
GRIEDER, RAYMOND H & DORISANNE	30	0.0530	30	28	27	25	24
GRILL, NICHOLAS P & MILLIE D	21	0.0371	21	19	18	17	16
GROEN, CORNELIS	1,043	1.8409	1,043	990	938	886	834
HANIFY, DBA - WHITE BEAR RANCH	152	0.2683	152	144	136	129	121
HARMSEN, JAMES & RUTH ANN	1,522	2.6863	1,522	1,445	1,369	1,293	1,217
HARPER LAKE COMPANY	1,433	2.5293	1,433	1,361	1,289	1,218	1,146

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TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN CENTRO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
HI DESERT MUTUAL WATER CO	34	0.0600	34	32	30	28	27
HILEMAN, KATHERINE	19	0.0335	19	18	17	16	15
HILL, MELVIN	2,335	4.1213	2,335	2,218	2,101	1,984	1,868
HOY, MIKE	632	1.1155	632	600	568	537	505
JORDAN, RAYMOND	460	0.8119	460	437	414	391	368
JUSTICE, CHRIS	421	0.7431	421	399	378	357	336
KING, GENEVIEVE E	69	0.1218	69	65	62	58	55
LEE, SEPOONG ETAL & WOO POONG	77	0.1359	77	73	69	65	61
LEYERLY, GENEVA	65	0.1147	65	61	58	55	52
LEYERLY, RICHARD	862	1.5214	862	818	775	732	689
LUDINGTON, JAMES E & JO ANN	58	0.1024	58	55	52	49	46
LYON, LOUIS & ERIKA	130	0.2295	130	123	117	110	104
MARTIN, LENDELL	14	0.0247	14	13	12	11	11
MCCOLLUM, CHARLES L	347	0.6125	347	329	312	294	277
MEAD, G C	90	0.1589	90	85	81	76	72
MEYERS, LONNIE	27	0.0477	27	25	24	22	21
MITCHELL, CHARLES A	201	0.3548	201	190	180	170	160
MOFFITT, THOMAS R & EDITH I	62	0.1094	62	58	55	52	49
MOST, MILTON W	9,660	17.0500	9,660	9,177	8,694	8,211	7,728
NELSON, MILDRED L	52	0.0918	52	49	46	44	41
NEWBERRY SPRINGS COMPANY, INC	2,489	4.3931	2,489	2,364	2,240	2,115	1,991
OHAI, REYNOLDS & DOROTHY	137	0.2418	137	130	123	116	109
OROPEZA, JOSE M	190	0.3354	190	180	171	161	152
OSTERKAMP, GEROLD	260	0.4589	260	247	234	221	208

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TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN CENTRO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
OWL ROCK PRODUCTS COMPANY	466	0.8225	466	442	419	396	372
PG & E	1,657	2.9246	1,657	1,574	1,491	1,408	1,325
REDDY, BOMMI V & KARUNA V	24	0.0424	24	22	21	20	19
ROWLAND, JAMES & HELEN	22	0.0388	22	20	19	18	17
RUISCH, DALE W	650	1.1473	650	617	585	552	520
SHIRKEY, ALAN G & MARY E	35	0.0618	35	33	31	29	28
SMITH, ROBERT A	43	0.0759	43	40	38	36	34
SOPPELAND, WAYNE	783	1.3820	783	743	704	665	626
SOUTHERN CALIFORNIA WATER COMPANY	11,309	19.9605	11,309	10,743	10,178	9,612	9,047
SPINK, WALTHALL	44	0.0777	44	41	39	37	35
ST CHARLES, DONALD B	609	1.0749	609	578	548	517	487
SUN 'N SKY COUNTRY CLUB	337	0.5948	337	320	303	286	269
TALLAKSON, WILLIAM V	17	0.0300	17	16	15	14	13
TILLEMA, HAROLD	874	1.5426	874	830	786	742	699
VAN DAM, ELDERT & SUSAN	722	1.2743	722	685	649	613	577
VAN LEEUWEN, JOHN	1,922	3.3923	1,922	1,825	1,729	1,633	1,537
VAN VLIET, HENDRIKA	820	1.4473	820	779	738	697	656
VANHOY, LUTHER C	23	0.0406	23	21	20	19	18
VERNOLA, PAT	3,116	5.4998	3,116	2,960	2,804	2,648	2,492
VISSER, ANNIE	91	0.1606	91	86	81	77	72
YANG, YOUNG MO	371	0.6548	371	352	333	315	296
YKEMA HARMSEN DAIRY	1,000	1.7650	1,000	950	900	850	800

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TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN CENTRO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
MINIMAL PRODUCER POOL	2,000	3.5300	2,000	1,900	1,800	1,700	1,600
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	864	1.5250					
CENTRO SUBAREA TOTALS =	56,657	100					

1 Base Annual Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production Right expressed as a percentage of the Total Base Annual Production.

3 Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
AKE, CHARLES J & MARJORIE M	23	0.0333	23	21	20	19	18
ANGERER, ROBERT J & PEGGY	24	0.0347	24	22	21	20	19
ANTELOPE VALLEY DAIRY	5,430	7.8597	5,430	5,158	4,887	4,615	4,344
ARGUELLES, ALFREDO	1,047	1.5155	1,047	994	942	889	837
ATCHISON, TOPEKA, SANTA FE RAILWAY CO	80	0.1158	80	76	72	68	64
BAGLEY, ROY	20	0.0289	20	19	18	17	16
BALDERRAMA, ALFRED & LINDA	250	0.3619	250	237	225	212	200
BALL, DAVID P	81	0.1172	81	76	72	68	64
BARAK, RICHARD	132	0.1911	132	125	118	112	105
BARBER, JAMES B	167	0.2417	167	158	150	141	133
BARSTOW CALICO K O A	24	0.0347	24	22	21	20	19
BAUR, KARL & RITA	26	0.0376	26	24	23	22	20
BEDINGFIELD, LYNDELL & CHARLENE	56	0.0811	56	53	50	47	44
BENTON, PHILIP G	35	0.0507	35	33	31	29	28
BORGOGNO, STEVEN & LILLIAN B	1,844	2.6691	1,844	1,751	1,659	1,567	1,475
BOWMAN, EDWIN L	31	0.0449	31	29	27	26	24
BROWN, RONALD A	1,080	1.5632	1,080	1,026	972	918	864
BROWY, ORVILLE & LOUISE	33	0.0478	33	31	29	28	26
BRUINS, NICHOLAS	29	0.0420	29	27	26	24	23
CALICO LAKES HOMEOWNERS ASSOCIATION	1,031	1.4923	1,031	979	927	876	824
CALIF DEPT OF TRANSPORTATION	71	0.1028	71	67	63	60	56
CAMPBELL, M A & DIANNE	22	0.0318	22	20	19	18	17
CARTER, JOHN THOMAS	746	1.0798	746	708	671	634	596
CDFG - CAMP CADY	14	0.0203	14	13	12	11	11

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
CHANG, TIMOTHY & JANE	18	0.0261	18	17	16	15	14
CHASTAIN, W C	100	0.1447	100	95	90	85	80
CHEYENNE LAKE, INC	122	0.1766	122	115	109	103	97
CHIAO MEI DEVELOPMENT	451	0.6528	451	428	405	383	360
CHO BROTHERS RANCH	758	1.0972	758	720	682	644	606
CHUANG, MARSHAL	70	0.1013	70	66	63	59	56
CONNER, WILLIAM H	25	0.0362	25	23	22	21	20
COOL WATER RANCH	76	0.1100	76	72	68	64	60
CRYSTAL LAKES PROPERTY OWNERS ASSOCIATION	447	0.6470	447	424	402	379	357
DAGGETT COMMUNITY SERVICES DISTRICT	235	0.3402	235	223	211	199	188
DALJO CORPORATION	31	0.0449	31	29	27	26	24
DAVIS, RONALD & DONNA	53	0.0767	53	50	47	45	42
DE JONG, ALAN L	1,648	2.3854	1,648	1,565	1,483	1,400	1,318
DENNISON, QUENTIN D	29	0.0420	29	27	26	24	23
DESERT LAKES CORPORATION - (LAKE DOLORES)	483	0.6991	483	458	434	410	386
DOCINO, DONALD P & PATRICIA J	23	0.0333	23	21	20	19	18
DONALDSON, JERRY & BEVERLY	90	0.1303	90	85	81	76	72
ELLISON, SUSAN	15	0.0217	15	14	13	12	12
EVKHANIAN, JAMES H	110	0.1592	110	104	99	93	88
FAWCETT, EDWARD C	20	0.0289	20	19	18	17	16
FELIX, ALAN E & CAROL L	36	0.0521	36	34	32	30	28
FERRO, DENNIS & NORMA	32	0.0463	32	30	28	27	25
FRIEND, JOSEPH & DEBORAH	60	0.0868	60	57	54	51	48
FUNDAMENTAL CHRISTIAN ENDEAVOR	285	0.4125	285	270	256	242	228

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
GARCIA, DANIEL	23	0.0333	23	21	20	19	18
GOLD, HAROLD	249	0.3604	249	236	224	211	199
GRAVES, CHESTER B	32	0.0463	32	30	28	27	25
HAIGH, WHILLDYN & MARGARET	32	0.0463	32	30	28	27	25
HALL, LARRY	23	0.0333	23	21	20	19	18
HARALIK, BESS & ROBERT	27	0.0391	27	25	24	22	21
HARDESTY, LESLIE E & BECKY J	47	0.0680	47	44	42	39	37
HARESON, NICHOLAS & MARY	30	0.0434	30	28	27	25	24
HARTER FARMS	1,083	1.5676	1,083	1,028	974	920	866
HARTER, JOE & SUE	738	1.0682	738	701	664	627	590
HARTLEY, LONNIE	19	0.0275	19	18	17	16	15
HARVEY, FRANK	38	0.0550	38	36	34	32	30
HENDLEY, RICK & BARBARA	48	0.0695	48	45	43	40	38
HIETT, PATRICIA J	16	0.0232	16	15	14	13	12
HILARIDES, FRANK	1,210	1.7514	1,210	1,149	1,089	1,028	968
HOLLISTER, ROBERT H & RUTH M	44	0.0637	44	41	39	37	35
HONG, PAUL B & MAY	95	0.1375	95	90	85	80	76
HORTON'S CHILDREN'S TRUST	106	0.1534	106	100	95	90	84
HORTON, JOHN MD	183	0.2649	183	173	164	155	146
HOSKING, JOHN W & JEAN	94	0.1361	94	89	84	79	75
HUBBARD, ESTER & MIZUNO, ARLEAN	28	0.0405	28	26	25	23	22
HUNT, RALPH M & LILLIAN F	31	0.0449	31	29	27	26	24
HUTCHISON, WILLIAM O	901	1.3042	901	855	810	765	720
HYATT, JAMES & BRENDA	210	0.3040	210	199	189	178	168

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT (PERCENT) [2]	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
IRVIN, BERTRAND W	29	0.0420	29	27	26	24	23
J V A AIR INC	54	0.0782	54	51	48	45	43
JACKSON, RAY	20	0.0289	20	19	18	17	16
JOHNSON, JAMES R	247	0.3575	247	234	222	209	197
JUSTICE, CHRIS	6	0.0087	6	5	5	5	4
KAPLAN, ABRAHAM M	76	0.1100	76	72	68	64	60
KASNER, ROBERT	1,001	1.4489	1,001	950	900	850	800
KATCHER, AUGUST M & MARCELINE	23	0.0333	23	21	20	19	18
KEMP, ROBERT & ROSE	32	0.0463	32	30	28	27	25
KIEL, MARY	34	0.0492	34	32	30	28	27
KIM, JOON HO	764	1.1059	764	725	687	649	611
KOSHAREK, JOHN & JOANNE	54	0.0782	54	51	48	45	43
LAKE JODIE PROPERTY OWNERS ASSOCIATION	254	0.3677	254	241	228	215	203
LAKE WAIKIKI	98	0.1419	98	93	88	83	78
LAKE WAINANI OWNERS ASSOCIATION	202	0.2924	202	191	181	171	161
LANGLEY, MICHAEL R	20	0.0289	20	19	18	17	16
LAWRENCE, WILLIAM W	45	0.0651	45	42	40	38	36
LEE, MOON & OKBEA	49	0.0709	49	46	44	41	39
LEE, VIN JANG T	630	0.9119	630	598	567	535	504
LESHIN, CONNIE & SOL	1,416	2.0496	1,416	1,345	1,274	1,203	1,132
LESHIN, SOL	1,997	2.8906	1,997	1,897	1,797	1,697	1,597
LEVINE, DR LESLIE	1,637	2.3695	1,637	1,555	1,473	1,391	1,309
LONG, BALLARD	35	0.0507	35	33	31	29	28
M BIRD CONSTRUCTION	41	0.0593	41	38	36	34	32

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
MAHJOUBI, AFSAR S	63	0.0912	63	59	56	53	50
MALIN, LILY	54	0.0782	54	51	48	45	43
MALONEY, JANICE	36	0.0521	36	34	32	30	28
MARCROFT, JAMES A & JOAN	38	0.0550	38	36	34	32	30
MARSHALL, CHARLES	20	0.0289	20	19	18	17	16
MAYBERRY, DONALD J	41	0.0593	41	38	36	34	32
MILBRAT, IRVING	73	0.1057	73	69	65	62	58
MITCHELL, CHARLOTTE	115	0.1665	115	109	103	97	92
MITCHELL, JAMES L & CHERYL A	155	0.2244	155	147	139	131	124
MOORE, WAYNE G & JULIA H	103	0.1491	103	97	92	87	82
MORRIS, KARL	304	0.4400	304	288	273	258	243
MULLIGAN, ROBERT & INEZ	35	0.0507	35	33	31	29	28
NEWBERRY COMMUNITY SERVICE DIST	23	0.0333	23	21	20	19	18
NU VIEW DEVELOPMENT, INC	2,899	4.1962	2,899	2,754	2,609	2,464	2,319
O F D L INC	109	0.1578	109	103	98	92	87
O'KEEFE, SARAH-LEE & JOKE E	50	0.0724	50	47	45	42	40
P & H ENGINEERING & DEV CORP	667	0.9654	667	633	600	566	533
PARKER, GEORGE R	144	0.2084	144	136	129	122	115
PATHFINDER INVESTORS	472	0.6832	472	448	424	401	377
PAYAN, PAUL	32	0.0463	32	30	28	27	25
PERKO, BERT K	132	0.1911	132	125	118	112	105
PITTS, JOE	30	0.0434	30	28	27	25	24
POHL, ANDREAS & CATHLYN	17	0.0246	17	16	15	14	13
POLAND, JOHN R & SANDRA M	92	0.1332	92	87	82	78	73

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
PRICE, ALAN E	37	0.0536	37	35	33	31	29
PRICE, DONALD	42	0.0608	42	39	37	35	33
PUCKHABER, WILLIAM F TRUST	63	0.0912	63	59	56	53	50
PURCIO, THOMAS F & PATRICIA A	80	0.1158	80	76	72	68	64
RANDOLPH, JOAN E	24	0.0347	24	22	21	20	19
REEVES, RICHARD	230	0.3329	230	218	207	195	184
RICE, DANIEL & MARY	121	0.1751	121	114	108	102	96
RICE, HENRY C & DIANA	24	0.0347	24	22	21	20	19
RIEGER, WALTER M	62	0.0897	62	58	55	52	49
RIKUO CORPORATION	1,517	2.1958	1,517	1,441	1,365	1,289	1,213
ROSSI, JAMES L & NAOMI I	614	0.8887	614	583	552	521	491
ROTEX CONSTRUCTION COMPANY	2,529	3.6606	2,529	2,402	2,276	2,149	2,023
SAN BERNARDINO COUNTY BARSTOW - DAGGETT AIRPORT	168	0.2432	168	159	151	142	134
SANTUCCI, ANTONIO & WILSA	30	0.0434	30	28	27	25	24
SCOGGINS, JERRY	105	0.1520	105	99	94	89	84
SHEPPARD, THOMAS & GLORIA	217	0.3141	217	206	195	184	173
SHORT, CHARLES & MARGARET	54	0.0782	54	51	48	45	43
SHORT, JEFF	30	0.0434	30	28	27	25	24
SILVER VALLEY RANCH, INC	109	0.1578	109	103	98	92	87
SMITH, WILLIAM R	19	0.0275	19	18	17	16	15
SNYDER, KRYL K & ROUTH, RICHARD J	64	0.0926	64	60	57	54	51
SOUTHERN CALIFORNIA EDISON CO - AGRICULTURE	5,858	8.4792	5,858	5,565	5,272	4,979	4,686
SOUTHERN CALIFORNIA EDISON CO - INDUSTRIAL	4,565	6.6076	4,565	4,336	4,108	3,880	3,652
SOUTHERN CALIFORNIA GAS COMPANY	98	0.1419	98	93	88	83	78

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
ST ANTONY COPTIC ORTHODOX MONASTERY	130	0.1882	130	123	117	110	104
STEWART, STANLEY & PATRICIA	27	0.0391	27	25	24	22	21
SUGA, TAKEAKI	154	0.2229	154	146	138	130	123
SUNDOWN LAKES, INC	168	0.2432	168	159	151	142	134
SWARTZ, ROBERT & IRENE	50	0.0724	50	47	45	42	40
TAPIE, RAYMOND & MURIEL	18	0.0261	18	17	16	15	14
TAYLOR, TOM	503	0.7281	503	477	452	427	402
THAYER, SHARON	58	0.0840	58	55	52	49	46
THE 160 NEWBERRY RANCH CALIFORNIA, LTD	1,033	1.4952	1,033	981	929	878	826
TRIPLE H PARTNERSHIP	993	1.4373	993	943	893	844	794
UNION PACIFIC RAILROAD COMPANY	249	0.3604	249	236	224	211	199
VAN BASTELAAR, ALPHONSE	78	0.1129	78	74	70	66	62
VAN DIEST, CORNELIUS	934	1.3519	934	887	840	793	747
VAN LEEUWEN, JOHN	1,084	1.5690	1,084	1,029	975	921	867
VANDER DUSSEN, AGNES	1,792	2.5938	1,792	1,702	1,612	1,523	1,433
VAUGHT, ROBERT E & KAREN M	43	0.0622	43	40	38	36	34
VERNOLA, PAT	1,310	1.8962	1,310	1,244	1,179	1,113	1,048
WARD, ERNEST & LAURA	38	0.0550	38	36	34	32	30
WARD, RONNY H	130	0.1882	130	123	117	110	104
WEBER, F R & JUNELL	96	0.1390	96	91	86	81	76
WEBSTER, THOMAS M & PATRICIA J	24	0.0347	24	22	21	20	19
WEIDKNECHT, ARTHUR J & PEGGY A	79	0.1143	79	75	71	67	63
WESTERN HORIZON ASSOCIATES INC	1,188	1.7196	1,188	1,128	1,069	1,009	950
WESTERN ROCK PRODUCTS	31	0.0449	31	29	27	26	24

EXHIBIT B

TABLE B-1

TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
WET SET, INC	129	0.1867	129	122	116	109	103
WITTE, E DANIEL	27	0.0391	27	25	24	22	21
WLSR INC	133	0.1925	133	126	119	113	106
WORSEY, REVAE	29	0.0420	29	27	26	24	23
YARD, BETTY	26	0.0376	26	24	23	22	20
YERMO WATER COMPANY	453	0.6557	453	430	407	385	362
YOUNG, KEITH O - (DESERT TURF)	312	0.4516	312	296	280	265	249
MINIMAL PRODUCER POOL	3,500	5.0661	3,500	3,325	3,150	2,975	2,800
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	320	0.4632					
BAJA SUBAREA TOTALS =	69,087	100					

1 Base Annual Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production Right expressed as a percentage of the Total Base Annual Production.

3 Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

EXHIBIT B
TABLE B-2
TABLE SHOWING TOTAL WATER PRODUCTION
FOR AQUACULTURE AND RECREATIONAL LAKE PURPOSES
ALTO SUBAREA

PRODUCER	TOTAL WATER [1] PRODUCTION	BASE ANNUAL [2] PRODUCTION	RECIRCULATED [3] WATER
	(ACRE-FEET)		
CDFG - MOJAVE RIVER FISH HATCHERY	10,678	20	10,658
JESS RANCH WATER COMPANY	18,625	7,480	11,145
ALTO SUBAREA TOTALS =	29,303	7,500	21,803

Total Water Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records; James C. Hanson site inspection; land use estimates from 1989 aerial photography; responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production as shown on Table B-1.

3 Amount shown is the difference between the Total Water Production and the Base Annual Production.

EXHIBIT B
TABLE B-2
TABLE SHOWING TOTAL WATER PRODUCTION
FOR AQUACULTURE AND RECREATIONAL LAKE PURPOSES
BAJA SUBAREA

PRODUCER	TOTAL WATER PRODUCTION [1]	BASE ANNUAL PRODUCTION [2]	RECIRCULATED WATER [3]
	(ACRE-FEET)		
BROWY, ORVILLE & LOUISE	210	33	177
CALICO LAKES HOMEOWNERS ASSOCIATION	2,513	1,031	1,482
CDFG - CAMP CADY	102	14	88
CHEYENNE LAKE, INC	638	122	516
CRYSTAL LAKES PROPERTY OWNERS ASSOCIATION	6,575	447	6,128
DESERT LAKES CORPORATION - (LAKE DOLORES)	928	483	445
FUNDAMENTAL CHRISTIAN ENDEAVOR	440	285	155
HORTON'S CHILDREN'S TRUST	1,291	106	1,185
HORTON, JOHN MD	672	183	489
KIEL, MARY	188	34	154
LAKE JODIE PROPERTY OWNERS ASSOCIATION	2,805	254	2,551
LAKE WAIKIKI	400	98	302
LAKE WAINANI OWNERS ASSOCIATION	1,420	202	1,218
LEE, MOON & OKBEA	171	49	122
O F D L INC	434	109	325
RICE, DANIEL & MARY	614	121	493
SCOGGINS, JERRY	922	105	817
SILVER VALLEY RANCH, INC	455	109	346
SMITH, WILLIAM E	153	19	134
SUNDOWN LAKES, INC	1,109	168	941
TAPIE, RAYMOND & MURIEL	108	18	90
THAYER, SHARON	159	58	101
WET SET, INC	441	129	312
WLSR INC	678	133	545

EXHIBIT B
TABLE B-2
TABLE SHOWING TOTAL WATER PRODUCTION
FOR AQUACULTURE AND RECREATIONAL LAKE PURPOSES
BAJA SUBAREA

PRODUCER	TOTAL WATER PRODUCTION [1]	BASE ANNUAL PRODUCTION [2]	RECIRCULATED WATER [3]
	(ACRE-FEET)		
BAJA SUBAREA TOTALS =	23,426	4,310	19,116

1 Total Water Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records; James C. Hanson site inspection; land use estimates from 1989 aerial photography; responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production as shown on Table B-1.

3 Amount shown is the difference between the Total Water Production and the Base Annual Production.

EXHIBIT C

ENGINEERING APPENDIX

CONTENTS

A. ADJUSTMENT OF FREE PRODUCTION ALLOWANCES

B. DETERMINATION OF SURFACE FLOW COMPONENTS

TABLE C-1: MOJAVE BASIN AREA ADJUDICATION SUBAREA HYDROLOGICAL INVENTORY BASED ON LONG-TERM AVERAGE NATURAL WATER SUPPLY AND OUTFLOW AND CURRENT YEAR IMPORTS AND CONSUMPTIVE USE

EXHIBIT C

ENGINEERING APPENDIX

The purpose of this Engineering Appendix is to establish the basis for measurements, calculations and determinations required in the operation of the Physical Solution.

A. Adjustment of Free Production Allowances. In the preparation of the report required by Paragraph 24 (o) of this Judgment, the Watermaster shall take into account all available pertinent hydrologic data and estimates, including at least the factors, or changes in the factors, shown in the attached Table C-1, "MOJAVE BASIN AREA ADJUDICATION SUBAREA HYDROLOGICAL INVENTORY BASED ON LONG-TERM AVERAGE NATURAL WATER SUPPLY AND OUTFLOW AND CURRENT YEAR IMPORTS AND CONSUMPTIVE USE," and changes in storage as determined by well levels, the factors listed in Paragraph 2(a) of Exhibit "H", and other pertinent data. The numbers for each of the factors for each Subarea shown in Table C-1 are Sample Numbers only, and are not intended to be used in determining actual water supply, Consumptive Use and outflow, or Free Production Allowance of the Subareas.

B. Determination of Surface Flow Components. The procedures used to determine the historical surface flow components of the Mojave River at various locations are summarized below.

1. Determination of Surface Flow Components at Lower Narrows. Since the records available for the discharge of the Mojave River at Lower Narrows only provide data on the total amount of surface flow and since Storm Flow occurs during and following periods of rainfall, it was necessary to determine what portion of

total measured surface flow at Lower Narrows was Storm Flow and what portion was Base Flow.

The Parties in reaching the physical solution provided for in the Judgment, used certain procedures to separate the Storm Flow and Base Flow components of the total measured surface flow at Lower Narrows. Hydrographs of the mean daily discharge at Lower Narrows were plotted for the Year under consideration together with corresponding rainfall data obtained from the National Oceanic and Atmospheric Administration (NOAA) for Lake Arrowhead. Hydrographs were also plotted for the combined flow of West Fork Mojave River and Deep Creek which together with the Lake Arrowhead precipitation data served as a guide for interpreting those periods during which Storm Flow was likely to have occurred at Lower Narrows.

Other factors considered included:

* Occurrences of Storm Flow at Barstow and Afton Canyon,
* Precipitation at Victorville and Barstow,
* Consideration of the time of Year and temperature, &
* Shape of hydrographs for Years having similar Base Flow characteristics.

Based on interpretation of all of the foregoing information, the flows occurring on those days during which Storm Flow most likely occurred were "scalped" by projecting an estimated Base Flow Curve through the Storm Flow Period. The Base Flow component of the total monthly flow was then determined as follows:

a. For those periods during which there was obviously no Storm Flow, the entire recorded mean daily flows were assumed to be Base Flow.

b. For the remaining Storm Flow periods, the Base Flow component was taken as the area under the Base Flow Curve, except that for those days within the Storm Flow period when the actual mean daily discharge is less than the amount indicated by the Base Flow Scalping Curves, then the actual recorded amount is used.

2. Determination of Surface Flow Components at Waterman Fault. The total amount of surface flow passing the Waterman Fault (under current riverbed conditions) is considered to be Storm Flow and can be estimated from the Storm Flow passing the USGS gauging station Mojave River at Barstow. The following table was developed to provide a method for estimating flow at Waterman Fault:

Storm Flow At Barstow Gage[1] (Acre-Feet)	Estimated Surface Flow at Waterman Fault (Acre-Feet)
2,000	0
10,000	6,200
20,000	14,300
30,000	22,600
40,000	31,400
50,000	40,500
60,000	49,200
70,000	58,400
80,000	67,800
90,000	76,800
100.000	85,400

[1]From Recorded Flow at USGS Gaging Station Mojave River at Barstow. Relationship is based on single storm events. More than one storm event separated by more than five day of zero flow will be considered as separate storms.

3. Determination of Surface Flow Components at Afton. Records available for the discharge of the Mojave River at Afton, California, provide data on the total mount of surface flow and since storm runoff occurs during and immediately following a major storm event in the watershed area tributary to the Baja Basin below Barstow or in the event of large Storm Flows at Barstow which reach Afton, it was necessary to determine what portion of the total measured surface flow at Afton is Storm Flow and what portion of Base Flow.

The Parties, in reaching the physical solution provided for in the Judgment, used certain procedures to separate the Storm Flow and Base Flow components of the total measured surface flow at Afton. Hydrographs of the mean daily discharge at Afton were plotted for the water Year under consideration. In the absence of Storm Flow, the Base Flow curve at Afton was generally a relatively constant amount. Storm Flows were evidenced by sharp spikes or abrupt departures from the antecedent Base Flow and a fairly rapid return to pre-storm Base Flow Condition. The hydrograph of flows at Barstow served as a guide for identifying those periods during which Storm Flow was likely to have occurred at Afton.

Based on interpretation of all of the foregoing information, the flows occurring on those days during which Storm Flow most likely occurred were "scalped" by projecting an estimated Base Flow Curve through the Storm Flow Period. The Base Flow component of the total monthly flow was then determined as follows:

a. For those periods during which there is obviously no Storm Flow, the entire recorded mean daily flows were assumed to be Base Flow.

b. For the remaining Storm Flow periods, the Base Flow component was taken as the area under the Base Flow Curve except that for those days within the Storm Flow period when the actual mean daily discharge was less than the amount indicated by the Base Flow Scalping Curves, then the actual recorded amount was used.

4. Engineers' Work Papers. These procedures are reflected in the Work Papers of the Engineers, copies of which are filed with the Watermaster.

TABLE C-1
Mojave Basin Area Adjudication
Subarea Hydrological Inventory Based On
Long-Term Average Natural Water Supply and Outflow
and Current Year Imports and Consumptive Use
(All Amounts in Acre-Feet)

	Este	Oeste	Alto	Centro	Baja	Basin Totals
WATER SUPPLY						
Surface Water Inflow						
Gaged	0	0	65,000	0	0	65,000
Ungaged	1,700	1,500	3,000	37,300 [1]	14,300 [2]	6,500 [3]
Subsurface Inflow	0	0	1,000	2,000	1,200	0 [4]
Deep Percolation of Precipitation	0	0	3,500	0	100	3,600
Imports						
Lake Arrowhead CSD	0	0	1,500	0	0	1,500
Big Bear ARWWA	2,000	0	0	0	0	2,000
TOTAL	3,700	1,500	74,000	39,300	15,600	78,600
CONSUMPTIVE USE AND OUTFLOW						
Surface Water Outflow						
Gaged	0	0	0	0	8,200	8,200
Ungaged	0	0	37,300 [1]	14,000 [5]	0	0
Subsurface Outflow	200	800	2,000	1,200	0	0
Consumptive Use						
Agriculture	6,800	2,900	16,300	20,300	30,200	76,500
Urban	1,900	1,200	36,300	9,500	9,700	58,600
Phreatophytes	0	0	5,100	900	1,500	7,500 [6]
Exports	0	0	0	0	0	0
TOTAL	8,900	4,900	97,000	45,900	49,600	150,800
Surplus / (Deficit)	(5,200)	(3,400)	(23,000)	(6,600)	(34,000)	(72,200)
Total Estimated Production (Current Year) [7]	15,700	7,600	98,900	46,500	54,300	223,000
PRODUCTION SAFE YIELD (Current Year) [7]	10,500	4,200	75,900	39,900	20,300	150,800

SAMPLE CALCULATIONS

[1] Estimated from reported flows at USGS gaging station, Mojave River at Victorville Narrows.

[2] Includes 14,000 acre-feet of Mojave River surface flow across the Waterman Fault estimated from reported flows at USGS gaging station, Mojave River at Barstow, and 300 acre-feet of local surface inflow from Kane Wash.

[3] Represents the sum of Este (1,700 af), Oeste (1,500 af), Alto (3,000 af) and Baja (300 af from Kane Wash).

[4] Inter subarea subsurface flows do not accrue to the total basin water supply.

[5] Estimated from reported flows at USGS gaging station, Mojave River at Barstow.

[6] Estimated by Bookman-Edmonston.

[7] For purposes of this Table, the current year is 1990.

EXHIBIT D

TIME SCHEDULES

EXHIBIT D

TIME SCHEDULES

1. Prior Year Report. Annually not later than February 1 Watermaster shall provide to each Party a report covering the prior Year and setting forth at least the following:

a. Each Producer's Replacement Water Assessment, including any surcharges, based on rates applicable during the prior Year.

b. Each Producer's Makeup Water Assessment, based on rates applicable during the prior water Year.

2. MWA Supplemental Water Rates. Annually, not later than December 1, MWA shall set the rates per acre foot to be charged for Supplemental Water for the following Year, and shall project the rates for the following two Years.

3. Budget and Assessment Rates. Annually, not later than February 1, Watermaster shall provide to all Parties its proposal for its Administrative Budget, Administrative Assessment Rates, Replacement Water Rates, and Makeup Water Rates for the next ensuing Year and its rate projections for the next two (2) years. No later than March 1 of each Year, the Watermaster shall hold a public hearing to receive comments from Parties as to its proposal. Not later than April 1 of each Year, Watermaster shall adopt its final Budget and assessment rates for the next ensuing Year, and shall notify all Parties of its final Budget and Assessments rates within fifteen (15) days of adoption.

4. Free Production Allowance Adjustment. In any Year that Watermaster prepares a report pursuant to Paragraph 24 (o) of this Judgment that includes a recommendation for an adjustment of a Free

Production Allowance, Watermaster shall notify all Parties as to its recommendation not later than February 1, shall hold a public hearing thereon not later than March 1, and shall submit any such recommendation, which may be revised pursuant to the public hearing, to the Court not later than April 1.

5. Payment of Administrative Assessments and Biological Resource Assessments. Each Producer shall submit quarterly along with the Production report required by Paragraph 24 (p) an Administrative Assessment payment in an amount equal to the current Year Administrative Assessment Rate multiplied times the acre-feet of water Produced during the quarter and a Biological Resource Assessment payment in an amount equal to the current Year Biological Resource Assessment Rate multiplied times the acre-feet of water Produced during the quarter.

6. Payment of Replacement Water Assessments and Makeup Water Assessments. Replacement Water Assessments and Makeup Water Assessments for the prior Year shall be due and payable on July 1.

7. Delinquency of Assessments. Any assessment payable pursuant to this Judgment shall be deemed delinquent: i) if paid in Person, if not paid within five (5) days of the date due; ii) if paid by electronic funds transfer, if not paid within three (3) banking days of the date due; or iii) if paid by any other means, if not paid within ten (10) days of the date due. "Payment" shall occur when good and sufficient funds have been received by the Watermaster. Any assessment shall also be deemed delinquent in the event that any attempted payment is by funds that are not good and sufficient.

EXHIBIT E

LIST OF PRODUCERS AND THEIR DESIGNEES

EXHIBIT E

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ABSHIRE, DAVID V	Same
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AGCON, INC.	Robert E. Hove
AGUAYO, JEANETTE L.	Same
AKE, CHARLES J & MARJORIE M	Same
ANDERSON, ROSS C & BETTY J	Same
ANGERER, ROBERT J & PEGGY	Same
ANTELOPE VALLEY DAIRY	Dick Van Dam
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APPLE VALLEY DEVELOPMENT	Same
APPLE VALLEY FOOTHILL CO WATER	Doreen Ryssel
APPLE VALLEY HEIGHTS CO. WATER	Elizabeth Hanna, Esq.
APPLE VALLEY RANCHOS WATER	Fredric Fudacz, Esq.
APPLE VALLEY REC. & PARKS	Elizabeth Hanna, Esq.
APPLE VALLEY VIEW MUTUAL WATER CO.	Joseph Saltmeris, Esq.
APPLE VALLEY, TOWN OF	Sandra Dunn, Esq.
ARC LAS FLORES	William De Wolfe, Esq.
ARGUELLES, ALFREDO	Therese Parker, Esq.
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ATCHISON, TOPEKA, SANTA FE	Curtis Ballantyne, Esq.
AVDEEF, THOMAS & LUCILLE	Same
AZTEC FARM DEVELOPMENT CO	Al Jackson
BACA, ENRIQUE	Same
BAGLEY, ROY	Same
BALDERRAMA, ALFRED & LINDA	Same
BALDY MESA WATER DISTRICT	William Smillie

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BAUR, KARL & RITA	Same
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BROWN, BOBBY G & VALERIA R	Same
BROWN, DOUG & SUE	Same
BROWN, RONALD A	Same
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PARKER, DAVID E	Same
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REED, MIKE	Same
REEVES, RICHARD	Same
RESSEQUE, JOHN & BILL	Same
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RICE, HENRY C & DIANA	Same
RIEGER, WALTER M	Same
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SAN BERNARDINO CSA #70C	William Smillie
SAN BERNARDINO CSA #70G	William Smillie
SAN BERNARDINO CSA #70J	William Smillie
SAN BERNARDINO CSA #70L	William Smillie
SAN BERNARDINO CO. BARSTOW-DAGGETT AIRPORT	William Smillie
SAN FILIPPO, JOSEPH & SHELLEY	Same
SANTUCCI, ANTONIO & WILSA	Same
SAN BERNARDINO CSA #70L	William Smillie
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SOUTHDOWN, INC.	Steve Abbott, Esq.
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PRODUCER	DESIGNEE
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WITTE, E DANIEL & MARCIA	Same
WLSR INC	Steve Winfield
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EXHIBIT F

TRANSFERS OF BASE ANNUAL PRODUCTION RIGHTS.

EXHIBIT F

TRANSFERS OF BASE ANNUAL PRODUCTION RIGHTS

1. Transferability. Any Base Annual Production Right, including any Carryover Right (Right) or any portion thereof may be sold, assigned, transferred, licensed or leased subject to the rules set forth in this Exhibit "F".

2. Consumptive Use Adjustments. A transferred Right shall be adjusted so as not to cause an increased Consumptive Use of water. For either inter Subarea or intra Subarea transfers, if the transferee's Consumptive Use of water Produced under the transferred Right would be at a higher rate than that of transferor, the transferred Right shall be reduced by Watermaster to a level that equalizes the Consumptive Use to that of transferor. Any such adjustments by Watermaster shall be made using the following Consumptive Use rates. If a transfer would cause the same or a decreased Consumptive Use, no adjustment shall be made.

Type of Water Use	Consumptive Use Rate
Municipal	50%
Irrigation	50%
Industrial	case by case
Lakes or Aquaculture	surface acres x 7 ft.

For mixed or sequential uses of water excluding direct reuse of municipal wastewater, the total acre-feet of Consumptive Use shall be the sum of Consumptive Uses for each use.

3. Notice to Watermaster. No transfer shall become operable until the Parties to the transfer have jointly notified Watermaster of the terms and conditions of the transfer, the price to be paid by the transferee, the name of the Responsible Party and the name of the Person who will pay any applicable Assessments. Intra-Subarea transfers shall not require Watermaster authorization after giving notice. No inter-Subarea transfer shall become operable until authorized by Watermaster after giving notice. Watermaster shall authorize such transfers in the order of the date of notice, provided that funds are available as set forth in Paragraph 4 of this Exhibit "F".

4. Inter Subarea Transfers of Rights. A Party's Right in a (Source) Subarea may be transferred (by lease only) to a Party in another (Use) Subarea provided that in any Year the resulting unconsumed water in the Source Subarea due to all such transfers shall not be greater than the Replacement Water requirement of the Source Subarea in the preceding Year. Watermaster shall replace the resulting Consumptive Use in the Use Subarea that is attributable to the transfer, utilizing Replacement Water Assessments from the Source Subarea.

5. Transfers to Meet Replacement Water or Makeup Water Obligations. Watermaster may use Assessment proceeds to purchase or lease Rights in a Subarea in order to obtain water to meet an Obligation. The water so obtained shall be equal to the Consumptive Use portion of the transferred and unproduced Rights. No such purchases of leases of Rights in the Harper Lake Basin may be used to satisfy Obligations in other parts of the Centro Subarea.

6. Inter Subarea Transfers of Water. Water Produced in one (source) Subarea and exported to another Subarea for use or disposal shall bear a Replacement Water Obligation equal to the sum of the Production in excess of the Producer's share of the Free Production Allowance in the source Subarea plus the amount of water exported that would normally have been returned to the source Subarea. Such exported water shall be credited to the appropriate Subarea Obligation unless it has been purchased or leased as Replacement Water pursuant to a transfer agreement.

7. Verde Ranch Producers. Together the Spring Valley Lake Country Club ("the Country Club"), the Spring Valley Lake Association ("the Association"), the California Department of Fish and Game (DFG) Mojave Narrows Regional Park ("the Park") the Kemper Campbell Ranch ("the Ranch") comprise a group herein called the Verde Ranch Producers. Each Verde Ranch Producer has the ability physically both to Produce Groundwater and to Produce water that originated as tailwater flowing from the DFG Mojave River Fish Hatchery. DFG Producer Groundwater to supply the Hatchery, and Hatchery tailwater can be discharged in part or entirely to the Mojave River or in part or entirely to a lined channel that conveys tailwater to points where the Verde Ranch Producers can Produce it. The present flow regimen is as follows: Hatchery Production flows through the Hatchery and is then discharged to the River and/or the lined channel. Water discharged to the lined channel flows to a Country Club lake. The Country Club Produces Groundwater that is discharged to the Country Club lake. The Country Club property is irrigated by pumping from the Country Club lake. Water overflowing from the Country Club lake flows through a lined channel and

through other Country Club lakes, and finally is discharged to Spring Valley Lake. The Association Produces Groundwater that is discharged to Spring Valley Lake. Water overflowing from Spring Valley Lake flows to lakes in the Park. The Park Produces Groundwater that is discharged to the lakes in the Park. The Park also Produces Groundwater that is used directly for irrigation of the Park. The Park is also irrigated by pumping from the lakes in the Park. Water overflowing from the lakes in the Park is discharged to the Mojave River. Some water from the lakes in the Park also flows to a lake on the Ranch. The Ranch also Produces Groundwater. The Ranch is irrigated from the lake on the Ranch. No water flows on the surface from the Ranch property to the Mojave River.

In order to continue the present arrangements among the Hatchery and the Verde Ranch Producers while assuring that they participate fairly in the Physical Solution the following rules shall apply:

a. Total Production by the Country Club will be calculated as the sum of Country Club Groundwater Production plus inflow of Hatchery tailwater minus outflow to Spring Valley Lake. The Country Club shall monitor and report to Watermaster the amounts of such Groundwater Production, inflow and outflow.

b. Total Production by the Association will be calculated as the sum of Association Groundwater Production plus inflow from the Country Club minus outflow to the Park. The Association shall monitor and report to Watermaster the amounts of such Groundwater Production, inflow and outflow.

c. Total Production by the Park will be calculated as the sum of Park Groundwater Production plus inflow from the Association minus outflow to the Ranch minus outflow to the Mojave River. The Park shall monitor and report to Watermaster as to such Groundwater Production, inflow and outflows.

d. Total Production by the Ranch will be calculated as the sum of Ranch Groundwater Production plus inflow from the Park. The Ranch shall monitor and report to Watermaster the amounts of such Groundwater Production and inflow.

e. Hatchery Production up to 10,678 acre-feet per Year will be permitted free of any Assessments against the Hatchery. The Hatchery shall monitor and report to Watermaster its Groundwater Production and the amounts of tailwater discharged to the River and to the artificial channel. In any Year the Hatchery may Produce more than 10,678 acre-feet free of any Assessments against the Hatchery, provided such Production in excess of 10,678 acre-feet is reported as Groundwater Production by one or more of the Verde Ranch Producers in the same Year pursuant to operating agreements by and between the Hatchery and such Producer(s) filed with the Watermaster. The operating agreement shall specify the responsibility for payment of assessments. In the operating agreement, the Verde Ranch Producers may elect to have assessments be based on the aggregate Production of the Verde Ranch Producers, and may freely transfer Base Annual Production Rights internally, provided that the aggregate consumptive use of the Verde Ranch Producers shall not be increased. In the absence of such operating agreements, or if the operating agreements do not otherwise allocate responsibility for payment of Assessments, the Hatchery

shall be liable for Administrative, Replacement Water and Biological Resource Assessments on the amount of water Produced by the Hatchery in excess of 10,678 acre-feet in any Year. In the event that Verde Ranch Producer who is allocated responsibility for payment of Assessments pursuant to an operating agreement is delinquent in making any such payment, the Hatchery shall not be liable therefor.

f. In any Year, if the total discharge to the River from the Hatchery and the Verde Ranch Producers exceeds the Groundwater Production by the Hatchery, such excess discharge shall be subject to Administrative, Replacement Water and, except for the Park, Biological Resource Assessments. Such Assessments shall be levied against individual Verde Ranch Producers in proportion to the extent that outflow from each Producer exceeds inflow to that Producer.

g. The Hatchery and the Verde Ranch Producers shall install all stage recorders, meters or other measuring devices necessary to determine inflows, outflows and Production that they are responsible for monitoring and reporting to Watermaster. Such stage recorders, meters or other measuring devices shall be installed, calibrated and operated in manner satisfactory to Watermaster.

h. Any change in the flow regimen described above will be subject to the same general rules set forth in this Paragraph 7. Any such change shall be reported to Watermaster in advance.

8. Harper Lake Basin. No Producer in the Harper Lake Basin may transfer any Base Annual Production Right or any portion thereof to Producers outside of Harper Lake Basin except by

physically conveying the water in compliance with the rules set forth in this Exhibit "F".

EXHIBIT G

SUBAREA OBLIGATIONS

EXHIBIT G

SUBAREA OBLIGATIONS

1. Subarea Obligations. Producers in the respective Subareas shall have the obligation to provide the following average Annual and minimum Annual Subsurface Flows and/or Base Flows per Year:

a. Este Subarea Producers--200 acre-feet per Year of Subsurface Flow to the Alto Subarea, except that in any Year the Subsurface Flow obligation shall be not be less than 160 acre-feet plus one-third of any cumulative debit plus any additional amount of water required to reduce the cumulative debit to 200 acre-feet.

b. Oeste Subarea Producers--800 acre-feet per Year of Subsurface Flow to the Alto Subarea, except that in any Year the Subsurface Flow obligation shall be not less than 640 acre-feet plus one-third of any cumulative debit plus any additional amount of water required to reduce the cumulative debit to 800 acre-feet.

c. Centro Subarea Producers--1200 acre-feet per Year of Subsurface Flow to the Baja Subarea, except that in any Year the Subsurface Flow Obligation shall be not less than 960 acre-feet plus one-third of any cumulative debit plus any additional amount of water required to reduce the cumulative debit to 1200 acre-feet.

d. Baja Subarea Producers--400 acre-feet per Year of Subsurface Flow toward Afton across the MWA eastern boundary, except that in any Year the Subsurface Flow Obligation shall not be less than 320 acre-feet plus one-third of any cumulative debit plus any additional amount of water required to reduce the cumulative debit to 400 acre-feet.

e. Alto Subarea Producers--an average Annual combined Subsurface Flow and Base Flow of 23,000 acre-feet per Year to the Transition Zone. For the purposes of Paragraph 6 of this Exhibit G, the Subsurface Flow component shall be deemed to be 2,000 acre-feet per Year. In any Year Alto Subarea Producers shall have an obligation to provide to the Transition Zone a minimum combined Subsurface Flow and Base Flow as follows:

i. If the accounting pursuant to Paragraph 5, below, reflects a net cumulative credit at the beginning of the Year, the combined minimum flow obligation shall be 18,400 acre-feet minus any net cumulative credit, but shall be not less than 15,000 acre-feet.

ii. If the accounting pursuant to Paragraph 5, below, does not reflect a net cumulative credit at the beginning of the Year, the combined minimum flow obligation shall be 18,400 acre-feet plus one-third of any net cumulative debit plus any additional amount of water required to reduce the net cumulative debit to 23,000 acre-feet.

2. <u>Obligation for Transition Zone Replacement Water</u>.

a. Until the Court approves Groundwater levels to be established and maintained pursuant to Subparagraph 2b of this Exhibit, Watermaster shall provide Replacement Water in the Transition Zone equal to Production in the Transition Zone that is in excess of the Transition Zone Producers' share of the Alto Subarea Free Production Allowance for that Year. All such Replacement Water shall be provided as soon as practicable during the next ensuing Year.

b. As soon as is practicable, the MWA shall establish key wells to be used to monitor Groundwater levels in the Transition Zone and, subject to approval by the Court, Watermaster shall establish minimum water levels to be maintained in the key wells.

c. After water level elevations have been established pursuant to Subparagraph 2b of this Exhibit, Watermaster shall provide Replacement Water in the Transition Zone as necessary to maintain the minimum water levels. Water purchased with Replacement Water Assessments paid by Producers in the Transition Zone in excess of the quantity of water needed to maintain said water levels shall be provided elsewhere in the Alto Subarea.

3. Other Water. "Other Water" that may be credited to a Subarea Obligation may include water conveyed and discharged across a boundary or Free Production Allowance water that is not Produced. Water other than Base Flow, Subsurface Flow or Storm Flow that is conveyed and discharged across a boundary between Subareas other than pursuant to a transfer agreement, shall be credited or debited, as appropriate, to the pertinent Subarea Obligation during the Year in which it is so conveyed and discharged. Any portion of the Subarea's Free Production Allowance that is allowed to remain unproduced in a Subarea pursuant to transfer agreements in order to satisfy a Subarea Obligation shall be credited to the pertinent Subarea Obligation in accordance with the terms of the transfer agreements.

4. Makeup Water. Assessments for Makeup Water shall be paid in accordance with the time schedule set forth in Exhibit D.

Makeup Water shall be credited to the Subarea Obligation at the end of the Year in which the Makeup Water Assessment is paid.

5. Accounting. Watermaster shall Annually not later than February 1 cause to be prepared a report of the status of each Subarea Obligation as of the end of the prior Year. The report shall set forth at least the following information for each Subarea Obligation:

a. The cumulative total of the average Annual Subarea Obligations since the Judgment was entered as of the beginning of the prior Year;

b. The cumulative total of all water credited to the Subarea Obligation since the Judgment was entered as of the beginning of the prior Year;

c. The net cumulative credit or debit [the difference between (a) and (b)] as of the beginning of the prior Year;

d. The amounts of water credited to the Subarea Obligation during the prior Year including, as appropriate, Base Flow, Subsurface Flow, Other Water and Makeup Water;

e. The cumulative total of the average Annual Subarea Obligations as of the end of the prior Year;

f. The cumulative total of all water credited to the Subarea Obligation as of the end of the prior Year;

g. The net cumulative credit or debit as of the end of the prior Year;

h. Any Makeup Water Obligation;

i. The Minimum Subarea Obligation for the current Year.

6. Subsurface Flow Assumptions. Some Subarea Obligations are expressed as average Annual or minimum Annual Subsurface Flow.

In all cases the Subsurface Flow obligations have been established initially at amounts equal to the estimated historical average Subsurface Flow across Subarea boundaries. Not later than two Years following entry of this Judgment MWA shall begin to install monitoring wells to be used to obtain data to enable improved estimates of Subsurface Flow at each Subarea boundary where there is a Subsurface Flow obligation and to develop methodology for future determinations of actual Subsurface Flow. Not later than ten years following entry of this Judgment Watermaster shall prepare a report setting forth the results of the monitoring program and the future methodology. Following opportunity for review of Watermaster's report by all Parties, Watermaster shall prepare a recommendation to the Court as to the likely accuracy of the estimated historical Subsurface Flows and any revision of Subarea Obligations that may be indicated. Pending Watermaster's report to the Court, Subsurface Flows shall be assumed to be equal to the Subsurface Flow obligations for purposed of accounting for compliance therewith.

7. Example Calculation. Table G-1 sets forth an example of Subarea Obligation accounting procedures using hypothetical flows.

TABLE G-1

HYPOTHETICAL EXAMPLE

ACCOUNTING FOR COMPLIANCE WITH SUBAREA OBLIGATIONS

OBLIGATION OF SUBAREA A TO SUBAREA B

AVERAGE ANNUAL: 23,000 AFA (21,000 AFA BASEFLOW + 2,000 AFA SUBSURFACE FLOW)

MINIMUM ANNUAL: 18,400 AFA + 1/3 OF ANY NET CUMULATIVE DEBIT; OR 18,400 AFA - ANY NET CUMULATIVE CREDIT, BUT NOT LESS THAN 15,000 AFA

	YEAR 1 AF	YEAR 2 AF	YEAR 3 AF	YEAR 4 AF	YEAR 5 AF	YEAR 6 AF	YEAR 7 AF	YEAR 8 AF	YEAR 9 AF	YEAR 10 AF
STATUS AT BEGINNING OF YEAR										
CUMULATIVE OBLIGATION	0	23,000	46,000	69,000	92,000	115,000	138,000	161,000	184,000	207,000
CUMULATIVE FLOW	0	17,000	32,600	50,800	69,067	87,067	107,111	139,978	168,378	198,978
NET CUMULATIVE CREDIT (DEBIT)	0	(6,000)	(13,400)	(18,200)	(22,933)	(27,933)	(30,889)	(21,022)	(15,622)	(8,022)
FLOW DURING THE YEAR (HYPOTHETICAL)										
BASE FLOW	8,000	5,000	4,000	4,000	2,000	2,000	15,000	18,000	20,000	23,000
SUBSURFACE FLOW	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
OTHER WATER	7,000	7,200	7,400	7,600	7800	8,000	8,200	8,400	8,600	8800
MAKEUP WATER PURCHASED	0	1,400	4,800	4,667	6,200	8,044	7,667	0	0	0
TOTAL FLOW	17,000	15,600	18,200	18,267	18,000	20,044	32,867	28,400	30,600	33,800
MINIMUM OBLIGATION DURING THE YEAR	18,400	20,400	22,867	24,467	26,044	27,711	28,696	25,407	23,607	21,074
MAKEUP OBLIGATION INCURRED	1,400	4,800	4,667	6,200	8,044	7,667	0	0	0	0
STATUS AT END OF YEAR										
CUMULATIVE OBLIGATION	23,000	46,000	69,000	92,000	115,000	138,000	161,000	184,000	207,000	230,000
CUMULATIVE FLOW	17,000	32,600	50,800	69,067	87,067	107,111	139,978	168,378	198,978	232,778
NET CUMULATIVE CREDIT (DEBIT)	(6,000)	(13,400)	(18,200)	(22,933)	(27,933)	(30,889)	(21,022)	(15,622)	(8,022)	2,778
FOLLOWING YEAR MINIMUM OBLIGATION										
18,400 + 1/3 OF NET CUM. DEBIT	20,400	22,867	24,467	26,044	27,711	28,696	25,407	23,607	21,074	0
ADDITIONAL TO REDUCE DEBIT TO 23,000	0	0	0	0	0	0	0	0	0	0
18,400 - CUM. CREDIT, BUT NLT 15,000	0	0	0	0	0	0	0	0	0	15,622
MINIMUM OBLIGATION	20,400	22,867	24,467	26,044	27,711	28,696	25,407	23,607	21,074	15,622

EXHIBIT H

BIOLOGICAL RESOURCE MITIGATION

EXHIBIT H

BIOLOGICAL RESOURCE MITIGATION

1. Protection of and Description of Existing Riparian Habitat. In arriving at a Physical Solution, the Parties have taken into consideration the water needs of the public trust resources of the Mojave Basin Area, including but not limited to, those species listed in Table H-1 within each of the areas as shown on Figure H-1 and the riparian habitat areas shown on Figure H-1 and described generally as follows:

a. The area which extends, south to north, in the Alto Subarea, from the intersection of the north line of Section 36, Township 5 North, Range 4 West with the Mojave River channel to the United States Geological Survey gauging station at the Lower Narrows;

b. The Lower Narrows to the Helendale Fault (Transition Zone);

c. The Harvard/Eastern Baja Subarea reach of the Mojave River that extends west to east, from Harvard Road to the Iron Ranch/Iron Mountain area (0.5 miles east of the west line of Section 20, Township 10 North, Range 4 East).

2. Protection Pursuant to Physical Solution. The following aspects of the Physical Solution must be implemented to seek to achieve the water table standards set forth in Table H-2 which were proposed by DFG as being necessary to maintain and converse the riparian resources in the areas shown on Figure H-1, including the species listed in Table H-1:

a. Pursuant to Paragraph 24(o) of the Judgment, the Watermaster in recommending an adjustment in Free Production

Allowance, shall compare the Free Production Allowance with the estimated Production Safe Yield. In the event the Free Production Allowance exceeds the estimated Production Safe Yield by five percent or more, Watermaster shall recommend a reduction of the Free Production Allowance equal to a full five percent of the aggregate Subarea Base Annual Production. In considering whether to increase or decrease the Free Production Allowance in a Subarea, Watermaster shall, among other factors, take into consideration for the areas shown on Figure H-1 the Consumptive Use of water by riparian habitat, the protection of public trust resources, including the species listed in Table H-1 and the riparian habitat areas shown on Figure H-1, and whether an increase would be detrimental to the protection of public trust resources.

b. If, pursuant to Paragraph 27, Watermaster buys or leases Free Production Allowance in the Baja Subarea below the Calico-Newberry Fault to satisfy the need for Replacement Water, priority shall be given to purchases or leases that will result in reducing Production in or near the area described in Subparagraph 1(c) of this Exhibit.

c. Pursuant to Paragraph 2 of Exhibit "G", Watermaster shall purchase Replacement Water to maintain Groundwater levels in the Transition Zone.

3. <u>Additional Protection Pursuant to Trust Fund Established by Watermaster Using the Proceeds of Biological Resource Assessments</u>.

a. Watermaster shall establish a Biological Resources Trust Fund account for the benefit of the riparian habitat areas shown on Figure H-1 and the species listed on Table H-1. To

establish and maintain the Trust Fund Watermaster shall levy against each acre-foot of Production within the Basin Area, other than Production by the California Department of Fish and Game (DFG), a Biological Resource Assessment of fifty cents ($0.50) (1993 dollars) to be collected at the same time and in the same manner as the Administrative Assessment, except that no Biological Resources Assessment shall be levied whenever the Trust Fund account balance exceeds $1,000,000 (1993 dollars).

b. Watermaster shall make funds held in the Biological Resources Trust Fund available to DFG only in the event that Groundwater levels are not maintained as set forth in Table H-2. Watermaster shall take action to acknowledge any proposed expenditure from the Biological Resources Trust Fund by DFG. Such Watermaster action shall be subject to the review procedures set forth in Paragraph 36 of the Judgment, provided that any motion made pursuant thereto and any Court disapproval of such Watermaster action and proposed DFG expenditure may be based only: 1) on the ground that the Groundwater levels set forth in Table H-2 are being maintained; and/or 2) the ground that the proposed expenditure is not for any of the purposes set forth in Subparagraphs 3.b.(i), (ii), or (iii) below in this Exhibit. The Biological Resources Trust Fund may be used only for the following purposes and only in the three areas identified on Figure H-1:

i. not to exceed $100,000 for the preparation by DFG of a DFG habitat water supply management plan, which plan shall include the water needs of the species listed in Table H-1 and the riparian habitat areas shown on Figure H-1.

ii. the purchase or lease by DFG of Supplemental Water or the lease or purchase of DFG of Base Annual Production Rights to be used to meet riparian habitat water needs of the species listed in Table H-1 and the riparian habitat areas shown on Figure H-1.

iii. the construction, repair and replacement of wells or other facilities identified in the plan prepared pursuant to Subparagraph (i), above, and/or any other measures necessary to implement the plan.

DFG shall not prepare or make any expenditure from the trust fund for the payment of administrative overhead or staff of DFG.

4. DFG agrees that absent substantial changed circumstances, DFG shall not seek to modify the provisions of this Judgment in any way to add to or change the above-stated measures to protect the referenced species or habitat. Nothing stated in this Judgment or in this Exhibit "H" is intended nor shall be deemed to relieve any Party hereto from any obligation or obligations not specifically referenced in this Exhibit H. Nothing in this Judgment or in this Exhibit H is intended or shall be construed to be a waiver by the State or any of its departments or agencies, including DFG, of its rights and obligations under the common law, the public trust doctrine, the constitution, statutes and regulations to preserve, protect or enhance the natural resources of the State including rare, threatened or endangered species or species of concern.

TABLE H-1

LIST OF SPECIES

SPECIES	ALTO			CENTRO		BAJA		
	Forks Dam to Upper Narrows	Upper Narrows to Lower Narrows	Lower Narrows to Helendale	Helendale to Hodge	Hodge to Barstow	Barstow to Harvard Road	Harvard Road to Mannix Wash	Afton Canyon
Purple Monkeyflower	6							
Mohave Monkeyflower	6		6	6	6	6		
Mohave Tarweed	5							
Desert Cymopterus	6							
Barstow Woolly Sunflower					6	6		
Victorville Shoulderband	6	6						
Mohave Tui Chub							1, 3	
California Red-legged Frog	6	6	6	6				
Southwestern Pond Turtle	6		6	6		6	6	6
Desert Tortoise	2, 4		2, 4	2, 4	2, 4	2, 4		
San Diego horned Lizard	6							
Cooper's Hawk	8	8						
Ferruginous Hawk	8	8						
Swainson's Hawk	4	4						
Bald Eagle	1, 3	1,3						
Merlin	6, 8	6, 8						
Prairie Falcon	6, 8	6, 8	6, 8	6, 8	6, 8	6, 8		
Western Yellow-billed Cuckoo	3, 7			3, 7	3, 7			
Southwestern Willow Flycatcher	8							
Brown-crested Flycatcher		8						
Vermillion Flycatcher	8					8	8	8
Le Conte's Thrasher	8							
Least Bell's Vireo	1, 3							1, 3

TABLE H-1

LIST OF SPECIES
(CONT'D)

SPECIES	ALTO			CENTRO		BAJA		
	Forks Dam to Upper Narrows	Upper Narrows to Lower Narrows	Lower Narrows to Helendale	Helendale to Hodge	Hodge to Barstow	Barstow to Harvard Road	Harvard Road to Mannix Wash	Afton Canyon
Yellow Warbler	9							
Yellow-breasted Chat	8	8			8	8		
Summer Tanager	8	8						8
Pale Big Earred Bat	8							
Mohave Ground Squirrel	4, 6		4, 6	4, 6				
Mohave Vole			6	6				
Nelson's Bighorn Sheep					10	10		10
TOTAL NUMBER OF SPECIES = 30 TOTAL NUMBER OF SPECIES IN EACH AREA:	25	11	7	8	7	8	3	5

1 = Federally Endangered
2 = Federally Threatened
3 = State Endangered
4 = State Threatened
5 = Federal Category: 1
6 = Federal Category: 2
7 = Federal Category: 3b
8 = State: Special Concern
9 = State: Sensitive
10 = State: Fully Protected

TABLE H-2

RIPARIAN HABITAT MONITORING WELL WATER LEVEL CRITERIA

ZONE	WELL NUMBER	MAXIMUM DEPTH BELOW GROUND
Victorville/Alto	H1-1	Seven (7) Feet
Victorville/Alto	H1-2	Seven (7) Feet
Lower Narrows/Transition	H2-1	Ten (10) Feet
Harvard/Eastern Baja Riparian Forest Habitat	H3-1	Seven (7) Feet
Harvard/Eastern Baja Surface Water Habitat	H3-2	Plus One (1) Foot (1705 Ft msl)*

* Surface Water Habitat water surface elevation of 1705 ft. msl is approximate pending ground elevation survey.

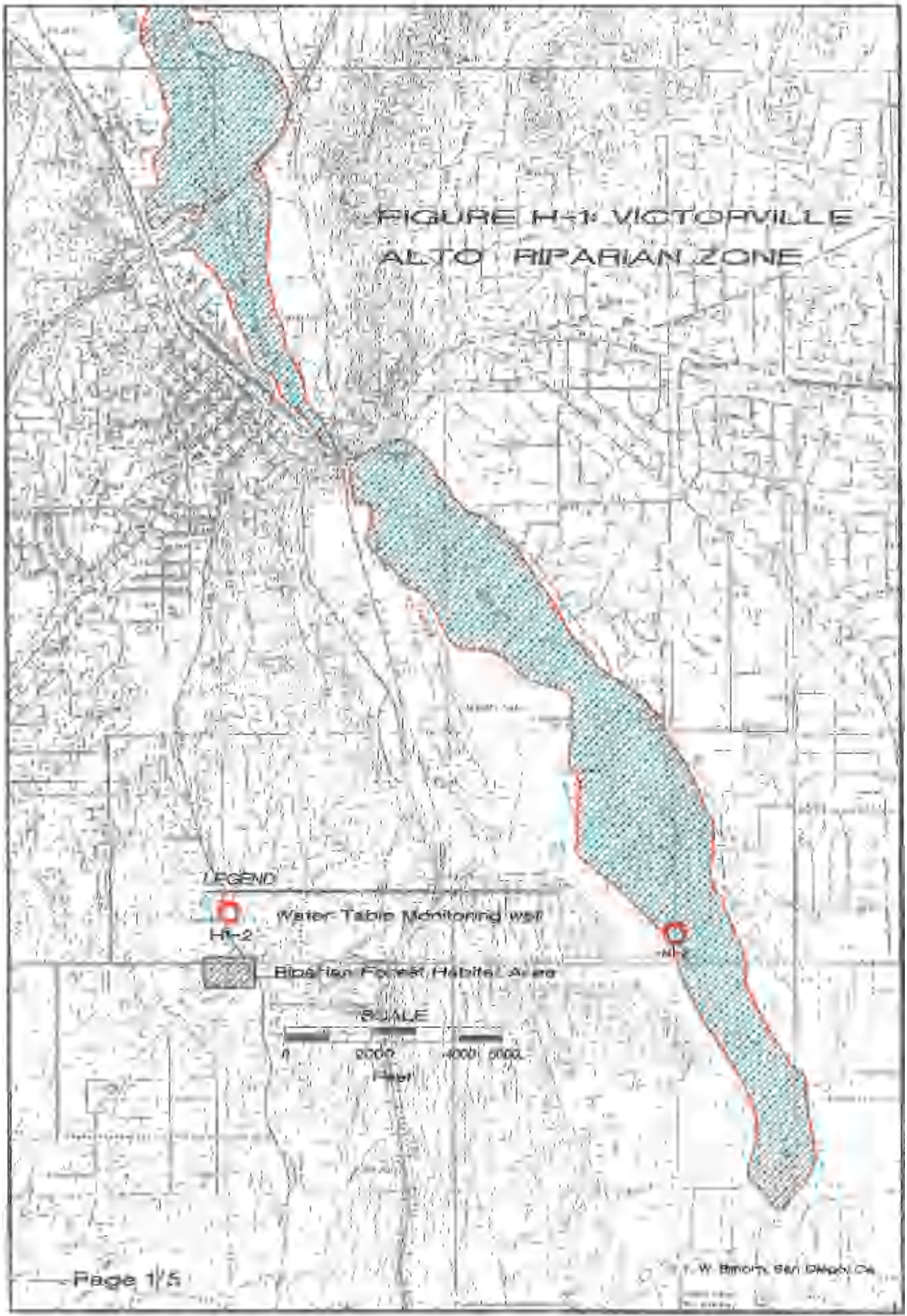


FIGURE H-1: VICTORVILLE
ALTO RIPARIAN ZONE
LEGEND
Water Table Monitoring well
H-2
Riparian Forest Habitat Area
SCALE
0
2000
4000
6000
Feet
H-1
Page 1/5

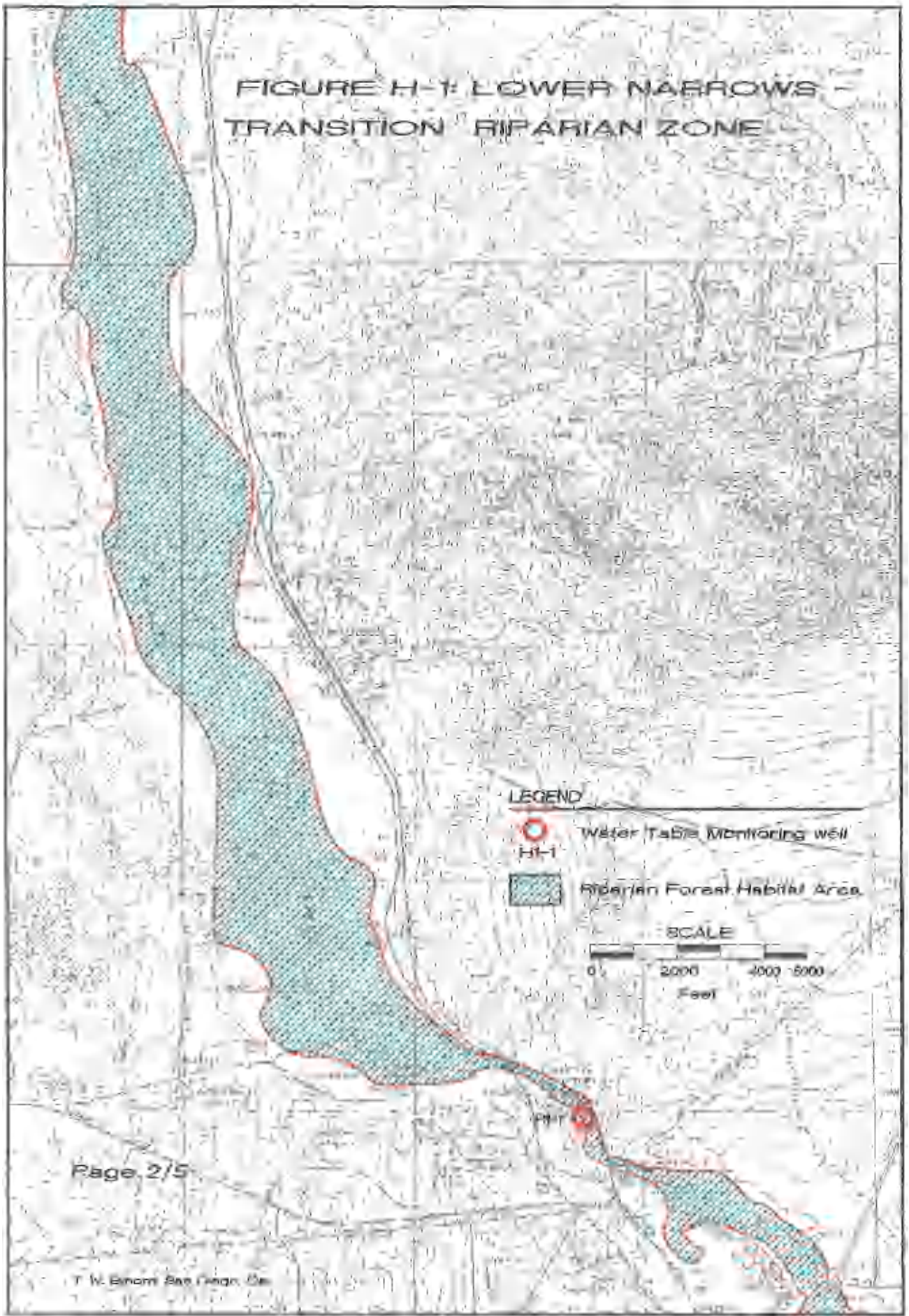
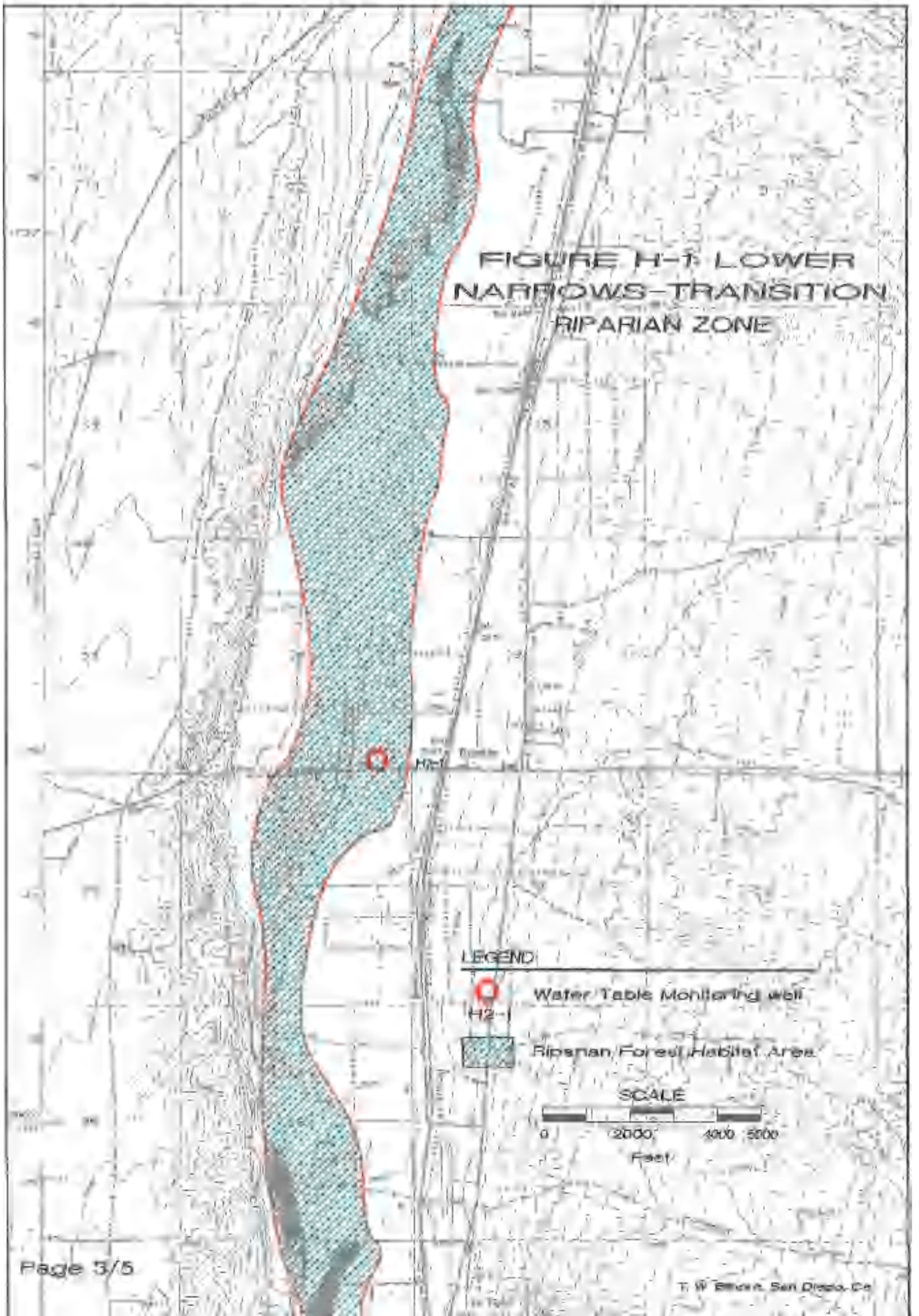


FIGURE H-1: LOWER NARROWS - TRANSITION RIPARIAN ZONE
LEGEND
H1-1
Water Table Monitoring well
Riparian Forest Habitat Area
SCALE
0
2000
4000
6000
Feet
Page 2/5
T. W. Enoch San Diego, Ca.



T. W. Blake, San Diego, Ca

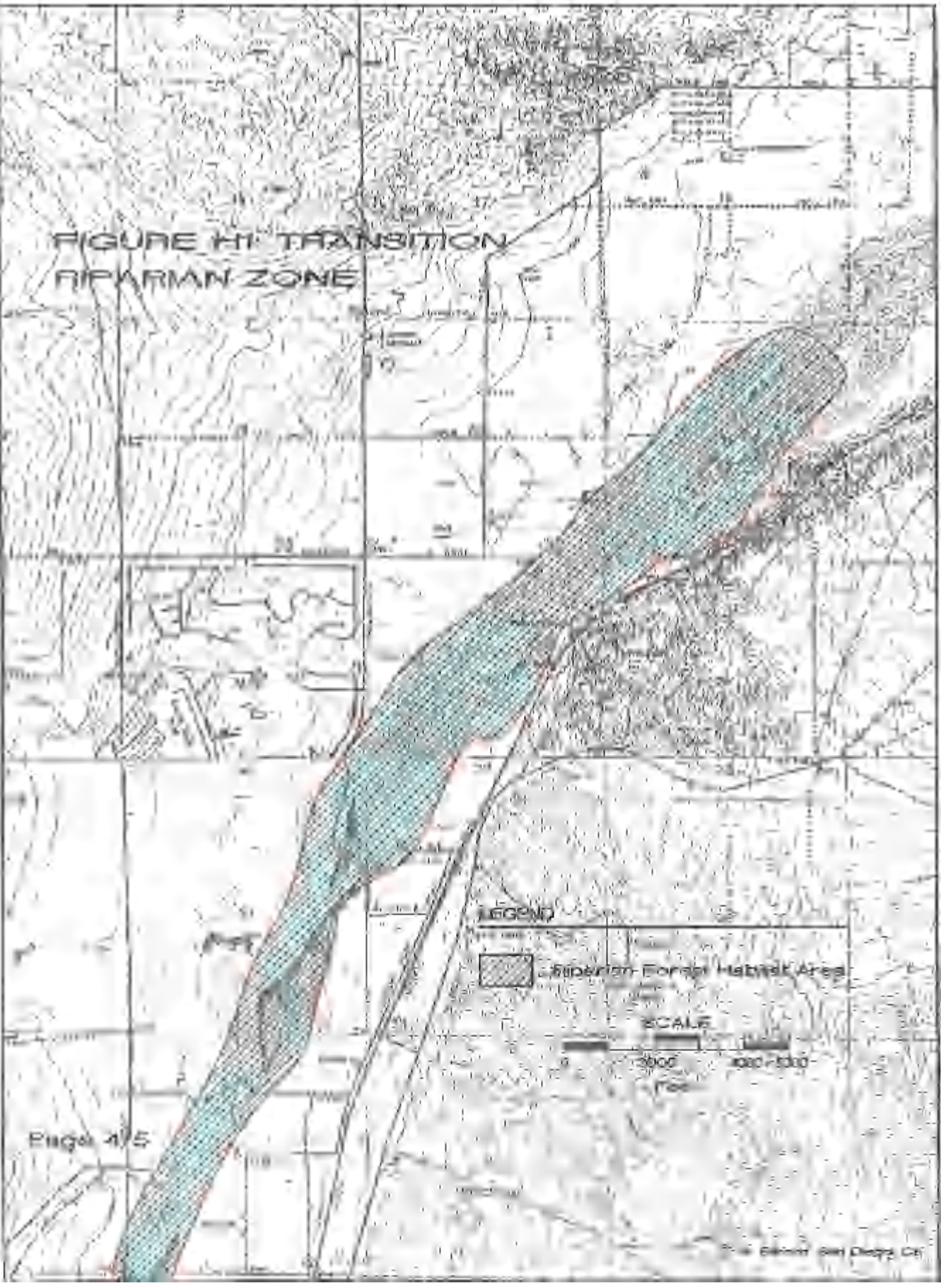
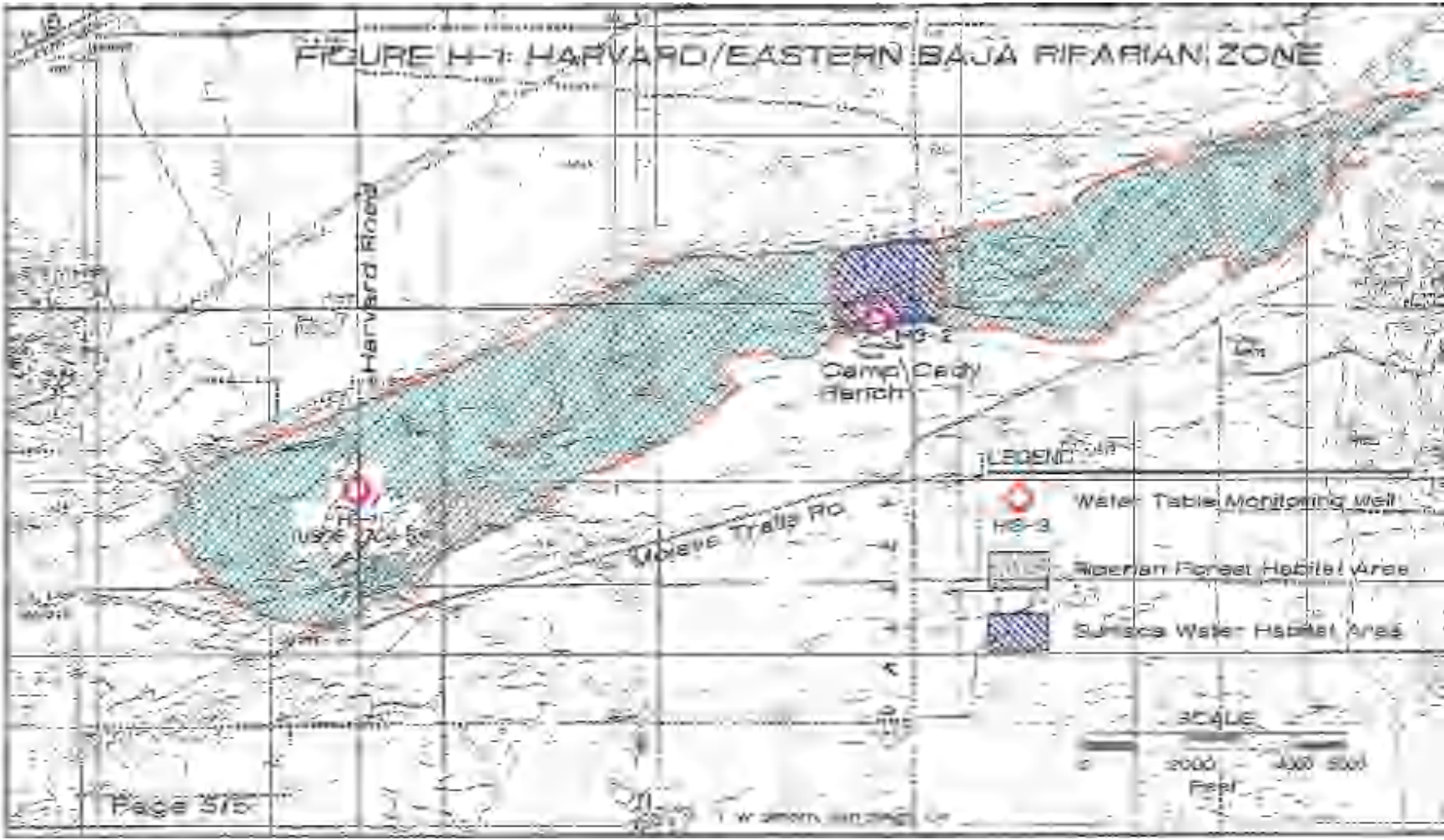
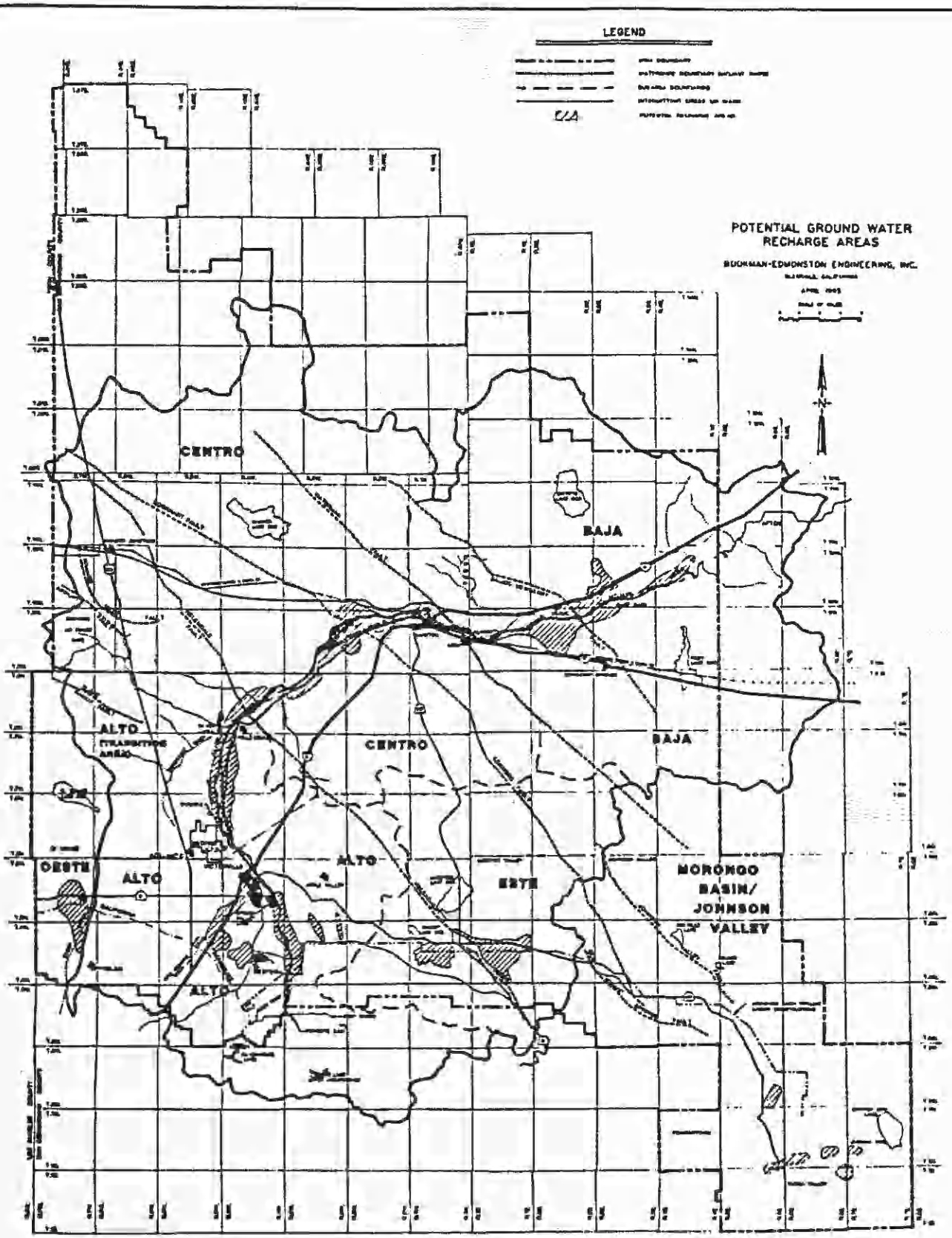


FIGURE III: TRANSITION
RIPARIAN ZONE
LEGEND
Riparian Forest Habitat Area
SCALE
0
3000
1000
Page 4/5

FIGURE H-1: HARVARD/EASTERN BAJA RIPARIAN ZONE





MOJAVE WATER AGENCY

REGIONAL WATER MANAGEMENT PLAN