Alameda County
Water District

URBAN WATER MANAGEMENT PLAN 2015-2020

ACWD
ALAMEDA COUNTY WATER DISTRICT

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF TABLES
(Continued)

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

ABAG	Association of Bay Area Governments
ACRP	Alameda Creek Recapture Project
ACWD	Alameda County Water District (District)
ADWF	average dry-weather flow
AF	acre-foot (325,900 gallons)
AF/yr	acre-feet per year
AHF	Above the Hayward Fault (aquifer)
ARP	Aquifer Reclamation Program
BAIRWMP	Bay Area Integrated Regional Water Management Plan
BAWSCA	Bay Area Water Supply and Conservation Agency
BDCP	Bay Delta Conservation Plan
bgs	below ground surface
BHF	Below the Hayward Fault (aquifer)
BMP	Water Conservation Best Management Practices
CAT	(California) Climate Action Team
CA DOF	California Department of Finance
CASGEM	California Statewide Groundwater Elevation Monitoring
ccf	hundred cubic feet (748 gallons)
cfs	cubic foot (feet) per second
CHARG	Coastal Hazards Adaptation Resiliency Group
CII	Commercial, Industrial and Institutional
CIMIS	California Irrigation Management Information System
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CWC	California Water Code
CYES	California Youth Energy Services
DBP	Disinfection by-product
DCR	(DWR's SWP) Delivery Capability Report
Desal Facility	Newark Desalination Facility
DFG	(California) Department of Fish and Game; renamed Department of Fish and Wildlife (see DFW)
DFW	(California) Department of Fish and Wildlife
DPR	Direct Potable Reuse
DMM	demand management measure
DWR	(California) Department of Water Resources
EBDA	East Bay Dischargers Authority
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ELT	Early Long Term
EPA	U.S. Environmental Protection Agency
FAT	Full Advanced Treatment
FERC	Federal Energy Regulatory Committee
GIS	Geographic Information System
GPCD	Gallons Per Capita Per Day
gpd	gallons per day
GPM	gallons per minute
IPR	Indirect Potable Reuses
IRP	Integrated Resources Planning
IRPM	(District's) Integrated Resources Planning Model
ISA	Interim Supply Allocation
MCL	Maximum Contaminant Level
mg/l	milligrams per liter
mgd	million gallons per day
MOU	Memorandum of Understanding
MSJWTP	(District's) Mission San Jose Water Treatment Plant

MFR	multi-family residential
MSL	mean-sea-level
MWELO	Model Water Efficient Landscape Ordinance
NDF	Newark Desalination Facility
NPDES	National Pollutant Discharge Elimination System
NMFS	National Marine Fisheries Service
PEIR	Program Environmental Impact Report
ppm	parts per million
R-GPCD	residential gallons per capita per day
RO	Reverse Osmosis Process
RWQCB	Regional Water Quality Control Board
RWS	Hetch Hetchy Regional Water System
SBP	Salinity Barrier Program
SBWR	South Bay Water Recycling
SDWA	Safe Drinking Water Act
SEP	Salt Evaporator Pond
SFPUC	San Francisco Public Utilities Commission
SFR	single-family residential
SFWD	San Francisco Water Department
SGMA	Sustainable Groundwater Management ACT
sq. ft.	square foot (feet)
SBA	South Bay Aqueduct
SFPUC	San Francisco Public Utilities Commission
SWC	State Water Contractors
SWSD	Semitropic Water Storage District
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAF	1,000 acre-feet
TDS	total dissolved solids
ULFT	ultra low flow toilet
USBR	U.S. Bureau of Reclamation
USC	Urban Stakeholders Committee
USD	Union Sanitary District
USGS	U.S. Geological Survey
UWMP	Urban Water Management Plan
WSA	Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County
WSAP	Water Shortage Allocation Plan
WSCP	Water Shortage Contingency Plan
WSEO	Water Supply Emergency Ordinance
WSIP	Water System Improvement Program
WTP	Water Treatment Plant
WTP 2	(District's) Water Treatment Plant Number 2
WWTP	Wastewater Treatment Plant
Zone 7	Zone 7 of the Alameda County Flood Control and Water Conservation District

CHAPTER 1
INTRODUCTION

1.1 PURPOSE

This update to Alameda County Water District's (District) Urban Water Management Plan (UWMP or Plan) has been prepared in response to the State of California's Urban Water Management Planning Act, Water Code Sections 10610 through 10656. The Act requires that every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually to prepare and adopt an urban water management plan. The Act also requires that water suppliers provide updates to their Plan every five years.

1.2 PLAN PREPARATION

This UWMP Update covers the period from 2015 through 2020, and is the seventh plan adopted by the District's Board of Directors[1]. Several changes have occurred since the District's first UWMP was adopted in 1985, which have resulted in the need for a broader, more sophisticated representation of the District's water supply, demand management and operational alternatives. Accordingly, in 1992, the District began implementation of a planning effort that would apply the approaches and techniques of integrated resources planning (IRP) to ensure that appropriate facility and resource decisions are made. IRP is an inclusive process that begins with the premise that a wide range of traditional and innovative supply-side and demand-side (conservation) resources must be considered. The process also provides information on potential consequences and aids in judging the value of trade-offs among resource strategies.

In August 1995, the District's Board of Directors adopted the recommendations of the District's Integrated Resources Planning Study as its road-map for both supply and demand-side planning through the year 2030. Because this planning process involves assessment and treatment of conservation as a resource that is evaluated as rigorously as supply-side options, the IRP process and results form the foundation for this and future UWMPs. Essential to IRP planning is to update and revise frequently in order to adapt to changing conditions, needs, legal requirements and technologies. In 2006, the District completed a 10-Year Review of the IRP which confirmed the recommended strategy and helped guide additional implementation elements. In response to significant changes in water supply, demands and the California Water Code between 2007 and 2011, the District accelerated completion of a second IRP review (2014 IRP Review). Table 1-1 provides a comparison of the key components of the District's IRP and 2015-2020 UWMP Update.

A key policy criterion used in the formulation and evaluation of water supply strategies in the IRP process is to maximize local control of resources while maintaining a high level of service reliability. This is especially important for the District because of the reliance on imported water supplies from the State Water Project (SWP) and Hetch Hetchy Regional Water System (RWS) for approximately 60% of the District's total supplies. As described in this UWMP, the District's water supply strategy includes maximizing the use of local water supplies (local groundwater and surface water, brackish groundwater desalination and recycled water), together with off-site groundwater banking of SWP supplies and a strong demand management program to minimize dependency on imported supplies.

[1] The normal UWMP submittal cycle requires that Urban Water Management Plans be prepared and submitted in December of years ending in five and zero. However, because of recent changes in UWMP requirements, State law has extended the deadline for the 2015 Plans to July 1, 2016.

Table 1-1
Comparison of UWMP and
the District's Integrated Resources Plan (IRP)

Item	*2015-2020 UWMP*	*2010 IRP Review*
Planning Horizon	2040 (25 Years)	2040
Planning Criteria	* Reliability * Water Quality * Environmental Impacts * Local Control	* Reliability * Water Quality * Environmental Impacts * Local Control * Cost
Demand Projections	Yes	Yes
Existing Water Supply Availability	Yes	Yes
Supply Opportunities: -Demand Management -Recycled Water -Water Transfers	Yes	Yes
Long-Term Water Supply Strategy	Yes	Yes
Water Quality Considerations	Yes	Yes
Cost Optimization	No	Yes
Treatment & Production Facilities	No	Yes
Shortage Contingency Plan	Yes	No

The District has coordinated with all appropriate agencies in the development of the District's IRP and this UWMP Update. Table 1-2 below provides a summary of the agencies that the District has coordinated with and the relevant information incorporated in this UWMP.

Table 1-2
Agency Coordination

Agency the District has coordinated with…	*Relevant information incorporated in the UWMP*
California Department of Water Resources	Estimated future reliability of State Water Project supplies
San Francisco Public Utilities Commission	Estimated future reliability of San Francisco Regional Water System supplies
Bay Area Water Supply and Conservation Agency	Estimated future reliability of San Francisco Regional Water System supplies
Union Sanitary District	Potential future recycled water supplies and projects
City of Fremont	Projected future land use conditions (City General Plan) in Fremont
City of Union City	Projected future land use conditions (City General Plan) in Union City
City of Newark	Projected future land use conditions (City General Plan) in Newark

As per section 10621 (b) of the Urban Water Management Planning Act, the District notified the cities of Fremont, Newark, Union City, Hayward and Milpitas of the District's UWMP planning process, as well as the County of Alameda and the County of Santa Clara. In addition, other agencies that the District coordinates with regarding water supply issues were also notified. These agencies include: State Water Contractors (SWC) and Bay Area Water Supply and Conservation Agency (BAWSCA).

1.3 PUBLIC REVIEW AND ADOPTION OF PLAN

Section 10642 of the Urban Water Management Planning Act requires urban water suppliers to make the Plan available for public review and hold a public hearing prior to adopting the Plan. The Draft Plan was made available for public review and comment beginning on May 10, 2016. In order to encourage the active involvement of diverse social, cultural, and economic elements of the population within the District's service area, including both residential and non-residential customers, the District made copies of the Draft Plan available on the District's web-site and at the District's headquarters. Comments were received through June 9, 2016. A public hearing was held on both the Plan and the District's approach for SBX7-7 compliance on June 9, 2016. Notice of the public hearing was provided to the County of Alameda, the County of Santa Clara; the Cities of Fremont, Newark, Union City, Hayward, Milpitas, and San Jose; the California Department of Water Resources; SWC; BAWSCA; Zone 7 Water Agency; Santa Clara Valley Water District; East Bay Regional Park District; USD; SFPUC; and Semitropic Water Storage District on May 25, 2016. Two notices of the public hearing were also published in the local newspapers (*The Argus* and *The Tri-City Voice*) at least once a week for two successive weeks prior to the public hearing. The Plan and the District's reaffirmation of approach for SBX7-7 compliance were adopted on June 9, 2016 by the District's Board of Directors Resolution No.16-039 (reference Appendix F).

As per the requirements in Water Code section 10644(a) a copy of the District's UWMP will be provided to the following entities: the California Department of Water Resources, the California State Library, Alameda County and the Cities of Fremont, Newark, Union City, and Hayward on or before July 1, 2016, which is within 30 days of the Plan's adoption. The District's UWMP, including the tables presented in Appendix G, will be provided to the California Department of Water Resources in electronic format. The District will provide a copy of the UWMP available for public inspection at the District office at 43885 South Grimmer Boulevard in Fremont, California, during normal business hours.

The District will periodically review its UWMP to ensure that it accurately reflects the District's water management activities. Changes will be adopted and incorporated into the plan via amendments or other appropriate means as set forth in Water Code sections 10640 through 10645.

1.4 REPORT FORMAT AND ORGANIZATION

This UWMP provides an update of the elements contained in the District's Integrated Resources Planning Study, and discusses the status of projects, programs, and studies in water supply planning, water conservation and recycled water that were recommended as part of the IRP.

Chapter 1: Introduction – This chapter provides an overview of the Urban Water Management Planning Act requirements, the preparation and organization of this report, and background information on the District.

Chapter 2: Past, Current & Future Water Use – This chapter provides an overview of historical and current water use in the District, as well as a summary of future projected water demands.

Chapter 3: Sources of Supply – This chapter provides a summary of the District's sources of supply and their availability, as well as an overview of the management of these supplies.

Chapter 4: Groundwater – This chapter describes the Niles Cone Groundwater Basin, the District's reliance on it as a source of water supply, and the District's policy and activities for managing it.

Chapter 5: Desalination – This chapter describes the Newark Desalination Facility and the District's recent expansion of this source of water supply.

Chapter 6: Water Recycling – This chapter describes the Union Sanitary District's wastewater system (which serves the District service area), and the opportunities for the use of recycled water.

Chapter 7: Demand Management – This chapter provides an overview of the District's demand management strategy and a summary of the implementation of the District's water conservation programs

Chapter 8: Water Conservation Bill of 2009 (SBX7-7) – This chapter provides a review of the SBX7-7 legislation regarding water use targets, potential approaches to demonstrate compliance, and the District's approach for compliance.

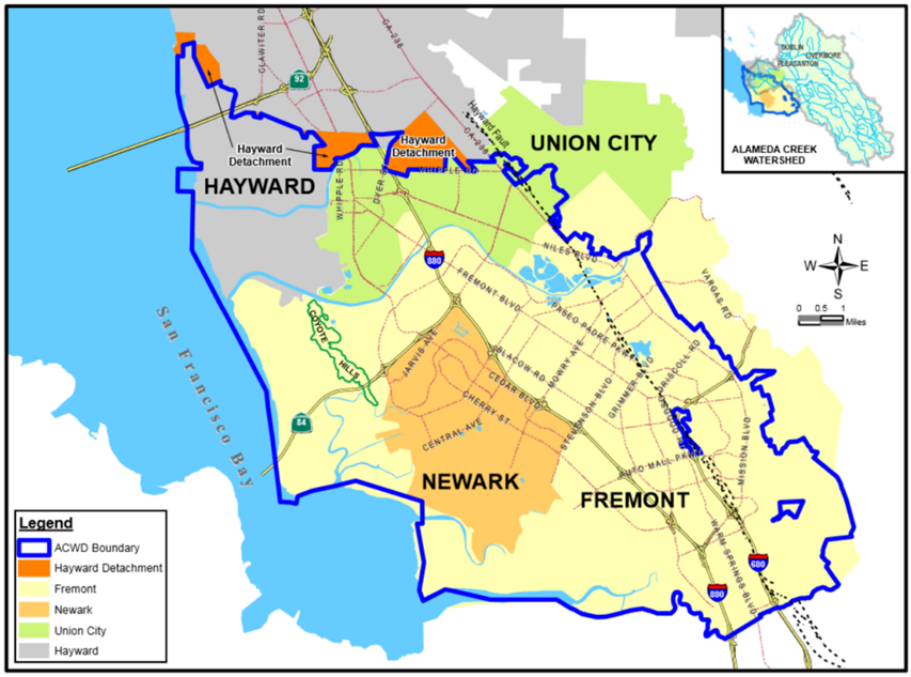
Chapter 9: Water Supply Strategy – This chapter summarizes the planning criteria utilized by the District in developing the District's water supply strategy (as part of the IRP process), followed by a summary of the recommended water supply strategy for the District and the implementation status of key IRP programs.

Chapter 10: Water Shortage Contingency Plan – This chapter provides the District's water shortage contingency plan, as required under the Urban Water Management Planning Act. This contingency plan includes scenarios for shortages of up to 50%.

1.5 DISTRICT BACKGROUND

The Alameda County Water District is a retail water purveyor with a service area of approximately 100 square miles generally encompassing the Cities of Fremont, Newark, and Union City (Figure 1-1). The District was established in 1914 under the California County Water District Act and is governed by a five-member Board of Directors. It was originally created to protect the groundwater basin, conserve the waters of the Alameda Creek Watershed and develop supplemental water supplies, primarily for agricultural use. In 1930, urban distribution became an added function of the District. Today, the District provides water primarily to urban customers: approximately 70% of supplies are used by residential customers, with the balance (approximately 30%) utilized by commercial, industrial, institutional and large landscape customers. At the time of preparation of this UWMP, the State of California is in the fifth year of a prolonged drought and the District is operating under a water shortage emergency ordinance designed to affect conservation savings of 20% (see Section 1.8, Current Drought Conditions); accordingly, total distribution system water use (including non-revenue water) was approximately 38,500 AF Acre-Feet in fiscal year 2014-2015, or approximately 73% of pre-drought demands in FY2012/2013.

Figure 1-1
District Boundary



The Niles Cone Groundwater Basin was the principal source of water supply for the District until 1962. Up to that time, groundwater use by the District and numerous private pumpers exceeded recharge, and this imbalance permitted saltwater from the Bay to intrude into the basin, severely limiting its use. In 1962, the District was the first state contractor to receive water from the State Water Project (SWP). The District's State Water Project supply was originally used solely to recharge the groundwater basin. As a result, groundwater levels rose and prevented additional saltwater intrusion. However, certain areas within the groundwater basin remain brackish due to past years of saltwater intrusion.

Today, the District's primary sources of supply come from: the Bay-Delta (via the SWP); the San Francisco Regional Water System; and local supplies including groundwater from the Niles Cone Groundwater Basin.

1.6 SERVICE AREA DESCRIPTION AND POPULATION PROJECTIONS

The District's jurisdictional boundary includes the City of Fremont, the City of Union City, the City of Newark, and the southern portion of the City of Hayward. The District has the authority to provide retail water service within its jurisdictional boundary, except for the areas that were detached to the City of Hayward. However, currently, the District provides retail water service predominantly within the Cities of Fremont, Union City, and Newark. Through existing agreements, the District does provide water service to a small number of parcels within the City of Hayward, and likewise the City of Hayward provides water service to some parcels within the District boundary. The District manages the Niles Cone Groundwater Basin within its entire jurisdictional boundary and also retains jurisdictional authority of the Niles Cone Groundwater Basin within the areas that were detached to the City of Hayward.

As part of the San Francisco Bay Area, the District provides retail water service primarily to the Cities of Fremont, Newark and Union City ("Tri-Cities") and is home to a population of over 344,000, and over 7,500 businesses. As mentioned previously, the District's retail water service area is not conterminous to the entire District boundary. For the purposes of the UWMP, as the population of customers within the City of Hayward receiving water service from the District is so few in number compared to the overall District service area population, the UWMP will reference the water service area population of the Tri-Cities. As indicated in Table 1-3, the projections provided by the Association of Bay Area Governments indicate that the population in the service area may grow to over 400,000 by the year 2040.

Table 1-3
Current and Projected Population in the District's Service Area
(Sources: 2015 values from California Department of Finance; 2020-2040 values from ABAG, 2013)

City	*Year*					
	2015	*2020*	*2025*	*2030*	*2035*	*2040*
Fremont	227,600	232,700	242,500	252,800	263,900	275,500
Newark	44,300	47,200	49,600	52,100	54,800	57,600
Union City	72,400	73,400	75,500	77,600	80,000	82,500
Total	344,300	353,300	367,600	382,500	398,700	415,600

Numerous high-tech, bio-tech and other industries are located in the service area. The Tri-Cities is also home to numerous retail and commercial businesses that support the local and surrounding Bay Area communities. The 2014-15 assessed valuation (land, improvements and personal property) of the Tri-Cities area was over $52 billion.

The District's service area is located approximately 20 miles southeast of San Francisco on the southeastern shores of the San Francisco Bay. The District is bounded by San Francisco Bay on the west, by the hills of the Diablo Range on the east, by the District boundary to the north and by Coyote Creek Slough to the south. The western portion of the District area (adjacent to San Francisco Bay) consists primarily of salt evaporation ponds and saltwater marshes. These ponds and marshes extend from one to four miles inland and cover an area of approximately 35 square miles.

Most of the District area is relatively flat with an average elevation of approximately 20-50 feet above mean sea level (MSL). The highest elevations (1,500 feet MSL) occur on the eastern boundary of the District, along the easterly slopes of the Diablo Range. In addition, elevations in the Coyote Hills, located adjacent to the salt evaporation ponds are up to 300 feet MSL.

The District is in the San Francisco Bay Hydrologic Region as defined by the California Department of Water Resources. The mean annual precipitation within the District is geographically variable due to the Diablo Range on the eastern boundary of the District. Along the Diablo Range the mean annual precipitation is the highest at approximately 20 inches. However, along the western boundary, adjacent to San Francisco Bay, the mean annual precipitation is approximately 13 to 15 inches. The mean annual precipitation at the Niles precipitation gauging station is approximately 19 inches. The precipitation in the area is highly seasonal with over 75% of the rainfall occurring in the winter months between November and March. Climate data for the District service area is provided in Table 1-4.

Table 1-4
Climate Data for the District Service Area

Climate Data	*Monthly Average Data*				*Annual Total*
	November - March	*April-June*	*July – Aug*	*Sept-October*	
Rainfall (in)	2.3”	0.8”	0.0”	0.5”	14.9”
Evapotranspiration (in)	1.9”	5.2”	5.8”	3.7”	44.3”
Temperature (°F)	50.7° F	58.7° F	64.3° F	61.9° F	56.8° F
Maximum Daily Temperature (°F)	61.8° F	69.6° F	75.6° F	74.7° F	68.2° F

Note: Data represents period of record for CIMIS Station #171 (Union City), January 2006 through December 2015.

1.7 REGIONAL INTEGRATED PLANNING

District water supply planning is coordinated with other agencies throughout the Bay Area region. Examples of the District’s participation in regional integrated planning include the following:

Bay Area Integrated Regional Water Management Plan: Water Quality and Water Supply Element: The District participates with a diverse group of water supply, water quality, wastewater, stormwater, flood management, watershed and habitat agencies, local governments, environmental groups, business groups and other interested parties to develop a Bay Area Integrated Regional Water Management Plan (Bay Area IRWMP). The purpose of this Bay Area planning effort is to (1) facilitate regional cooperation in water management planning and (2) foster coordination, collaboration, and communication among the participating agencies to achieve greater efficiencies, enhance public services and build public support for vital plans and projects. The Bay Area IRWMP was completed in 2006 and updated in 2013, and it served as the basis for Proposition 50, Chapter 8 grant funding within the nine-county Bay Area region.

Alameda Creek Watershed Planning: The District participates in stakeholder-based Alameda Creek Watershed management planning efforts including: (1) a watershed management planning effort (Alameda Creek Watershed Council) to coordinate watershed management planning for the Alameda Creek Watershed; and (2) the Alameda Creek Fisheries Restoration Workgroup, which is focused on restoring steelhead trout, a federally listed threatened species, to the Alameda Creek Watershed.

1.8 CURRENT DROUGHT CONDITIONS

As a result of four successive years of low rainfall, the State is currently experiencing a severe drought. Due to the record-dry conditions, Governor Edmund G. Brown proclaimed a drought emergency on

January 17, 2014 ordering, amongst other actions, State agencies to execute a statewide conservation campaign to reduce water usage by 20%. On March 13, 2014, the District's Board of Directors adopted Ordinance No. 2014-01 declaring a water shortage emergency and adopting water use regulations, restrictions and guidelines for the water shortage emergency (see Attachment C), designed to achieve a 20% service area-wide reduction in water use by prohibiting wasteful uses of water and limiting landscape irrigation. On July 29, 2014 the State Water Resources Control Board (SWRCB) adopted statewide emergency conservation regulations that largely mirrored the District's Ordinance prohibitions.

As the drought entered its fourth year, the State passed additional emergency conservation regulations on March 27, 2015 which extended and expanded the regulations adopted in 2014[2]. These regulations were further expanded and adopted on May 5, 2015. During the intervening month, the Governor issued another Executive Order on April 1, 2015 which included, for the first time ever, a mandate to reduce statewide water use, specifically by 25% from 2013 levels. In response, the SWRCB replaced the statewide target established in July of 2014 with agency-specific goals based on each agency's average residential gallons per capita per day (R-GPCD), as reported to the State, for July 2014 - September 2014; the District's target reduction is 16% from its baseline use between July 2013-December 2013, and January/February 2013. The SWRCB also expanded water agency reporting requirements and added additional end-user prohibitions including prohibiting irrigation with potable water of ornamental turf on public medians and called for new standards for irrigation of landscaping in new development. The new development standards are addressed under an emergency regulation adopted by the Building Standards Commission in June 2014 and through a revised Model Water Efficient Landscape Ordinance (MWELO) that all cities will be required to adopt. The revised MWELO includes much stricter efficiency standards for irrigation systems and greatly limits the installation of non-functional turf for new developments and for renovated landscapes at existing developments.

The District's Ordinance is consistent with the revised State goal for the District and therefore has not been changed, even though the savings target was reduced from 20% to 16%. Water demand for FY 2014-2015 was 38,500 AF, or roughly 27% less than the pre-drought demand.

1.9 URBAN WATER MANAGEMENT PLAN CHECKLIST

In order to ensure compliance with the Urban Water Management Planning Act, and to provide a guide for review of this UWMP update, a checklist of all required components of the UWMP, and their location in this document, is provided in Table 1-5. This checklist is consistent with the DWR 2015 Urban Water Management Plans Guidebook for Urban Water Suppliers (DWR, March 2016).

[2] March 27, 2015, Regulations included: prohibiting irrigation during and within 48 hours following measurable rainfall, prohibiting restaurants from serving water unless requested, requiring hotels/motels to offer guests the option to not have linens/towels laundered daily and required water agencies to notify customers about leaks within the customer's control

Table 1-5
2015 Urban Water Management Plan Checklist, organized by Water Code (CWC) section

CWC Section	UWMP Requirement Source: DWR 2015 UWMP Guidebook for Urban Water Suppliers	Subject	UWMP Location (Optional Column for Agency Use)
10608.20(b)	Retail suppliers shall adopt a 2020 water use target using one of four methods.	Baselines and Targets	**Sect. 8**
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	**Sect. 8.1**
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	**Sect. 8.1**
10608.24(a)	Retail suppliers shall meet their interim target by December 31, 2015.	Baselines and Targets	**Sect. 8.2**
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	**Sect. 8.2**
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	**Sect. 1.3, Appendix I**
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	**Sect. 8.2, Appendix G**
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	**Sect. 1.2**
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	**Sect. 1.2 and 1.3, Appendix I**
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	**Sect. 9.2**
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	**Sect. 1.2, Appendix I**
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	**Sect. 1.3, Appendix I**
10631(a)	Describe the water supplier service area.	System Description	**Sect. 1.6**
10631(a)	Describe the climate of the service area of the supplier.	System Description	**Sect. 1.6**
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	**Sect. 1.6**
10631(a)	Provide population projections for 2020, 2025, 2030, and 2035.	System Description	**Sect. 1.6**
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	System Description	**Sect. 1.6**
10631(b)	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, 2030, and 2035.	System Supplies	**Sect. 9.3**

Table 1-5 (continued)
2015 Urban Water Management Plan Checklist, organized by Water Code (CWC) section

CWC Section	UWMP Requirement Source: DWR 2015 UWMP Guidebook for Urban Water Suppliers	Subject	UWMP Location (Optional Column for Agency Use)
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	**Sect. 3.2**
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	**Sect. 4.2 and 4.3, Appendix C**
10631(b)(2)	Describe the groundwater basin.	System Supplies	**Sect. 4.1**
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	**Sect. 4.1**
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	**Sect. 4.1**
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	**Sect. 4.5**
10631(b)(4)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	**Sect. 9.3**
10631(c)(1)	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage.	Water Supply Reliability Assessment	**Sect. 3.2, 3.5, and 9.3**
10631(c)(1)	Provide data for an average water year, a single dry water year, and multiple dry water years	Water Supply Reliability Assessment	**Sect. 3.2 and 9.3**
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	**Sect. 3.2 and 9.2**
10631(d)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	System Supplies	**Sect. 9.2**
10631(e)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	**Sect. 2.3 and 2.4**
10631(e)(3)(A)	Report the distribution system water loss for the most recent 12-month period available.	System Water Use	**Appendix H**
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	**Sect. 7.3**
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	**Sect.9.2**
10631(h)	Describe desalinated water project opportunities for long-term supply.	System Supplies	**Sect. 5.5 and 9.2**
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	**Appendix D**

Table 1-5 (continued)
2015 Urban Water Management Plan Checklist, organized by Water Code (CWC) section

CWC Section	UWMP Requirement Source: DWR 2015 UWMP Guidebook for Urban Water Suppliers	Subject	UWMP Location (Optional Column for Agency Use)
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	**Sect. 3.2**
10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	**Sect. 2.4**
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	**Sect. 10.2**
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	**Sect. 10.5**
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	**Sect. 10.4**
10632(a)(4)	Identify mandatory prohibitions against specific water use practices during water shortages.	Water Shortage Contingency Planning	**Sect. 10.2, Appendix E**
10632(a)(5)	Specify consumption reduction methods in the most restrictive stages.	Water Shortage Contingency Planning	**Sect. 10.2, Appendix E**
10632(a)(6)	Indicated penalties or charges for excessive use, where applicable.	Water Shortage Contingency Planning	**Sect. 10.2, Appendix E**
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	**Sect. 10.3**
10632(a)(8)	Provide a draft water shortage contingency resolution or ordinance.	Water Shortage Contingency Planning	**Appendix E**
10632(a)(9)	Indicate a mechanism for determining actual reductions in water use pursuant to the water shortage contingency analysis.	Water Shortage Contingency Planning	**Sect. 10.2 and 10.3**
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)	**Sect. 6.2**
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)	**Sect. 6.3**
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)	**Sect. 6.3, Appendix G**
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	**Sect. 6.4**
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)	**Sect. 6.5**
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)	**Sect. 9.2**

Table 1-5 (continued)
2015 Urban Water Management Plan Checklist, organized by Water Code (CWC) section

CWC Section	UWMP Requirement Source: DWR 2015 UWMP Guidebook for Urban Water Suppliers	Subject	UWMP Location (Optional Column for Agency Use)
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)	**Sect. 6.5 and 6.7**
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	**Sect. 6.6**
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	**Sect. 3.4**
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	**Sect. 9.3**
10635(b)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 60 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	**Sect. 1.3, Appendix I**
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	**Sect. 1.2 and 1.3, Appendix I**
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	**Sect. 1.3, Appendix I**
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	**Sect. 1.3, Appendix I**
10642	Provide supporting documentation that the plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	**Sect. 1.3, Appendix F**
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	**Sect. 1.3, Appendix I**
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	**Sect. 1.3, Appendix I**
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	**Sect. 1.3**
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	**Sect. 1.3, Appendix I**

CHAPTER 2
PAST, CURRENT, AND FUTURE WATER USE

2.1 WATER USE OVERVIEW

This chapter provides an overview of historic, current, and projected future water use in the District. This chapter also describes usage by water use categories.

2.2 WATER USE CATEGORIES

Water use in the District service area is divided into two categories: 1) distribution system use, and 2) groundwater system use. The distribution system use includes all water uses supplied by the District's treatment and production facilities, and this use is further subdivided into the categories of single family residential (SFR), multi-family residential (MFR), commercial, industrial, institutional, landscape and other use.

Groundwater system use includes private (non-District) groundwater pumping (primarily for industrial, agricultural and municipal landscape irrigation uses), the District's Aquifer Reclamation Program pumping, and saline groundwater outflow to San Francisco Bay. The Aquifer Reclamation Program (ARP) pumping is an ongoing District program to pump saline groundwater out of the aquifer system and replace it with fresh water recharged at the District's groundwater recharge facilities. Saline groundwater outflow to San Francisco Bay represents the groundwater outflow required to maintain a bayward groundwater flow direction to prevent saltwater intrusion into the local aquifer system and to flush saline groundwater (from historical saltwater intrusion) back to San Francisco Bay.

The District's groundwater system use is not anticipated to change significantly in the future. Therefore, the following discussions of water use are focused on the District's distribution system water use.

2.3 HISTORICAL AND CURRENT WATER USE

Table 2-1 provides a summary of the last ten years of water use within the District. Table 2-2 provides a summary of the existing and forecast water accounts by customer classification in the District service area. Figure 2-1 provides a summary of water consumption by customer classification. As indicated in Figure 2-1, residential water use comprises approximately 67% of District water use, with the remaining 33% used by commercial, industrial, dedicated landscape and institutional customers.

Water consumption patterns in the District service area are a function of many independent factors including growth, weather conditions, economic conditions and water conservation behaviors. The District saw dramatic declines in consumption during the 1987-1992 drought due to District-sponsored demand management efforts and voluntary conservation efforts by our customers. However, during the drought recovery period after 1992, several significant factors have influenced consumption. From 1993-2001 accelerated growth of both residential and business customers (including the high-tech industry) occurred due to a strong economy. During this period, vacancy rates decreased and water consumption rose. From 2001 to 2007 the overall consumption in the District was relatively flat, attributed primarily to less robust local economic conditions, mild weather and on-going water conservation programs. After 2007, the District saw significant declines in overall water consumption, which has been attributed to a combination of continued economic downturn, 2007-2009 successive dry year conditions, and statewide conservation campaigns. Since the previous UWMP (2010-2015 UWMP), the State of California has experienced a drought, and the resulting substantive reduction in demand for water has changed the District's near and mid-term anticipated levels of new demands from those reported in the previous UWMP. Figure 2-2 provides a summary of the trends in per capita water use in the service area from 1985 to 2015.

Table 2-1
District Past and Current Water Use (Acre-Feet)

Water Use Category	*Fiscal Year*									
	05-06	*06-07*	*07-08*	*08-09*	*09-10*	*10-11*	*11-12*	*12-13*	*13-14*	*14-15*
Distribution System										
Single Family Residential	25,000	25,200	24,600	24,100	21,500	21,800	21,700	23,200	21,600	16,600
Multi-Family Residential	8,000	8,100	8,100	7,400	7,600	7,500	7,600	8,200	8,100	7,100
Commercial	5,500	5,300	5,200	5,100	4,700	4,700	3,800	5,000	5,000	4,600
Industrial	3,500	3,400	3,100	2,800	2,500	2,500	2,600	2,500	2,300	2,200
Institutional	2,100	2,100	2,100	2,100	1,800	1,700	1,900	2,000	1,800	1,300
Landscape	5,200	5,700	6,000	5,600	4,800	4,900	6,400	5,700	5,200	3,600
Other	200	100	100	200	100	200	100	200	200	200
Total Consumption	49,500	49,900	49,200	47,300	43,000	43,300	44,100	46,800	44,200	35,600
Gross Non-Revenue Water	3,600	5,100	5,800	3,500	4,100	4,100	4,200	2,000	2,400	2,800
Distribution System Total	**53,100**	**55,000**	**55,000**	**50,800**	**47,100**	**47,400**	**48,300**	**48,800**	**46,600**	**38,400**
Groundwater System										
Private Groundwater	3,000	3,000	2,200	2,100	1,900	2,000	2,600	1,900	2,000	2,000
Groundwater Reclamation										
-ARP Pumping	11,600	9,900	6,600	4,900	7,000	11,300	12,000	11,000	11,400	11,200
-Saline Outflow	8,400	6,800	7,400	7,400	6,800	6,100	4,700	3,600	300	2,200
Groundwater System Total	**23,000**	**19,700**	**16,200**	**14,400**	**15,700**	**19,400**	**19,300**	**16,500**	**13,700**	**15,400**
Grand Total	***76,100***	***74,700***	***71,200***	***65,200***	***62,800***	***66,800***	***67,600***	***65,300***	***60,300***	***53,800***

Notes:
1. Annual consumption is based on units billed during the Fiscal Year (July 1 to June 30). The District uses a bi-monthly billing cycle.
2. All values rounded to the nearest 100 AF; total consumption values may not equal sum of individual components.
3. Multi-Family Residential, Commercial, Industrial, and Institutional categories do not include dedicated landscape irrigation water use within these categories.
4. Landscape water use includes all dedicated landscape accounts for Multi-Family Residential, Commercial, Industrial and Institutional customers.
5. Distribution System Total represents total water production, as reported in the District's Annual Groundwater Survey Reports.
6. Gross Non-Revenue Water is the difference between Distribution System Total and Total Measured Consumption, and includes distribution system losses; it is not the AWWA calculation for Distribution System Losses in Appendix G.
7. Groundwater System demands are based on annual reported values in the District's Annual Survey Report on Groundwater Conditions.
8. Groundwater Reclamation demands represent groundwater system demands to protect and reclaim the groundwater system from saltwater intrusion.
9. Groundwater System demands do not include "Other Outflows" as reported in the District's Annual Survey Report on Groundwater Conditions.

Table 2-2
District Water Accounts by Customer Classification
(Number of Accounts)

Water Use Category	*Historical (Fiscal Year)*						*Projected*				
	09 - 10	*10 - 11*	*11 - 12*	*12 - 13*	*13 - 14*	*14 - 15*	*2020*	*2025*	*2030*	*2035*	*2040*
Single Family Residential	71,394	71,555	71,682	71,817	72,061	72,101	74,508	76,159	77,496	77,785	78,075
Multi-Family Residential	2,063	2,065	2,069	2,067	2,431	2,551	2,895	3,180	3,352	3,467	3,577
Commercial	2,729	2,719	2,714	2,728	3,816	3,832	3,887	3,938	3,988	4,036	4,077
Industrial	851	848	847	848	1,182	1,184	958	1,019	1,125	1,127	1,129
Institutional	701	576	574	536	708	715	778	819	884	888	715
Landscape	2,141	2,283	2,294	2,299	2,331	2,338	2,475	2,580	2,694	2,713	2,491
Other	2,212	2,239	2,249	2,270	258	286	286	286	286	286	286
Grand Total	**82,091**	**82,285**	**82,429**	**82,565**	**82,787**	**83,007**	**85,787**	**87,982**	**89,825**	**90,302**	**90,350**

Notes:
1. Number of historical accounts represents accounts at mid-point of fiscal year.
2. Beginning in FY 13-14, category totals include 'fire-line' accounts within each customer class; 'fire-line' accounts are dedicated accounts for fire-suppression systems.
3. "Other" accounts include temporary hydrant meters and, prior to FY 13-14, included all of the 'fire-line' accounts.
4. Multi-Family Residential, Commercial, Industrial, and Institutional categories do not include dedicated landscape irrigation accounts within these categories.
5. Landscape includes all dedicated landscape accounts for Multi-Family Residential, Commercial, Industrial and Institutional customers.
6. Estimates of projected future accounts are based on the forecast development units (housing and non-residential building area) and the current ratios of accounts per development unit.

Figure 2-1
Relative Water Consumption by Customer Classification, FY14/15

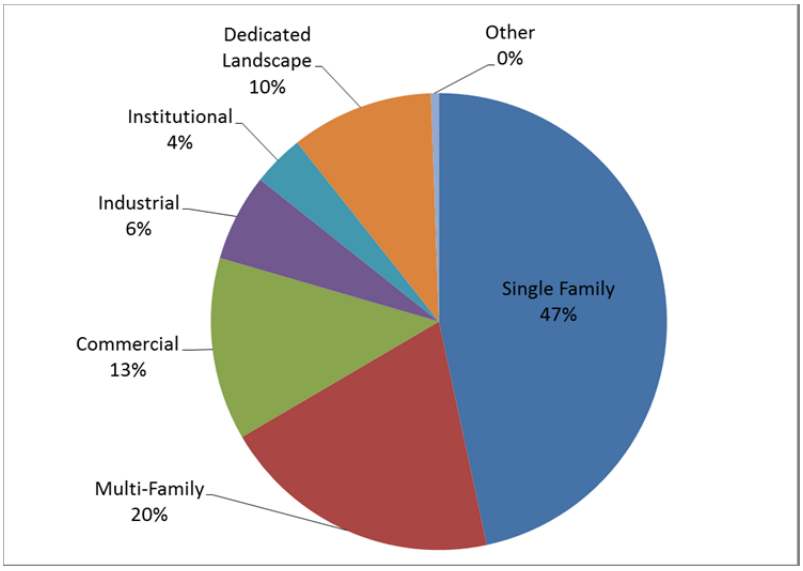
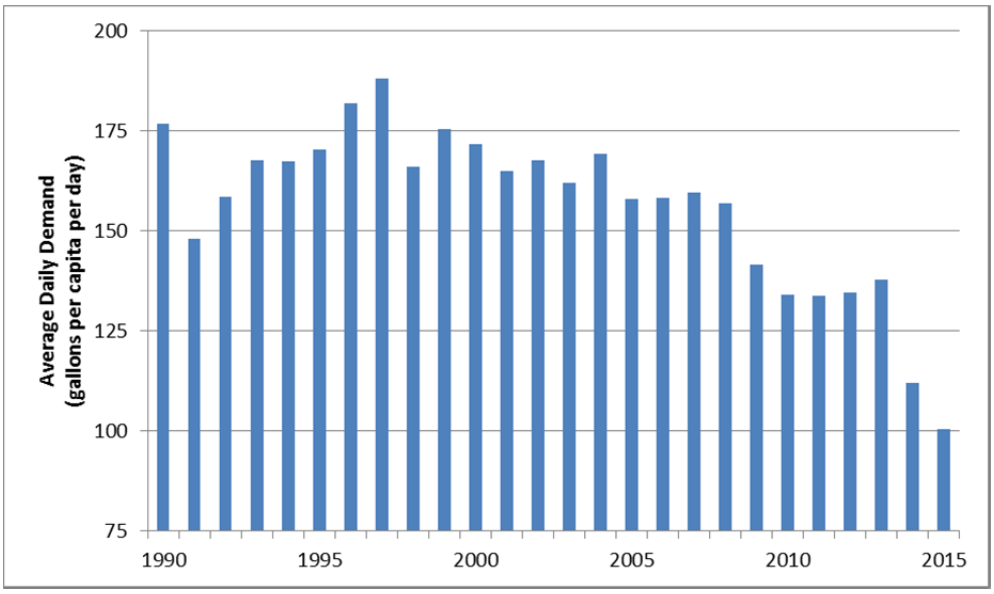


Figure 2-2
Water Use Trends - Per Capita Water Use:
Distribution System and Private Groundwater Pumping



2.4 PROJECTED FUTURE WATER DEMANDS

District planning for water supplies and water production facilities begins with a detailed water demand forecast. Prior to preparation of a UWMP, the District conducts a detailed update to its forecast, reflecting the most current land use planning information, water use trends, and policies affecting water utilization. The 2015 Forecast serves as the basis for this UWMP update.

The District's approach to water demand forecasting is to: 1) analyze existing demands associated with current lands usage; 2) coordinate with City planning staff to obtain future land use plans; 3) estimate potential demands of currently undeveloped lands that are zoned for development; 4) estimate future demands resulting from approved land use changes for already developed lands; and 5) estimate anticipated demand reductions from on-going water conservation and plumbing code changes. This approach is proven sufficiently accurate for long-term, District-wide demand forecasting and is consistent with the California Water Code requirements for urban water management planning.

Demand forecasting is done for six primary land use categories: single family residential, multi-family residential, commercial, industrial, institutional, and "other". Existing customer water use in each of these categories is analyzed using multiple linear regression modelling techniques of stochastic variables that affect water demands including weather, plumbing codes, economic and public policy factors. This analysis generates "unit demand" figures for each of the land use categories. The District then coordinates with planning staff from the Cities of Fremont, Newark and Union City to compile future land use assumptions for both undeveloped and developed land that has been designated for changed use. This includes current City plans (general and specific) as well as forecast development included in the Association of Bay Area Governments (ABAG) most recent regional projections which provide target housing units and employment numbers for the Tri-City area and that Cities have agreed to meet. The 2015 Forecast relies more on ABAG projections than previous forecasts due to the near build out of the service area and changing trends in land use and development. A District-wide demand forecast for each land use category, as well as the total District-wide demand, is then developed by multiplying the planned land use under each land use category by the unit demand factors.

Inclusion of Future Conservation in Demand Forecasting

The District's forecast includes projected demand reductions from the ongoing implementation of *programmatic* and *natural* conservation. Programmatic conservation (also known as a*ctive* conservation) is the savings achieved through implementation of the District's conservation programs. This includes savings from actions such as providing financial incentives for customers to replace turf with drought-tolerant landscaping, as well as savings resulting from public education campaigns such as encouraging customers to seasonally adjust their irrigation systems to prevent overwatering. These savings are a direct result of both District and customer actions. The District is a signatory to the California Urban Water Conservation Council's (CUWCC) MOU on Urban Water Conservation and is committed to the implementation of locally cost-effective water conservation best management practices; a complete description of the District's water conservation program is provided in Chapter 7.

Natural conservation (also known as *passive* conservation) is the savings expected to result from regulatory and other non-programmatic actions. It is called "natural" because these savings do not require special action on the part of the District or customers. For example, when an old toilet or showerhead is in need of replacement due to age or a remodel, the replacement devices will conform to current, higher-efficiency standards. City policies such as "retrofit on resale" can also significantly increase natural conservation as they require the upgrade of old, inefficient toilets, to modern standards when a property is sold. Natural conservation savings reflected in this forecast include regulatory changes from: California Civil Code section 11.02.155; Titles 20 and 24 of the California Code of Regulations related to water conservation appliances and point of installation requirements; 2011 updates to the California Plumbing Code for water efficiency standards; updates to the Code of Federal Regulations, Title 10, Chapter II, Subchapter D, Part 430, Subpart C, 430.32(g)(3) related to water factor standards.

Table 2-3 shows the projected future savings due to natural conservation and programmatic conservation; a further discussion of these savings assumptions is provided in Chapter 9.

Table 2-3
Projected Future Conservation Savings (AF/yr)

	2020	***2025***	***2030***	***2035***	***2040***
Natural Conservation	(632)	(1,134)	(1,510)	(1,795)	(2,015)
Programmatic Conservation	(224)	(448)	(672)	(896)	(1,120)

Effect of Drought on Water Demands

Historically, dry periods have impacted water demands in several ways. Because approximately 35% of the District's demand comes from landscape irrigation, dry periods tend to increase demands as low rainfall and higher temperatures result in increased evapotranspiration requirements for landscaping. However, when dry periods extend in length or intensity and become designated as drought, public awareness campaigns at local, regional, and state level have typically reduced demands due to customer awareness and social consciousness. District customers have a proven history of high awareness of drought and responsible water usage during dry periods.

In extreme dry periods, the District may set either a voluntary or even mandatory water use reduction targets (as discussed in Chapter 10). These restrictions have historically resulted in large, temporary demand reductions as customers curtail non-essential water use and implement lasting conservation measures. After past drought periods, the temporary reductions have returned gradually to pre-drought levels, taking upwards of five years. However, as demonstrated during past droughts, District customers like California residents on whole, have also implemented permanent demand reductions during the drought which extend beyond the end of the drought and have lasting effects of reduced demands for water. These demand reductions occur as a result of accelerated implementation of water efficiency and conservation measures during the drought due to heightened customer awareness.

As an example, during the 1987-1992 drought, District customers reduced overall water use by approximately 20% as the result of both voluntary efforts and mandatory restrictions imposed by the District with a lasting 5% reduction after the drought ended. During the current drought, District customers have reduced overall water use, through April 2016, by 27.7% relative to baseline demands in 2013. The District has had an unprecedented participation in conservation programs during the current drought and estimates that a permanent 6% demand reduction will last beyond the end of drought. Because of the continued implementation of natural and programmatic conservation, the ability to reduce overall volumetric water use during future droughts by similar levels may be lessened. For planning purposes, the 2015 Forecast assumes the current drought to end in 2016, with demand rebound to occur over the next five years from 2017-2021.

For planning purposes, it is conservatively assumed that, during drought periods, water demands for the District's distribution system customers do not change from those during normal years. However, the groundwater system demands are typically lower in dry years as lower groundwater levels, caused by reduced local recharge and increased reliance on groundwater storage, result in reduced saline groundwater outflows. The District will often minimize ARP pumping as well during dry periods. Summaries of projected demands under single dry year and multiple dry year conditions are provided in Tables 9-3 through 9-8 (Chapter 9).

Low Income Housing Water Demand

The District will be able to meet projected water demands for all customers in its service area through 2040, including the projected water use for single family and multi-family residential housing needed for low income households. California Water Code (Section 10631.1) requires 2015 UWMPs to include projected water demands for lower income single-family and multi-family residential households to assist water purveyors in complying with the requirements of Government Code Section 65589.7, which requires water purveyors to grant a priority for the provision of service to housing units affordable to lower income households. Health and Safety Code Section 50079.5 defines lower income households, for all geographic areas of the state, at 80% of area median income or less, adjusted for family size and revised annually.

The District's service area cities, Fremont, Union City, and Newark, have made low income housing development a priority. Each city has assessed current stock and needs of affordable housing in their most recent General Plan Housing Elements. The District used this information to estimate projected demands of low income residential (single and multi-family) customers in the District's service area. The number of affordable units (both current and planned) were compared to total units to estimate the percentage of low income units, this percentage was applied to the District's estimated future single family and multi-family residential water demands to estimate low income residential demands in Table 2-4.

Table 2-4 Low Income Residential Demand Projections

Year	*Low-income Residential Demand (AF/yr)*
2015	1,900
2020	1,900
2025	2,000
2030	2,000
2035	2,000
2040	2,000

Summary of 2015 Water Demand Forecast

The projected future demands in the District's service area are summarized in Figure 2-3 and Table 2-4 (for the years 2015, 2020, 2025, 2030, 2035 and 2040). The District anticipates reduced future demands for water compared to previous forecasts as well as in comparison to demonstrated past levels of actual demand. These reductions in total demand come despite a net increase in total housing per City and ABAG projections. The District also anticipates a continued decrease in per-capita water demands due to pronounced conservation effects as well as an increased ratio of high-density to low-density housing (discussed further in Chapter 8). These trends also reflect the continued transition of the local industrial sector from water intensive manufacturing to lower water demand activities.

Figure 2-3
Historical and Projected Distribution System Demands
(with Additional Conservation Savings and Non-Revenue Water)

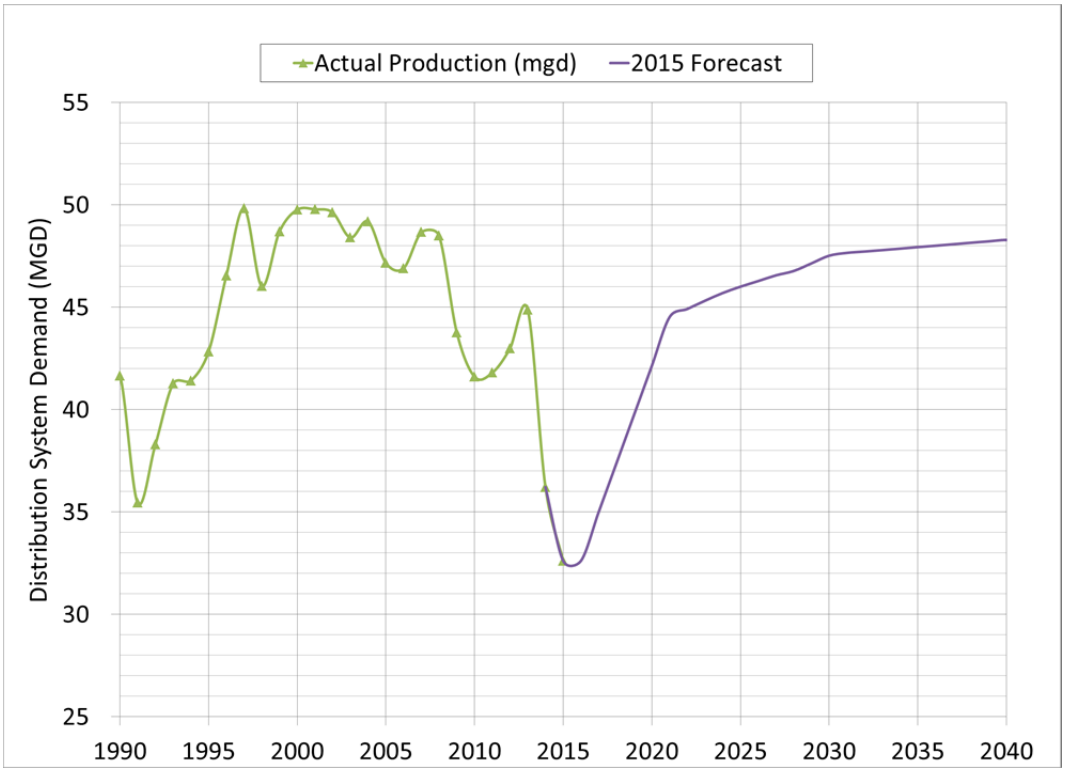


Table 2-5
District Estimated Future Water Demands (AF/yr)

Water Use Category	Year				
	2020	2025	2030	2035	2040
Distribution System					
Single Family Residential	22,700	22,800	22,900	22,700	22,600
Multi-Family Residential	10,700	11,300	11,700	12,000	12,200
Commercial	7,100	7,500	8,000	8,400	8,800
Industrial	4,400	5,000	5,300	5,400	5,500
Institutional	4,400	4,800	5,400	5,400	5,400
Other	300	300	300	300	300
Total Distribution System Demand (without losses)	***49,600***	***51,700***	***53,500***	***54,200***	***54,700***
Total Distribution System Demand (with losses)	***52,700***	***55,000***	***56,900***	***57,600***	***58,200***
2011-2016 Drought Demand Factor	(5,300)	(3,000)	(3,000)	(3,000)	(3,000)
Additional Conservation Program Savings	(200)	(400)	(700)	(900)	(1,100)
Groundwater System Demand	***16,200***	***16,200***	***16,200***	***16,200***	***16,200***
Grand Total	***63,400***	***67,700***	***69,400***	***69,900***	***70,300***

Notes:
1. All values rounded to the nearest 100. Total values may not equal sum of individual components due to rounding errors.
2. Landscape Irrigation included within Multi-Family Residential, Commercial, Industrial, and Institutional categories
3. Adjustment for natural conservation (efficiency improvements due to plumbing code enhancements) is included in demand totals.
4. Total Distribution System Demand (with Non-Revenue Water) includes estimated Non-Revenue Water of 6%.
5. "2011-2016 Drought Demand Factor" is the estimated amount of demand reduction the District anticipates to remain after the present drought has ended. At that point, the District will reevaluate these savings and categorically classify them as either programmatic or natural conservation savings.
6. Groundwater System Demands includes average annual values for: (1) private pumping (2,000 AF/yr), (2) ARP pumping (7,000 AF/yr) and (3) saline groundwater outflows (7,200 AF/yr)
7. See Section 9.2 of this UWMP regarding assumptions for Additional Water Conservation Savings.

CHAPTER 3
SOURCES OF SUPPLY

3.1 SOURCES OF SUPPLY OVERVIEW

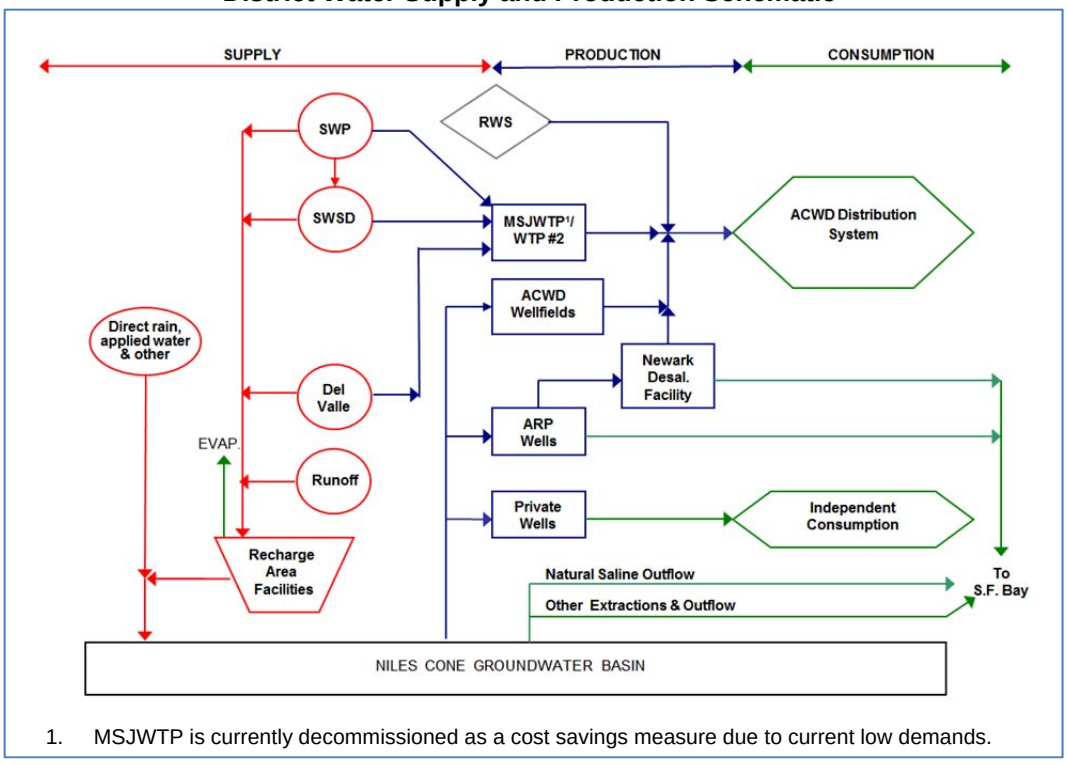
This chapter provides a summary of the District's sources of supply and their availability, as well as an overview of the management of these supplies and how water quality may impact future water supply reliability. A summary of the District's water supply strategy is provided in Chapter 9 – Water Supply Strategy.

3.2 SOURCES OF SUPPLY AND SUPPLY AVAILABILITY

The District currently has three primary sources of water supply: (1) the State Water Project (SWP), (2) San Francisco's Regional Water System (RWS) and (3) local supplies. The SWP and RWS supplies are imported into the District service area through the South Bay Aqueduct (SBA) and Hetch Hetchy Aqueduct, respectively. Local supplies include fresh groundwater from the Niles Cone Groundwater Basin, desalinated brackish groundwater from portions of the groundwater basin previously impacted by saltwater intrusion, and surface water from the Del Valle Reservoir. The primary source of recharge for the Niles Cone Groundwater Basin is from percolation of runoff from the Alameda Creek watershed and, to a lesser degree, direct stormwater capture. A portion of the District's SWP supplies are also used for supplemental groundwater recharge when Alameda Creek supplies are insufficient or when groundwater levels fall below critical thresholds. Infiltration of rainfall and applied water also contribute to local groundwater recharge.

Before being supplied to District customers via the District's potable water distribution system, the source water supplies are treated to meet and surpass all state and federal drinking water standards. The District

Figure 3-1
District Water Supply and Production Schematic



1. MSJWTP is currently decommissioned as a cost savings measure due to current low demands.

operates two surface water treatment plants[1] that treat SWP and local surface water from Del Valle Reservoir. The Newark Desalination Facility treats brackish groundwater to remove salts and other impurities, and the Blending Facility blends San Francisco water with relatively high hardness groundwater in order to provide a blended supply with lower overall hardness. Figure 3-1 provides a schematic of the District's sources of supply and production facilities. Over the FY2005/06 -FY2014/15 period, 29% of the total in-District water demands (distribution system and groundwater system demands) have been met by SWP supplies, 17% from San Francisco Public Utilities Commission (SFPUC) supplies and 54% from local supplies. When considering only the distribution system demands (treated water), over the same time period, about 39% of the District's distribution system water supply was from the SWP[2]. Water from the SFPUC provided approximately 24% of the distribution system water supply and local supplies accounted for the balance (about 38%) of the distribution system supplies. Figures 3-2 and 3-3 provide a summary of the District's sources of supply. Table 3-1 provides a summary of the District's historical use of each supply source.

Figure 3-2
Average Sources of Supply (FY05/06-14/15)
Distribution and Groundwater System Demands

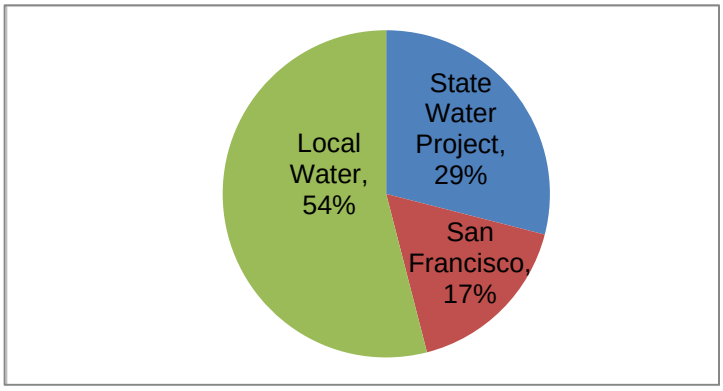
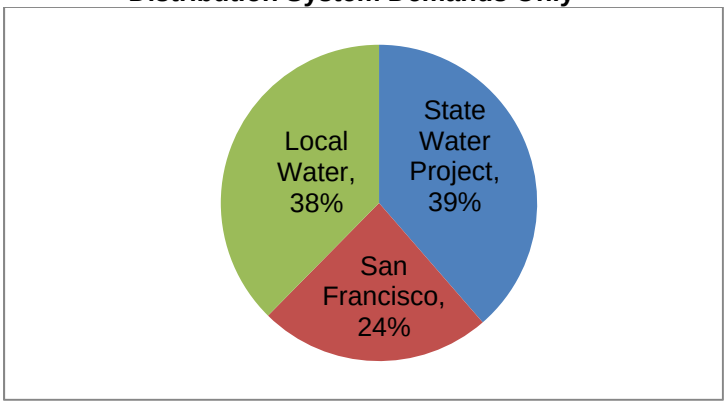


Figure 3-3
Average Sources of Supply (FY05/06-14/15)
Distribution System Demands Only



Each of the District's water supply sources is discussed in greater detail below. Table 3-2 provides a summary of the estimated availability of each of these supplies. Tables 3-3 and 3-4 provide a summary of the availability of wholesale water supplies from the SWP and SFPUC.

[1] The Mission San Jose Treatment Plant is currently decommissioned as a cost savings measure due to current low demands.
[2] Total SWP use includes both water that was treated at a District water treatment plant or used to recharge local aquifers.

Table 3-1
District Historical Water Supply Utilization (AF/yr)

FISCAL YEAR	SWP supplies used at District facilities	Del Valle	SFPUC	Newark Desal Facility[2]	Net Local Groundwater Recharge[3]	Recovered from Semitropic GW bank	Total In-District Water Supply	SWP Supply delivered to Semitropic GW bank
05-06	15,600	7,700	11,700	3,900	38,200	0	77,100	41,500
06-07	13,800	11,000	15,300	2,800	26,000	0	68,900	11,900
07-08	22,600	500	15,000	3,600	24,600	5,500	71,800	0
08-09	8,300	4,200	12,600	3,200	24,100	12,600	65,100	0
09-10	18,100	2,500	11,700	1,100	30,800	0	64,200	0
10-11	14,300	5,900	8,800	6,600	33,600	0	69,200	23,400
11-12	18,300	2,600	9,320	8,900	17,000	0	56,140	5,000
12-13	14,800	5,800	10,000	8,100	12,200	2,000	52,900	7,500
13-14	16,800	1,400	13,100	8,100	12,900	3,000	55,300	0
14-15	9,000	1,200	8,600	8,200	23,300	13,200	63,500	0

Notes:
1. All values rounded to the nearest 100. Total values may not equal sum of individual components due to rounding errors.
2. Newark Desal Facility supply represents total blended flow. In 2009/10 the facility was operated for only two months due to the Phase 2 construction activities. Net annual Desal production rates in excess of 5,600 AF/yr. represent facility optimization efforts; the quantity produced above 5,600 AF/yr will have a corresponding reduced production from other local groundwater wells.
3. Net Local Groundwater Recharge figures do not include Del Valle Reservoir or imported supplies used for recharge, and are less evaporation and other losses.

Table 3-2
Summary of Water Supply Availability for Existing Supplies (AF/yr)

SUPPLY COMPONENT	Estimated Water Supply Availability			
	Median Year[1] (1971 Hydrologic Conditions)	Long-Term Average[2]	Maximum Availability[3]	Minimum Availability[4]
Imported Supplies				
SWP[5]	28,700	26,300	42,000	4,500
SFPUC	15,400	14,300	15,400	7,700
Local Supplies				
Groundwater Recharge[6]	24,000	22,000	36,000	6,600
Groundwater Storage	N/A	N/A	10,000	0
Del Valle	4,700	5,800	14,000	0
Desalination[7]	5,100	5,100	5,600	5,100
Banking/Transfers				
Semitropic Banking	N/A	N/A	33,500	13,500
TOTAL SUPPLY	***77,900***	***73,500***	***N/A***	***N/A***

Notes:

1. Median Year values represent the median projected supply availability considering the sum of all of existing District supplies over the 1922-2003 historical hydrologic conditions (planning hydrology) and assumes 2015 operating conditions. 1971 hydrologic conditions represent a near median supply year for all supplies. Groundwater Storage and Semitropic Banking are not included in the Median Year because these supply components are used solely for dry year supplies.
2. Long-term Average values represent the average water supply availability based on the planning hydrology. Similar to median year, Groundwater Storage and Semitropic Banking are not included.
3. Maximum Availability represents the maximum quantity of supply from each supply component. Imported supplies reflect the District's full contractual amounts. Local supplies maximums are evaluated from the planning hydrology and reflect operating constraints; District has water rights in excess of these values, 30TAF on Arroyo Valle and 40TAF on Alameda Creek. For Groundwater Storage, this assumes that the groundwater basin is within normal operating levels in the beginning of the year. For Semitropic Banking, this is based on a maximum contractual return capacity under a 100% SWP allocation. The maximum supply quantities for each source may or may not occur under the same year/hydrologic conditions as the other sources and therefore are not summed together.
4. Minimum Availability represents the minimum quantity of supply from each supply component. These quantities represent the minimum projected supply availability based on the planning hydrology under future build out conditions. SFPUC minimum is estimated by the District and is based on Tier Two drought allocation estimates provided by BAWSCA under 2015 operating conditions and assumes only 50% of the reliability improvements projected by SFPUC to occur between 2015 and 2040 actually occur. For Groundwater Storage, the minimum quantity assumes that the groundwater basin was at the minimum operating groundwater elevation in the beginning of the year and there is no usable groundwater storage available. For Semitropic Banking, the minimum quantity is based on the District's contractual guaranteed recovery and assumes that only Semitropic "pumpback" capacity is available to return banked water to the District. Similar to maximum values, individual minimum supply quantities may not occur in the same year and are not summed together.
5. SWP availability is based on DWR's 2015 Delivery Capability Report, "Base" scenario.
6. Groundwater Recharge is calculated as recharge from deep percolation of rainfall and applied water plus recharge at the District's groundwater percolation facilities from Alameda Creek Watershed supplies diverted under the District's Water Rights Permit, less "Other Outflows" as described in the District's annual Groundwater Survey Reports and do not include recharge from SWP or Del Valle Reservoir supplies.
7. Desalination supplies are recovered from required ARP pumping that historically was discharged to the San Francisco Bay. Median Year availability is based on 10% outage.

Table 3-3
District Supply Request and Projected Availability of SWP Supplies (AF/yr)

Supply Request and Projected Availability	Year					
	2015	2020	2025	2030	2035	2040
District Forecast Delivery Request	42,000	42,000	42,000	42,000	42,000	42,000
DWR Projected Supply Availability						
Maximum Contractual Amount	42,000	42,000	42,000	42,000	42,000	42,000
Median Value	27,400	27,400	27,400	27,400	27,400	27,400
Single Dry Year	4,500	3,400	3,400	3,400	3,400	3,400
Multiple Dry Year						
-Year 1	9,000	9,100	9,100	9,100	9,100	9,100
-Year 2	9,000	6,500	6,500	6,500	6,500	6,500
-Year 3	26,700	25,900	25,900	25,900	25,900	25,900
-Year 4	10,100	11,200	11,200	11,200	11,200	11,200
-Year 5	6,300	6,700	6,700	6,700	6,700	6,700

Source: California Department of Water Resources, 2015 Final State Water Project Delivery Capability Report

Notes:
1. SWP availability assumptions for 2015 are based on DWR's "Base" Scenario in the 2015 Final State Water Project Delivery Capability Report. SWP availability assumptions for 2020 through 2040 are based on DWR's "Early Long Term" Scenario from the same report.

Table 3-4
District Supply Request and Projected Availability of San Francisco Regional Supplies (AF/yr)

Supply Request and Projected Availability	Year					
	2015	2020	2025	2030	2035	2040
District Forecast Delivery Request	15,400	15,400	15,400	15,400	15,400	15,400
SFPUC Projected Supply Availability						
Maximum	15,400	15,400	15,400	15,400	15,400	15,400
Median Value	15,400	15,400	15,400	15,400	15,400	15,400
Single Dry Year	7,700	7,900	8,300	8,600	8,900	9,200
Multiple Dry Year						
-Year 1	10,100	12,000	12,200	12,400	12,600	12,800
-Year 2	7,700	8,200	8,500	8,900	9,300	9,600
-Year 3	7,700	8,200	8,500	8,900	9,300	9,600
-Year 4	7,700	7,900	8,300	8,600	8,900	9,200
-Year 5	7,700	7,900	8,300	8,600	8,900	9,200

Source: San Francisco Public Utilities Commission, Transmittal to BAWSCA, January 5, 2016 (with application of Tier 2 drought allocation formula and supply District reductions described in Appendix B).

State Water Project

In 1961, the District signed a contract with the California Department of Water Resources (DWR) for a maximum annual amount of 42,000 acre-feet from the State Water Project (SWP). An agency's contracted amount of water with the SWP is referred to as the "Table A" amount of water. The SWP, managed by the DWR, is the largest state-built, multi-purpose water project in the country. The SWP facilities include 28 dams and reservoirs, 26 pumping and generating plants, and approximately 660 miles of aqueducts. The water stored in the SWP storage facilities originates from rainfall and snowmelt runoff in Northern and Central California watersheds. The SWP's primary storage facility is Lake Oroville in the Feather River Watershed. Releases from Lake Oroville flow down the Feather River to the Sacramento River, which subsequently flows to the Sacramento-San Joaquin Delta. The SWP diverts water from the Delta through the Banks Pumping Plant which lifts water from the Clifton Court Forebay (in the Delta) to the California Aqueduct and Bethany Reservoir. From Bethany Reservoir, the South Bay Pumping Plant lifts water into the South Bay Aqueduct, which delivers SWP supplies to the District and to other Bay Area water agencies in Alameda and Santa Clara Counties.

State Water Project Availability

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

DWR's estimates of SWP deliveries are based on a computer model that simulates monthly operations of the SWP and Federal Central Valley Project systems. Key assumptions and inputs to the model include the facilities included in the system, hydrologic inflows to the system, regulatory and operational constraints on system operations, and projected contractor demands for SWP water. For example, the 2015 DCR uses the following assumptions to model current conditions (the "Base" scenario): existing facilities, hydrologic inflows to the model based on 82 years of historical inflows (1922 through 2003), current regulatory and operational constraints, and contractor demands at maximum Table A amounts.

To evaluate SWP supply availability under future conditions, the 2015 DCR included four model studies. The first of the future-conditions studies, the Early Long Term (ELT) scenario, used all of the same model assumptions for current conditions, but reflected changes expected to occur from climate change, specifically, a 2025 emission levels and a 15 cm sea-level rise. The other three future-conditions include varying model assumptions related to the Bay Delta Conservation Plan/California Water Fix ("BDCP"), such as changes to facilities and/or regulatory and operational constraints.

In spring 2015, DWR announced that BDCP would move from a Section 10 permit to a Section 7 permit process under the Federal Endangered Species Act. As a practical matter, this split the project into two distinct parts known as Cal WaterFix, the conveyance portion, and Cal EcoRestore, the restoration portion. Cal WaterFix is Alternative 4A in the recirculated environmental document, and the preferred alternative. Alternative 4A is different from all of the other future scenarios modeled by DWR in the DCR. While there is widespread support for the BDCP/Cal WaterFix project, plans are currently in flux; environmental review is ongoing and is not anticipated to be final until at least 2016, and several regulatory and legal requirements must be met prior to construction. It would be speculative at this time to assume that the project will move forward.

This UWMP uses the ELT scenario to estimate future SWP supply availability because it is based on existing facilities and regulatory constraints, with hydrology adjusted for the expected effects of climate change, and full Table A demand by contractors. This scenario is consistent with the studies DWR has used in its previous SWP Delivery Reliability Reports for supply availability under future conditions. Therefore, in this UWMP, future SWP supply availability is based on the ELT study included in the 2015 DCR. The District elects to assume the more conservative ELT projection for all years beyond 2015 as it

better reflects the potential full stress on the SWP. According to the DWR, the long-term average delivery capability for these future years is projected to be 62% of Table A, ranging from a minimum of 11% (single dry year) to 100% (single wet year). Contractual amounts are projected to range from 15 to 27% during multiple-dry year periods, and from 69 to 100% in multiple-wet year periods. A summary of the projected SWP supply availability is provided in Table 3-3.

In order to assist the DWR in its water supply planning, the District annually submits projected future use of SWP supplies to DWR under a variety of Table A allocation assumptions. Currently, SWP water that is not used by the District for treatment and delivery to customers is 'banked' in groundwater storage, either locally in the Niles Cone Groundwater Basin or at the Semitropic Groundwater Bank for later use in dry years (see discussion below). Alternatively, the District's SWP water may also be stored as carryover water in the DWR's San Luis Reservoir. Recently, the District has been pursuing opportunities to store surplus Table A in "non-project reservoirs" notably Contra Costa Water District's Los Vaqueros reservoir.

Semitropic Banking of District's SWP Supplies

To address the year-to-year variability of SWP supply, the District's 1995 IRP identified the need to secure storage to improve dry year reliability. Based on this IRP recommendation, the District contracted with Semitropic Water Storage District for participation in the Semitropic Groundwater Banking Program. The District has secured 150,000 AF of groundwater storage capacity at Semitropic under this program. In wet years, the District delivers its surplus SWP supplies to Semitropic for storage in their groundwater basin. In dry years, the District can recover these supplies through either of two methods: (1) an "in-lieu" exchange whereby the District uses Semitropic's SWP supplies while Semitropic utilizes the previously stored groundwater; or (2) a "pumpback" program where Semitropic directly pumps the stored groundwater into the California Aqueduct. As with storage in the Niles Cone Groundwater Basin, the Semitropic Groundwater Banking Program does not provide a new source of supply for the District. Rather, it provides a means to store the District's unused SWP supplies in wet years for recovery and use during dry years when the delivery of SWP supplies may be significantly curtailed.

On January 31, 2014, DWR announced a 0% Table A allocation for the first time in its 54-year history. Although the allocation was subsequently raised to 5%, this water was not available before September 1, 2014, after the typically high summer demand season. Even during the unprecedented 0% Table A allocation period, the District was able to recover more than 2,000 AF of its Semitropic supplies. Moreover, when Table A deliveries were resumed in September, the Semitropic Groundwater Banking Program returned more water to the District than its contractual commitment.

San Francisco's Regional Water System

The District receives water from the City and County of San Francisco's Regional Water System (RWS), operated by the San Francisco Public Utilities Commission (SFPUC). This supply is predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by the SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties. The amount of imported water available to the SFPUC's retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River.

In order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability, and water supply, the SFPUC has undertaken the Water System Improvement Program (WSIP), approved October 31, 2008. The WSIP provides capital improvements aimed at enhancing the SFPUC's ability to meet its water service mission of providing high quality water to customers in a reliable, affordable and environmentally sustainable manner. Many of the water supply and reliability projects evaluated in the WSIP were originally put forth in the SFPUC's Water Supply Master Plan (2000).

A Program Environmental Impact Report (PEIR) was prepared in accordance with the California Environmental Quality Act for the WSIP. The PEIR, certified in 2008, analyzed the broad environmental effects of the projects in the WSIP at a program level and the water supply impacts of various alternative

supplies at a project level. Individual WSIP projects are also undergoing individual project specific environmental review as required.

In approving the WSIP, the Commission adopted a Phased WSIP Variant for water supply that was analyzed in the PEIR. This Phased WSIP Variant established a mid-term water supply planning milestone in 2018 when the Commission would reevaluate water demands through 2030. At the same meeting, the Commission also imposed the Interim Supply Limitation which limits the volume of water that the member agencies and San Francisco can collectively purchase from RWS to 265 mgd until at least 2018. Although the Phased WSIP Variant included a mid-term water supply planning milestone, it did include full implementation of all proposed WSIP facility improvement projects to insure that the public health, seismic safety, and delivery reliability goals were achieved as soon as possible. As of December 31, 2015, the WSIP was 90.8% complete overall and is scheduled to be completed in May 2019. (*SFPUC, SFPUC WSIP Regional Project Quarterly Report (Q2/FY15-16)*, Feb. 2, 2016)

San Francisco Regional Water Supply Availability In order to assist the SFPUC in its water supply planning, the District annually submits projected future use of RWS supplies to SFPUC through BAWSCA. Water supplies from the RWS are subject to variability depending on hydrologic conditions and other factors. A summary of the projected availability of supplies from this source is provided in Table 3-4. The following provides a description of the District's contractual supply for RWS supplies, and how this supply would be allocated among San Francisco Retail and wholesale customers in the event of a water supply shortage.

2009 Water Supply Agreement The business relationship between San Francisco and its wholesale customers is largely defined by the "Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County" entered into in July 2009 (WSA). The new WSA replaced the Settlement Agreement and Master Water Sales Contract that expired June 2009. The WSA addresses, water supply, water shortages, and the SFPUC rate setting methodology used for wholesale customers. The WSA has a 25 year term.

The WSA provides for a 184 mgd "Supply Assurance" to the wholesale customers, subject to reduction in the event of a water shortage due to drought, emergencies, or the malfunctioning or rehabilitation of the RWS. The WSA does not guarantee that SFPUC will meet peak daily or hourly customer demands when usage exceeds the Supply Assurance. The wholesale customers have agreed to the allocation of the 184 mgd Supply Assurance amongst themselves, with each entity's share of the Supply Assurance set forth in Attachment C to the WSA. The Supply Assurance survives termination or expiration of the WSA and the District's Individual Water Sales Contract with the SFPUC.

Individual Supply Guarantee The WSA is supplemented by an Individual Water Sales Contract. These contracts, which expire in 25 years, provide for a 184 mgd Supply Assurance to the SFPUC's wholesale customers collectively. The District's Individual Supply Guarantee (ISG) is 13.76 mgd (approximately 15,400 AF/year). Although the WSA and accompanying Water Supply Contract expire in 2034, they are perpetual and survive their expiration.

Water Shortage Allocation Plan In July 2009, in connection with the WSA, the wholesale customers and San Francisco adopted a Water Shortage Allocation Plan (WSAP) to allocate water from the RWS to retail and wholesale customers during system-wide shortages. The WSAP has two tiers:

- The Tier One Plan, which allocates water between San Francisco and the wholesale customers collectively for RWS shortages of less than 20%; and
- The Tier Two Plan, which allocates the collective wholesale customer share among the wholesale customers of 20% or greater.

The Tier One Plan applies only when the SFPUC determines that a system-wide water shortage exists and issues a declaration of a water shortage emergency under California Water Code Section 350. Apart from a declaration, the SFPUC may opt to request voluntary cutbacks to achieve necessary water use reductions during drought periods. During the current drought, the SFPUC has requested, but has not mandated, a

10% system-wide reduction. The Tier One Plan will expire at the end of the term of the WSA in 2034, unless extended by San Francisco and the wholesale customers.

The Tier Two Plan The wholesale customers have negotiated and adopted the "Tier Two Plan," the second component of the WSAP, which allocates the collective wholesale customer share among each of the 26 wholesale customers. This Tier Two allocation is based on a formula that takes multiple factors into account for each customer including: 1) the ISG; 2) a "Base/Seasonal" use component; and 3) a residential per capita usage adjustment.

The water made available from the SFPUC will be allocated to the individual wholesale customers in proportion to each wholesale customer's Allocation Basis, expressed in mgd, which is the weighted average of the wholesale customer's ISG and Base/Seasonal Component. An agency's base/seasonal component is calculated using the monthly water demands for three consecutive years prior to the onset of the drought. The Base/Seasonal component is accorded twice the weight of the ISG in calculating the Allocation Basis. Minor adjustments to the Allocation Basis are then made based on the resultant per capita amount, to ensure a minimum cutback level, a maximum cutback level, and a sufficient supply for certain wholesale customers.

The Tier Two Plan requires that the Allocation Factors be calculated by BAWSCA each year in preparation for a potential water shortage emergency. As the wholesale customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each wholesale customer will also change. For long-term planning purposes, each wholesale customer has been provided with the Tier Two Allocation Factors calculated by BAWSCA based upon the most recent normal year to determine its share of available RWS supplies. However, actual allocations to each wholesale customer during a future shortage event will be calculated in accordance with the Tier Two Plan at the onset of the shortage. The Tier Two Plan will expire in 2018 unless extended by the wholesale customers.

2018 Interim Supply Limitation As part of its adoption of the WSIP in October 2008, discussed separately herein, the SFPUC adopted a water supply limitation, the Interim Supply Limitation (ISL), to limit sales from RWS watersheds to an average annual amount of 265 mgd through 2018. All 26 wholesale customers and San Francisco retail are subject to the ISL. The wholesale customers' collective allocation under the ISL is 184 mgd and San Francisco Retail's is 81 mgd. Although the wholesale customers did not agree to the ISL, as further discussed below, the WSA provides a framework for administering the ISL.

Interim Supply Allocations The Interim Supply Allocations (ISAs) refer to San Francisco's and each individual wholesale customer's share of the Interim Supply Limitation (ISL). On December 14, 2010, the SFPUC established each agency's ISA through 2018. In general, the SFPUC based the allocations on the lesser of the projected FY2017/18 purchase projections or ISG. The ISAs are effective only until December 31, 2018 and do not affect the Supply Assurance or the ISGs, both discussed separately herein. San Francisco's ISA is 81 mgd. The District's ISA is 13.76 mgd, the same as its ISG.

Environmental Enhancement Surcharge As an incentive to keep Regional Water System (RWS) deliveries below the ISL of 265 mgd, the SFPUC adopted an Environmental Enhancement Surcharge for collective deliveries in excess of the ISL effective at the beginning of FY2011/12. This volume-based surcharge would be unilaterally imposed by the SFPUC on individual wholesale customers and San Francisco retail customers, when an agency's use exceeds their ISA and when sales of water to the wholesale customers and San Francisco retail customers, collectively, exceeds the ISL of 265 mgd. Actual charges would be determined based on each agency's respective amount(s) of excess use over their ISA. To date, no Environmental Enhancement Surcharges have been levied.

As stated in the WSA, the wholesale customers do not concede the legality of the SFPUC's establishment of the ISAs and Environmental Enhancement Surcharge, discussed below, and expressly retain the right to challenge either or both, if and when imposed, in a court of competent jurisdiction.

Local Sources

As described above, the District's local sources include fresh groundwater from the Niles Cone Groundwater Basin, brackish groundwater desalination, and surface water supplies from the Del Valle Reservoir. Each of these supplies is described in greater detail below.

Niles Cone Groundwater Basin: The principal source of local supply for the District is the local aquifer system known as the Niles Cone Groundwater Basin (Niles Cone, the Basin). The primary source of recharge for the Niles Cone Groundwater Basin is local runoff from the Alameda Creek Watershed, which is captured, diverted and recharged at the District's groundwater recharge facilities. Alameda Creek annual runoff at the U.S. Geological Survey (USGS) Alameda Creek near Niles stream gage (located near the District's recharge facilities) has varied from a recorded minimum of 650 AF/yr in 1960-1961, to a recorded maximum in 1982-1983 of 360,000 AF/yr. Typically, the District diverts only a small portion of the local runoff flowing in Alameda Creek. The majority of local runoff flows downstream through the Alameda Creek Flood Control Channel to San Francisco Bay. To a lesser extent, infiltration of rainfall, applied water, and direct stormwater runoff to the groundwater percolation ponds also provide a local source of recharge for the groundwater basin. The District also uses a portion of its imported SWP supplies for groundwater recharge.

The water quality in the groundwater system is characterized by fresh groundwater in the eastern portion of the groundwater basin transitioning into brackish groundwater in the western portion of the Basin. The brackish groundwater is a result of historical saltwater intrusion from the adjacent San Francisco Bay. Since the 1960's, the District has managed the groundwater basin to prevent any additional saltwater intrusion and has been pumping the trapped brackish groundwater back to San Francisco Bay through the District's Aquifer Reclamation Program (ARP).

The Niles Cone has capacity to store water from year to year ("local groundwater storage") however the amount of long-term storage is limited relative to the annual utilization of the Basin. In a majority of years, The District is able to fill the Basin to its natural full condition leaving no room for storage of surplus supplies, be they local runoff or surplus SWP supplies. The Basin is significantly limited on the lower end of storage by the potential for saltwater intrusion. Although local groundwater storage (i.e., groundwater supplies in excess of recharge) provides a short-term source of supply during dry years, it is not a supply that is available every year because the groundwater system will require replenishment from freshwater sources, without which saltwater intrusion would occur. Chapter 4 provides additional information about the District's management of the Niles Cone.

Brackish Groundwater Desalination: In 2003, the District commissioned the Newark Desalination Facility Desal Facility), with a capacity of 5 mgd permeate, or 6 mgd of total treated water production capacity. In 2010, the District expanded this capacity to 10 mgd permeate or 12 mgd total treated water production capacity. This facility utilizes the reverse osmosis process to remove salts and other impurities from the brackish groundwater pumped at the District's ARP wells. Permeate from the NDF is blended with local groundwater and provides a supply for the distribution system demands. Chapter 5 provides additional information on the District's desalination program.

Del Valle Reservoir: The District and Zone 7 Water Agency of the Alameda County Flood Control and Water Conservation District (Zone 7), have equal rights on Arroyo Del Valle to divert water to storage. When the California Department of Water Resources (DWR) constructed Del Valle Dam in the upper Alameda Creek Watershed, those rights were recognized in an agreement between DWR, the District, and Zone 7. Consequently, DWR typically makes a total of 15,000 AF of storage available annually in Del Valle Reservoir for use by the District and Zone 7. The District and Zone 7 equally share this storage capacity, thereby providing up to 7,500 AF of storage capacity annually to the District.

Local Water Supply Availability

A summary of the estimated water supply availability from the District's local supplies is provided in Table 3-2. As indicated in these tables, the amount of local water supplies available to the District from Del Valle

Reservoir and fresh groundwater sources varies widely from year to year, depending primarily on hydrologic conditions and availability of local runoff. In general, desalination of brackish groundwater provides a more reliable water source than other local supplies. However, there may be limitations to this source if groundwater levels are lowered to the extent that a reduction in ARP pumping is required to prevent new saltwater intrusion.

In addition, the District has initiated informal discussions with the National Marine Fisheries Service (NMFS) and California Department of Fish and Wildlife (CDFW) regarding the permitting for fish passage facilities at the District's inflatable rubber dams in the Alameda Creek Flood Control Channel. A key element of these discussions has been the minimum bypass flows needed at these facilities to support steelhead migration through the Flood Control Channel. In March 2011, the District, NMFS and CDFW agreed on a minimum bypass flow schedule which will be incorporated into the permitting for this project. The March 2011 bypass flow schedule has been incorporated into the modeling analyses of local water supply availability in this UWMP.

3.3 MANAGEMENT AND DISTRIBUTION OF WATER SUPPLIES

With local water and two sources of imported water, the District has the flexibility to change the timing and use of supplies to best meet its water management objectives, which include:

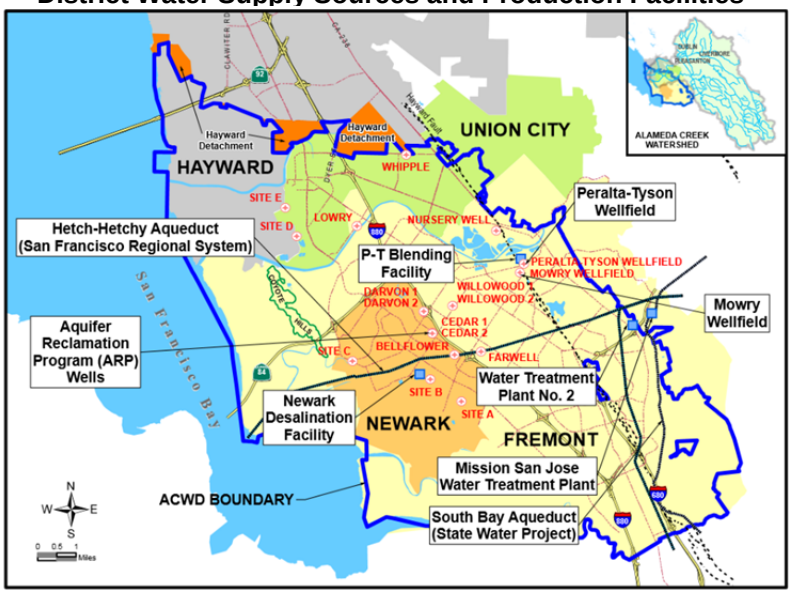
- Maximizing total usable supply
- Maximizing water quality/providing uniform water quality
- Protecting groundwater resources from degradation due to previously intruded saltwater
- Protecting groundwater resources from further saltwater intrusion
- Achieving the above with the lowest possible operating costs

District customers receive water from one or more production sources: the District's Water Treatment Plant Number 2 (WTP 2), the District's Blending Facility which blends local groundwater (from the Mowry and Peralta-Tyson Wellfields) with San Francisco Regional supplies, the Newark Desalination Facility (see Figure 3-4), the San Francisco Regional Water System, and the District's Mission San Jose Water Treatment Plant (MSJWTP)[3].

Flow from the SBA and releases from Del Valle Reservoir may be diverted into either of the two treatment plants, diverted into Alameda Creek, or both. Depending on the water quality and flow in Alameda Creek, water can also be diverted into percolation ponds for groundwater recharge. San Francisco Regional Water System supplies are either routed to the Blending Facility for blending with local groundwater supplies or, under certain conditions, directly supplied to users.

[3] The MSJWTP is currently decommissioned as a cost savings measure due to current low demands.

Figure 3-4
District Water Supply Sources and Production Facilities



Groundwater Management and Protection

Groundwater is an important component of the District's water supply portfolio, as demonstrated in Tables 3-1 and 3-2. Since 1914, the District has actively managed and protected the water in the Niles Cone Groundwater Basin and conserved the water of the Alameda Creek Watershed. The District has had a Groundwater Management Policy in place since 1989. This management policy outlines the District's protection and management activities for the Niles Cone Groundwater Basin to ensure a reliable supply of high quality water that satisfies current and future water needs in the District's service area. Chapter 4 in this UWMP describes the District's groundwater management and protection policy in more detail.

Groundwater Recharge

During wet periods, local runoff from the Alameda Creek Watershed is diverted into the groundwater percolation ponds. When local runoff is not available, water may be released from either Del Valle Reservoir or from the SBA for groundwater recharge. Currently, the District operates two inflatable dams to capture and divert Alameda Creek flow into the percolation ponds. The dams are deflated for protection from debris when creek flow exceeds approximately 1,000 cfs and no off-stream diversions occur during these high flow conditions.

Del Valle Supplies

Typically, the District's water stored at Del Valle is used by the fall to maximize the capture of local runoff during the winter and spring seasons. In decreasing order of priority, Del Valle water is delivered to the District:

- Via the SBA to the District's treatment facilities (MSJWTP[4] and WTP2).
- Via the SBA and released into Alameda Creek at Vallecitos Takeoff for groundwater recharge.
- Into Arroyo Del Valle Creek, where it flows to Arroyo de la Laguna and eventually into Alameda Creek for groundwater recharge.

[4] MSJWTP is currently decommissioned as a cost savings measure due to current low demands.

State Water Project Water

Water from the SWP (delivered via the SBA) can either be taken at Vallecitos turnout and discharged to Alameda Creek for groundwater basin recharge or taken at the Alameda-Bayside turnout for delivery to the surface water treatment plants. By October 1 of every year, the District must submit its anticipated requests for monthly water deliveries for the upcoming year. The State confirms the District's request or provides the District with the anticipated percentage allocation by December 1. The estimated percentage delivery is then adjusted during the spring based on estimated runoff.

Blending of San Francisco Regional System Water with Groundwater

RWS supply can be taken at any of eight takeoff locations throughout the District's distribution system. This water supply is significantly lower in hardness than the District's local groundwater supplies. The District blends the RWS supply with higher hardness groundwater at the District's Blending Facility with the objective of providing a uniform water quality with hardness levels similar to those of other sources of supply. Since the Blending Facility has come on-line, most of the RWS supply has been taken at the Fremont takeoff connection for direct delivery to the Blending Facility.

3.4 SOURCE WATER QUALITY

As required by law, Drinking Water Source Assessments are conducted to determine the vulnerability of the District's drinking water sources to contamination. As described below, assessments have been completed for all of the District's water sources:

- The San Francisco Public Utilities Commission completed its assessment in 2000. It was found that the SFPUC's watersheds are vulnerable to contaminants associated with wildlife and, to a limited extent, human recreational activity. Historically, the levels of contamination have been very low in the watersheds.

- The South Bay Aqueduct Source Assessment was completed in 2002 to evaluate potential vulnerabilities to the District's SWP supplies. This source is most vulnerable to agricultural drainage, wastewater treatment plant discharges, urban runoff, recreational usage of the water, and cattle grazing. In addition, saltwater intrusion in the Delta contributes salt and bromide to the water supply.

- The District's assessment of local groundwater sources was also completed in 2002. This assessment concluded that local groundwater is most vulnerable to gas stations, known contaminant plumes, confirmed leaking underground fuel tanks, dry cleaners, metal plate/finishing/fabricating, and sewer collection. The potential for saltwater intrusion into the aquifer system is also of concern to the District.

Although District raw water sources are vulnerable to potentially contaminating activities, the District's treatment and blending facilities ensure that all potable water delivered by the District meets the strict standards set by state and federal regulatory agencies. In addition, the District's groundwater management program (see Chapter 4) has been developed to protect the local groundwater supplies from contamination. As such, under most future scenarios, it is not anticipated that future changes to source water quality will adversely impact the long-term availability or reliability of these supplies. However, catastrophic events (i.e., levee failures in the Delta resulting in saltwater intrusion impacts on Delta supplies) or other unforeseen circumstances may impact District supplies and their reliability, resulting in water supply shortages. Chapter 10 (Water Shortage Contingency Plan) addresses potential future shortages.

3.5 WATER SUPPLY UNCERTAINTIES

The purpose of this section is to identify factors which may impact current planning assumptions, the significance and magnitude of which are currently unknown. As described below, the potential impacts of global warming are a key uncertainty which may impact all District supplies. In addition, each of the District's supplies face uncertainties which may be unique to the source of supply. A summary of water supply uncertainties facing the District's supplies is provided in Table 3-5 and discussed in greater detail below. This includes a discussion of how climate change may impact the District's supplies, followed by a discussion of additional sources of uncertainty for each source of supply.

Table 3-5
Summary of Potential Future Factors that may Influence District Water Supply Reliability

SUPPLY	***Factor***		
	Legal & Environmental	***Water Quality***	***Climatic***
Imported Supplies			
- SWP	ESA* requirements may constrain Delta pumping	Potential saltwater intrusion impacts if Delta Levees fail.	Supply is dependent on hydrologic conditions
- SFPUC RWS	ESA and other permitting requirements may require additional reservoir releases	None anticipated	Supply is dependent on hydrologic conditions
Local Supplies			
- Groundwater Recharge	ESA requirements may impact groundwater recharge operations Upstream water management activities and/or agreements with upstream agencies may impact supply availability	Upstream water management activities and/or land use activities may impact water quality	Supply is dependent on hydrologic conditions Sea level rise may constrain usable storage of Niles Cone groundwater basin
- Groundwater Storage	None anticipated	None anticipated	Supply is dependent on availability of water to store in wet years
- Del Valle	ESA requirements may require downstream flow releases	None anticipated	Supply is dependent on hydrologic conditions
- Desalination	None anticipated	None anticipated	Supply is dependent on local groundwater conditions
- Recycled Water	None anticipated	None anticipated	None anticipated
Banking/Transfers			
- Semitropic Banking	Delta pumping constraints may impact ability to recover water through SWP exchanges Sustainable Groundwater Management Act (SGMA) could impact future operations of the bank	Banked groundwater may require treatment	Supply is dependent on availability of water to store in wet years

* Endangered Species Act

State Water Project Supplies

The reliability of the District's SWP supplies will continue to remain uncertain due to the on-going concerns regarding the sustainability of the Delta. These concerns include the Delta ecosystem and potential future environmental regulations, levee stability and the potential for catastrophic failure of these levees, urban encroachment within the Delta, and water quality within the Delta due to urban and agricultural discharges.

An ongoing planning effort to increase long-term supply reliability for both the SWP and Central Valley Project (CVP) is taking place through the Bay Delta Conservation Plan (BDCP) process. The co-equal goals of the BDCP are to improve water supply reliability and restore the Delta ecosystem. The BDCP is being prepared through a collaboration of state, federal, and local water agencies, state and federal fish agencies environmental organizations, and other interested parties. Several "isolated conveyance system" alternatives are being considered in the plan that would divert water from the north Delta to the south Delta where water is pumped into the south-of-Delta stretches of the SWP and CVP. The new conveyance facilities would allow for greater flexibility in balancing the needs of the estuary with the reliability of water supplies. The plan would also provide other benefits, such as reducing the risk of long outages from Delta levee failures.

The BDCP has been in development since 2006 and is currently undergoing extensive environmental review. The Draft BDCP and its associated Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) were released for public review in December 2013. In response to public comments, the BDCP was reevaluated, and in April 2015 the lead agencies announced a modified alternative which effectively split the project into two parts: the conveyance portion (known as Cal WaterFix), and the restoration portion (known as EcoRestore). The Cal WaterFix alternative is evaluated in a partially recirculated draft environmental document (Recirculated Draft EIR/Supplemental Draft EIR) that was released for public review in July 2015. That environmental document is not anticipated to be final until at least 2016.

While there is widespread support for the BDCP/Cal WaterFix project, plans are currently in flux and environmental review is ongoing. Additionally, several regulatory and legal requirements must be met prior to any construction. Because of this uncertainty, any improvements in SWP supply reliability or other benefits that could result from this proposed project are not included in this Plan.

Delta Disruption due to low water supply availability On January 31, 2014, DWR announced a 0% Table A allocation for the first time in its 54-year history. Although the allocation was subsequently raised to 5%, this water was not available before September 1, 2014, after the typically high summer demand season. Being situated downstream of the Delta but upstream of the major water storage facilities of the SWP, the District was in a uniquely vulnerable position. Among other factors, this disruption of the SWP created an uncertainty surrounding the District's ability to access remotely stored supplies in Semitropic Groundwater Bank and San Luis Reservoir leading the District to declare a Water Shortage Emergency targeting 20% conservation District-wide, following plans outlined in the Chapter 10 of the UWMP (Water Shortage Contingency Plan).

Despite this low allocation, DWR's DCR modeling scenarios still considers the minimum reliability to be between 8% and 11% in the various scenarios as documented in Table 3-2. The 2014 condition has been described as the result of a rare sequence of extreme hydrology in water year 2013.[5] October through December 2012 was one of the wettest fall periods on record, but was followed by the driest consecutive 12 months on record. The 2013 hydrology ended up being even drier than DWR's conservative hydrologic forecast, resulting in initial reservoir storage levels for 2014 that were lower than targeted levels with less stored water available for 2014 supplies. Compounding this low initial storage situation, 2014 also was an extremely dry year, with runoff for water year 2014 being the fourth driest on record. Due to the extraordinarily dry conditions in 2013 and 2014, the 2014 Table A allocation was a historic low only 5%. The

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

unusual hydrologic conditions are not included in the DCR which only runs through year 2003.[6] It is anticipated that the hydrologic record used in the DWR model will be extended to include the period through 2014 during the next update of the model, which is expected to be completed prior to 2017.

Additional information on potential factors affecting SWP reliability is provided in Appendix B.

Semitropic Banking Program

The District faces some uncertainty with regard to recovery of water from the Semitropic Banking Program. These uncertainties include: 1) water quality concerns with regard to groundwater from Semitropic that is pumped back into the California Aqueduct; 2) the availability of exchange and/or delivery capacity to deliver water to or recover water from Semitropic; and 3) repercussions of the recent Sustainable Groundwater Management Act (SGMA) on the operations of the Banking Program. With regards to the water quality issues, in 2013 Semitropic initiated a Raw Water Processing Facility (RWPF) to capture raw water constituents of concern before the groundwater is pumped into the California Aqueduct. Since initiation in 2013, Semitropic was able to meet or exceed DWR's water quality pump-in criteria, therefore reliability concerns associates with Water Quality have been greatly reduced. It is possible that in the future additional constituents of concern could be identified and Semitropic may be required to expand or revise its RWPF. With regards to the exchange and delivery capacities needed to both deliver water to and recover dry year supplies from Semitropic, the District has coordinated with Semitropic, DWR, and other Semitropic Banking partners to ensure coordination of the planned use of the Semitropic delivery and recovery capacity and the needed exchanges. During the recent drought in 2014, Semitropic demonstrated the ability to return the District's banked supplies even during the temporary 0% Table A allocation. However, the risk remains that, under certain critical dry year conditions, the District may be limited in its ability to recover its contractual recovery capacity from Semitropic. Potential mitigation measures to minimize the risk associated with the constraints in Semitropic dry year recovery. These measures may include: 1) re-operation of local and other storage available to the District (i.e. Niles Cone Groundwater Basin, Del Valle Reservoir, San Luis Reservoir) in coordination with recovery from Semitropic; 2) non-project water storage options such as Los Vaqueros Reservoir; and 3) alternative dry year supply programs.

San Francisco Regional Water System

In order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability, and water supply, the SFPUC is undertaking a Water System Improvement Program (WSIP). Completion of the projects in the WSIP is critical for the SFPUC in order to achieve the stated reliability goals for the RWS. However, it is currently uncertain if the SFPUC will be successful in fully implementing this program, and if it will be accomplished in a timely manner. Other factors that may impact the reliability of RWS supplies include environmental regulations and permitting requirements for its Hetch-Hetchy and local watershed facilities and operations.

Additional information on potential factors affecting the RWS reliability is provided in Appendix B.

Local Supplies

In addition to potential climate change impacts, the availability of the District's local supplies may be influenced by a variety of other factors including additional operational and facility modifications to accommodate on-going Alameda Creek fishery restoration efforts (beyond those included in the March 2011 preliminary agreement with NMFS/DFG). Upstream land use, flood control and water supply projects in the Alameda Creek Watershed may also impact the supply and quality of water available at the District's groundwater recharge facilities. There also may be uncertainties regarding the operation of water supply facilities in the Alameda Creek Watershed, including Calaveras and San Antonio Reservoirs and Del Valle

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

Reservoir. The SFPUC is currently preparing a CEQA study for a proposed Alameda Creek Recapture Project (ACRP), intended to recover water lost as a result of providing environmental flows from Calaveras Dam and the Alameda Creek Diversion Dam; currently the impacts of the ACRP on downstream flows and District recharge operations is unknown. Other uncertainties include a previous agreement between the District and the SFPUC to provide water to the District for groundwater recharge during a period when the Niles Cone Groundwater Basin was in overdraft condition and threatened by saltwater intrusion. Similarly, efforts to develop groundwater supplies by adjacent entities may also impact the District's groundwater supply availability. The District is currently working to address these items. However, it is not clear whether or not these issues will ultimately impact the District's local supplies.

Climate Change

The issue of climate change has become an important factor in water resources planning in California, and is frequently considered in urban water management planning purposes, though the extent and precise effects of climate change remain uncertain. There is convincing evidence that increasing concentrations of greenhouse gasses have caused and will continue to cause a rise in temperatures around the world, which will result in a wide range of changes in climate patterns. Moreover, observational data show that a warming trend occurred during the latter part of the 20th century and virtually all projections indicate this will continue through the 21st century. These changes will have a direct effect on water resources in California, and numerous studies have been conducted to determine the potential impacts to water resources. Based on these studies, climate change could result in the following types of water resource impacts, including impacts on the watersheds in the Bay Area:

- Reductions in the average annual snowpack due to a rise in the snowline and a shallower snowpack in the low and medium elevation zones and a shift in snowmelt runoff to earlier in the year;
- Changes in the timing, intensity and variability of precipitation, and an increased amount of precipitation falling as rain instead of as snow;
- Long-term changes in watershed vegetation and increased incidence of wildfires that could affect water quality and quantity;
- Sea-level rise and an increase in the potential for saltwater intrusion in the Delta and Coastal aquifers such as the Niles Cone;
- Increased water temperatures with accompanying potential adverse effects on some fisheries and water quality;
- Increases in evaporation and transpiration (irrigation need); and
- Changes in urban and agricultural water demand.

Each of the District's supply sources will be effected uniquely by climate change and are discussed below.

State Water Project: In addition to changed weather patterns, the SWP is anticipated to have operational challenges in the Delta stemming from climate change as well. DWR notes:

> *"climate change poses the threat of increased variability in floods and droughts, and sea level rise complicates efforts to manage salinity levels and preserve water quality in the Delta so that the water remains suitable for urban and agricultural uses. Among the other challenges are continued subsidence of Delta islands, many of which are already below sea level, and the related threat of a catastrophic levee failure as water pressure increases on fragile levees."* (DWR, *State Water Project Delivery Capability Report 2015*)

DWR coordinates with the Climate Action Team (CAT) in order to capture changing weather patterns and the impacts of sea-level rise in the DCR. The CAT reports that SWP reliability will be further diminished in the future with impacts beginning to become significant in the latter half of the 21st century. However, the water supply impacts anticipated from climate change are minimal during the 20-year purview of the UWMP; these impacts include climate impacts from the 2025 Green House Gas (GHG) emission assumptions and 15-cm of assumed sea-level rise.

San Francisco Regional Water System: Climate change research by the SFPUC began in 2009 and continues to be refined. In its 2012 report "Sensitivity of Upper Tuolumne River Flow to Climate Change Scenarios," the SFPUC assessed the sensitivity of runoff into Hetch Hetchy Reservoir to a range of changes in temperature and precipitation due to climate change. Key conclusions from the report include the following:

- With differing increases in temperature alone, the median annual runoff at Hetch Hetchy would decrease by 0.7-2.1 percent from present-day conditions by 2040 and by 2.6-10.2 percent from present-day by 2100. Adding differing decreases in precipitation on top of temperature increases, the median annual runoff at Hetch Hetchy would decrease by 7.6-8.6 percent from present-day conditions by 2040 and by 24.7-29.4 percent from present-day conditions by 2100.
- In critically dry years, these reductions in annual runoff at Hetch Hetchy would be significantly greater, with runoff decreasing up to 46.5 percent from present day conditions by 2100 utilizing the same climate change scenarios.
- In addition to the total change in runoff, there will be a shift in the annual distribution of runoff. Winter and early spring runoff would increase and late spring and summer runoff would decrease.
- Under all scenarios, snow accumulation would be reduced and snow would melt earlier in the spring, with significant reductions in maximum peak snow water equivalent under most scenarios.

Currently, the SFPUC is planning to conduct a comprehensive assessment of the potential effects of climate change on water supply. The assessment will incorporate an investigation of new research on the current drought and is anticipated to be completed in late 2016 or early 2017.

Both the District and SFPUC participated in the 2013 update of the Bay Area Integrated Regional Water Management Plan (BAIRWMP), which includes an assessment of the potential climate change vulnerabilities of the region's water resources and identifies climate change adaptation strategies. These works are summarized in Appendix B.

Local Groundwater: In 2003, and then again in an update prepared in August of 2005, the Pacific Institute for Studies in Development, Environment and Security prepared a literature search report for DWR, which summarized recommendations for coping with and adapting to climate change from key peer-reviewed publications and specifically considered the potential impacts of climate change on groundwater. The Pacific Institute's report is entitled, *Climate Change and California Water Resources: A Survey and Summary of the Literature,* by Michael Diparsky and Peter H. Gleick, Pacific Institute (*Climate Change and Water Resources*).

Climate Change and Water Resources found that little work has been done on the impacts of climate change for specific groundwater basins, or for general groundwater recharge characteristics or water quality. As the following conclusions from the report illustrate, the potential impacts of climate change on groundwater resources are divided, with some potentially resulting in increased availability of groundwater and others potentially resulting in less.

- Changes in recharge will result from change in effective rainfall as well as a change in the timing of the recharge season. Increased winter rainfall could lead to increased groundwater recharge.

- Higher evaporation or shorter rainfall seasons could mean that soil deficits persist for longer periods of time, shortening recharge seasons.

- Because a significant portion of winter recharge comes from deep percolation of precipitation below the rooting zone, warmer winter temperatures between storms would be expected to increase and dry out the soil between storms. A greater amount of rain in subsequent storms would then be required to wet the root zone and provide water for deep percolation.

- Sea-level rise could affect coastal aquifers through saltwater intrusion.

- Warmer, wetter winters would increase the amount of runoff available for groundwater recharge. However this additional runoff would be occurring at a time when some basins are either being recharged at their maximum capacity or are already full.

- Reductions in spring runoff and higher evapotranspiration because of higher temperatures could reduce the amount of water available for recharge.

- In 2009, the District performed a preliminary modeling study to evaluate future impacts on groundwater levels and legacy saltwater intrusion in the Niles Cone in response to hypothetical increases in sea level. The District has shared the results with the Coastal Hazards Adaptation Resiliency Group (CHARG).

CHAPTER 4
GROUNDWATER

This chapter describes the Niles Cone Groundwater Basin, the District's reliance on it as a source of water supply and the District's policy and activities for managing it.

4.1 BACKGROUND

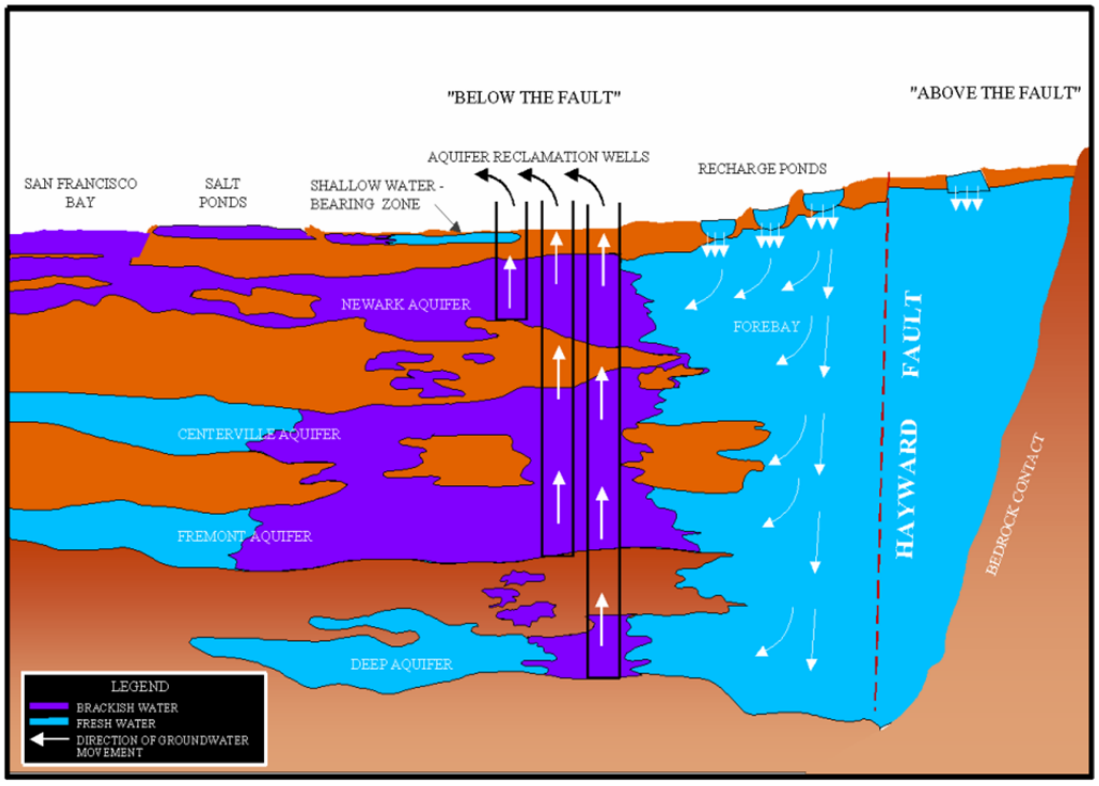
As described in Chapter 3 (Sources of Supply), the Niles Cone Groundwater Basin provides a significant source of water supply for the District's service area. The Niles Cone Groundwater Basin is a conjunctively managed basin. Local runoff along with imported water is percolated into the Niles Cone Groundwater Basin through recharge in Alameda Creek itself and through recharge ponds within Quarry Lakes Regional Recreational Area and adjacent areas. Most recharge of surface water occurs in the wet season, with most groundwater extraction occurring during the dry season, and excess water is stored in the basin during wet years for recovery during dry years when local and imported supplies may be significantly cut back. Because of its importance as a local water supply, the protection of this valuable local resource has long been a high priority for the District. The Niles Cone Groundwater Basin is sustainably managed by the District and is not an adjudicated basin nor is it considered to be in an "overdraft" or "potentially overdraft" condition by the DWR (source: DWR Bulletin 118 - Update 2003).

Niles Cone Groundwater Basin Hydrogeology

Since 1914, the District has actively managed and protected the water in the Niles Cone Groundwater Basin and conserved the water of the Alameda Creek Watershed. The Niles Cone Groundwater Basin (Niles Cone Sub-basin 2-09.01) was established as the southern portion of the east bay area bounded on the south by the Alameda-Santa Clara County boundary and on the north by the boundary of Alameda County Water District, and southern portions of the City of Hayward. The only detachments in the northern extent of the District's boundary (within the southern portions of the City of Hayward) occurred in 1973, 2000, and 2004, when the District worked cooperatively with the City of Hayward to detach (through the Alameda County Local Agency Formation Commission) properties in order for the City of Hayward to provide water service while ensuring (through agreements) that the District retained authority to manage the groundwater basin (see Figure 4-2).

The Niles Cone Groundwater Basin is an alluvial aquifer system consisting of unconsolidated gravel, sand, silt, and clay, which is divided by the Hayward Fault. The fault is a relatively impermeable barrier that impedes the flow of groundwater, hence dividing the overall basin into two sub-basins. The portion of the Niles Cone Groundwater Basin on the east side of the Hayward Fault is generally referred to as the "Above Hayward Fault Sub-basin" (AHF) and the portion on the west side of the Hayward Fault is generally referred to as the "Below Hayward Fault Sub-basin" (BHF). Large differences in water levels on either side of the fault demonstrate the relatively impermeable nature of the fault. Over time, the alluvial/fluvial depositional environment produced thick coarse grain sediments along present day Alameda Creek and also along historic stream channels (now buried). With distance westward, both the thickness and grain size of the aquifers decreases while the intervening clay aquitards become thicker (DWR, 1967). The aquitards appear to be absent just west of the Hayward Fault in the hydrogeologic region called the forebay area. Figure 4-1 provides a cross-section based on a DWR conceptual figure (DWR, 1968).

Figure 4-1
Niles Cone Groundwater Basin Schematic



The AHF sub-basin on the east side of the Hayward Fault is composed of highly permeable sediments referred to as the AHF Aquifer. The BHF sub-basin is composed of a series of relatively flat lying aquifers separated by extensive clay aquitards. The shallowest regional aquifer in the BHF sub-basin, the Newark Aquifer, is an extensive permeable gravel and sand layer between 40 and 140 feet below ground surface (bgs), except in the forebay (inland) area where it begins at the surface. The thickness of the Newark Aquifer ranges from less than 20 feet at the western edge of the basin to more than 140 feet at the Hayward Fault (DWR, 1968). The Newark Aquifer is overlain in most of the sub-basin by a thick layer of silt and clay called the Newark Aquiclude (DWR, 1968). The Newark Aquiclude is absent in the forebay area, allowing direct recharge to the Newark Aquifer from Alameda Creek and the recharge ponds. Within the Newark Aquiclude, discontinuous layers of sand and silt comprise a non-regional hydrogeologic unit known commonly as the shallow water-bearing zone.

An extensive thick clay aquitard separates the Newark Aquifer from the Centerville Aquifer. The Centerville Aquifer, the top of which lies at an average depth of 180 to 200 feet bgs, overlies a thick clay aquitard, which in turn overlies the Fremont Aquifer which exists in the interval of 300 to 390 feet bgs. The Centerville and Fremont Aquifers are considered as one combined aquifer (Centerville-Fremont Aquifer) in some parts of the basin based on lithology and water level data that indicate that they are in good hydrogeologic connection. However, water level and water chemistry results from recently installed wells indicate that, in some areas of the basin, these two aquifers are isolated from each other.

The deepest water-bearing units, referred to collectively as the Deep Aquifers, are present at approximately 400 and 500 feet bgs (and possibly deeper) and are separated from the overlying Fremont Aquifer by a competent regional aquitard. Also, based on the District's lithologic data and DWR (1967), these deep aquifers are both hydraulically separated and connected by the presence or absence of intervening clays dependent on the location in the basin, and extend beyond the limits of the Niles Cone Groundwater Basin to act as conductive layers for the migration of groundwater out of the basin.

The AHF Aquifer is both unconfined and confined due to the presence of local low permeability layers. The Newark Aquifer is confined in all areas except in the forebay area, where the overlying aquitard is absent. The Centerville-Fremont and Deep Aquifers are both confined.

Groundwater Quality

Groundwater quality in all of the AHF and much of the BHF is acceptable for potable use; however, groundwater quality in certain areas of the BHF aquifers remains degraded by legacy saltwater intrusion. The District regularly monitors the basin for saltwater intrusion (chloride and Total Dissolved Solids) and the results are provided in its annual Groundwater Monitoring Report. In addition, the District has monitored the basin for nitrate as part of an effort to prepare a salt and nutrient management plan. In general, groundwater in the basin was found to meet regulatory limits for nitrate, with exception of a few wells screened in the Centerville-Fremont Aquifer and located in the north part of the basin.

The Niles Cone Groundwater Basin is a coastal aquifer system hydraulically connected to the Bay and is subject to saltwater intrusion should groundwater levels fall below mean sea level in the Newark Aquifer. The saltwater intrusion was first noticed in the 1920's and occurred due to historical pumping that created chronic overdraft of the basin. Many years of this chronic overdraft caused the groundwater levels in the Newark Aquifer to drop below sea level. This relative elevation difference between the groundwater in the basin and the saline water from San Francisco Bay caused a landward direction of groundwater flow through the Newark Aquifer and intrusion of saltwater into the groundwater basin. Several decades of saltwater intrusion occurred and saline water migrated as far as the forebay area. The piezometric heads in the deeper aquifers are generally lower than that of the Newark Aquifer, and the aquitards separating the aquifers are thin to absent in the forebay area. As a result, saline water in the forebay area migrated downward from the Newark Aquifer and into the lower aquifers. Also, saline water may have migrated downward from the Newark Aquifer to the deeper aquifers through abandoned and improperly sealed water wells.

Since 1962, when supplemental water was first purchased from the State Water Project (SWP), the District has been engaged in a continuous water replenishment/recharge program in order to sustainably manage the quality and quantity of water in the Niles Cone Groundwater Basin while balancing and protecting environmental resources. Expansion and improvement of the District's recharge facilities has aided this effort and increased capture of local water for groundwater replenishment. The District's recharge efforts, in addition to the District's use of imported water, have caused water levels to slowly rise above sea level.

As a result, water levels in the Newark Aquifer were restored above sea level by 1972 and the hydraulic gradient was returned to its natural bayward direction in the Newark Aquifer. Although there has been substantial improvement in the basin, a considerable volume of saline water still remains in the aquifers. As described below, the District has also implemented an Aquifer Reclamation Program (ARP) to pump out brackish groundwater from the impacted areas of the aquifer system. Historically, this brackish water has been discharged back to San Francisco Bay through local flood control channels. However, most of it is now treated at the Newark Desalination Facility for potable use.

In order to protect the Niles Cone Groundwater Basin from further saltwater intrusion, the District's operational goals are to maintain groundwater levels above sea level in the Newark Aquifer system. During critically dry periods the District may temporarily reduce groundwater levels slightly below sea level (no lower than -5 feet mean sea level), in the Newark Aquifer in the forebay area. Groundwater modeling analysis has indicated that temporarily drawing the aquifer down in this inland area can provide additional supply in critically dry years without impacting the integrity of the Basin.

Groundwater Facilities

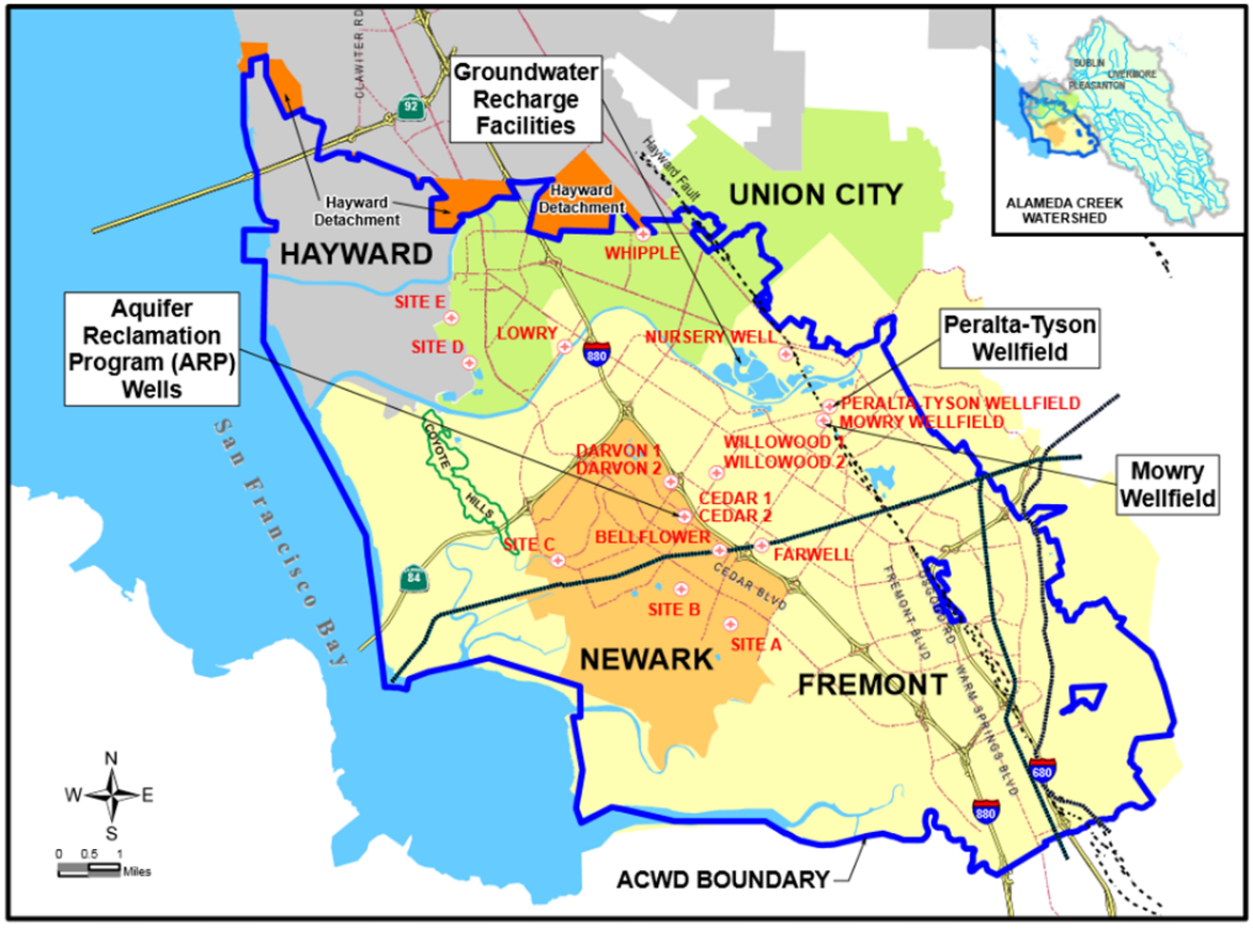
The District's groundwater management activities include groundwater recharge as well as production. As shown on Figure 4-2, the District's groundwater facilities include production wellfields and groundwater recharge facilities. Currently, 16 wells are available for production; eight of the wells are located in the

Peralta-Tyson Wellfield in the AHF sub-basin; and the remaining eight wells are located in the Mowry Wellfield in the BHF sub-basin.

The Niles Cone Groundwater Basin is recharged through (1) deep percolation of rainfall and applied water, and (2) percolation of water in Alameda Creek received at the District's groundwater recharge facilities. Most of the water for this artificial recharge program is from Alameda Creek Watershed runoff and the remainder is imported supplies released to tributaries of Alameda Creek. Water percolates into the groundwater basin through the stream channel bed and through the District's off-stream recharge ponds. The District utilizes inflatable rubber dams in the channel to divert water from the creek into the ponds.

As described below, the District's Aquifer Reclamation Program, which is designed to remove and control the movement of intruded saline water, has been in operation since 1974. The program facilities consist of eleven wells. These wells also provide the source water for the Newark Desalination Facility. This facility removes salts and other impurities from the brackish groundwater and provides the treated water as a source for the District's distribution system.

Figure 4-2
District Groundwater Facilities



Aquifer Reclamation Program

As discussed under Groundwater Quality, the District's aggressive artificial recharge program and its use of imported water in lieu of groundwater have caused water levels to slowly rise above sea level. Thus, further saltwater intrusion has been prevented and saline water in the Newark Aquifer is now flushed towards San Francisco Bay. However, because the Centerville-Fremont and Deep Aquifers are not in

direct hydraulic connection with San Francisco Bay, saline water in those deep aquifers cannot be easily flushed back by simply raising groundwater levels. Consequently, there are trapped pockets of saline water in these deeper aquifers.

In 1974, the District initiated its Aquifer Reclamation Program (ARP) to restore water quality in the groundwater basin by removing the saline water trapped in the aquifer system. The District has a total of eleven ARP wells. Brackish groundwater from five of the ARP wells is utilized as the source water for the District's Newark Desalination Facility, with any excess pumped brackish groundwater discharged to San Francisco Bay through flood control channels. The quality of groundwater in the basin is improved as recharge water replaces the pumped brackish groundwater and prevents the plume of brackish water from further migrating toward the District's Mowry Wellfield.

Groundwater Elevations

The District actively manages the Niles Cone Groundwater Basin to prevent groundwater overdraft conditions that could lead to future saltwater intrusion and groundwater overdraft. The Spring/Fall Groundwater Monitoring Program, initiated in 1961, is a semiannual field effort to document the status of wells, obtain water level measurements, and collect water samples. The data collected is summarized in an annual groundwater monitoring report prepared by the District.

The Spring/Fall Groundwater Monitoring Program is a semiannual program since groundwater elevations throughout the basin fluctuate seasonally. The Spring Program is conducted to provide insight into subsurface conditions throughout the District when water levels tend to be at their highest levels. The Fall Program's purpose is to update information on groundwater flow and quality and to provide insight into subsurface conditions when water levels tend to be at their lowest levels. However, the District operates the groundwater facilities to maintain elevation in the Newark Aquifer above sea level with a positive groundwater gradient from the inland area (at the recharge ponds) towards San Francisco Bay. The groundwater elevations in the Centerville/Fremont and Deep Aquifers are generally lower than that of the Newark Aquifer, thereby allowing percolation from the Newark Aquifer to these deeper aquifers. Because the District operates the groundwater basin in a balanced "put and take" mode, groundwater elevations over the past thirty years have remained fairly consistent (within a typical operating range), and there have been no long-term trends that suggest the basin is in overdraft condition.

4.2 GROUNDWATER MANAGEMENT

The District has been managing the Niles Cone Groundwater Basin (also referenced as the Niles Cone Sub-basin 2-09.01) pursuant to its statutory authority under the County Water District Law (California Water Code Section 30000 et seq.), the Replenishment Assessment Act of the Alameda County Water District (Chapter 1942 of the Statutes of 1961, as amended in 1970 and 1974), the Alameda County Water District Groundwater Protection Act (California Water Code Section 31142.20 et seq.), as well as, through agreements with the cities of Fremont, Union City, Newark, and Hayward (in the context of the detachment of certain areas for purposes of allowing Hayward to provide potable water service in certain areas while the District retained authority to manage the groundwater basin). In addition, Alameda County Water District is identified within the Sustainable Groundwater Management Act as an agency created by statute to manage groundwater and deemed to be the exclusive local agency to comply with the Sustainable Groundwater Management Act (California Water Code Section 10723 et seq.).

The Governor signed the Sustainable Groundwater Management Act (SGMA) into law on September 16, 2014, establishing a new structure for groundwater management, recognizing that groundwater management in California is best accomplished locally. Since the District is identified in SGMA as an exclusive local agency, the District can comply with SGMA by either meeting specific requirements outlined in SGMA for functionally equivalent plans or by becoming a groundwater sustainability agency. The framework for how SGMA will be implemented is still in development. However, the implementation of SGMA will not have a negative impact on the reliability of local groundwater supply.

4.3 GROUNDWATER MANAGEMENT AND PROTECTION POLICY

The District's Groundwater Management Policy (Policy) adopted on January 26, 1989, (prior to Assembly Bill 3030) and as amended on March 22, 2001, was formally adopted by the District's Board of Directors through Resolution No. 01-021 (prior to Senate Bill 1938). The District developed and adopted a policy instead of a groundwater management plan because it reflects a pre-existing institutional framework for management of groundwater resources in the Niles Cone Groundwater Basin already established through special acts of the Legislature and other means. The Policy is intended to serve as a guide in the continued development and implementation of programs to manage and protect the Niles Cone Groundwater Basin and as a nontechnical document to explain the District's groundwater programs to members of the public. To implement the Policy, two reports are produced annually: Groundwater Monitoring Report and Survey Report on Groundwater Conditions. As recognized by DWR during the Local Groundwater Assistance grant application process, the District's amended Policy along with the District's Replenishment Assessment Act and current versions of the District's Groundwater Monitoring Report and Survey Report on Groundwater Conditions are considered to be an appropriate Groundwater Management Plan. Every year, updated versions of these reports are submitted to DWR; the most recent submittal to DWR was on July 14, 2015.

A copy of the District's Groundwater Management Policy is provided in Appendix C.

Groundwater Management Policy Statement

The District's groundwater management policy statement is in part as follows:

> *It is the policy of the Alameda County Water District to efficiently protect and manage the Niles Cone Groundwater Basin to ensure a reliable supply of high quality water that satisfies present and future municipal, industrial, recreational, and agricultural water needs in the ACWD service area. ACWD will develop and implement appropriate programs within the ACWD service area to protect and manage the groundwater basin as a long-term source of water supply for ACWD. ACWD will also actively protect the groundwater basin from activities outside the ACWD service area that may negatively impact the water quality and/or water supply of the basin.*

Policy Objectives

The purpose of the Groundwater Management Policy is to protect and improve the District's groundwater resources for the benefit of both the District's customers and private well owners by taking actions designed to meet the following objectives:

- Increase groundwater replenishment capability.

- Increase the usable storage capacity of the groundwater basin.

- Operate the basin to provide:
  - A reliable water supply to meet baseload and peak distribution system demands,
  - An emergency source of supply, and
  - Reserve storage to augment dry year supplies.

- Protect groundwater quality from degradation from any and all sources including: saline water intrusion, wastewater discharges, recycled water use, urban and agricultural runoff, or chemical contamination.

- Improve groundwater quality by:
  - Removing salts and other contaminants from affected areas of the basin, and
  - Improving the water quality of source water used for groundwater recharge.

4.4 GROUNDWATER MANAGEMENT PROGRAMS

The following eight major groundwater management programs have been developed and implemented by the District to achieve the District's Groundwater Management Policy objectives:

- Water Supply Management
- Groundwater Replenishment
- Watershed Protection and Monitoring
- Basin Monitoring
- Wellhead Protection Program
- Aquifer Reclamation Program
- Groundwater Protection Program
- Well Ordinance Administration

A brief summary of each of these programs is provided in Table 4-1. A detailed description of each program is included in the Groundwater Management Policy which is attached in Appendix C.

In addition to the programs identified above, the District participates in the California Statewide Groundwater Elevation Monitoring (CASGEM) program. The CASGEM Program was established in response to State Legislation which mandates a statewide monitoring program to track seasonal and long-term groundwater elevation trends in California's groundwater basins. In 2012, the District was designated by the California Department of Water Resources (DWR) as a Monitoring Entity for the Niles Cone Groundwater Basin. As a Monitoring Entity, the District developed a monitoring plan and regularly submits groundwater level measurements to the DWR's online database in an effort to improve the management of California's groundwater resources.

In addition to the above, the District has prepared a draft Salt and Nutrient Management Plan. It is currently being reviewed by the Regional Water Quality Control Board.

4.5 GROUNDWATER RECHARGE AND PRODUCTION

Groundwater recharge occurs primarily through percolation at the District's recharge facilities and natural percolation of rainfall and applied water. Operation of the District's groundwater recharge facilities ensures adequate replenishment of the groundwater basin, and is part of a basin management framework that includes: a) pressurization of aquifers through managed-aquifer-recharge; b) importation of purchased water for managed aquifer recharge when needed to supplement local water; c) basin-wide groundwater level and water quality monitoring through a network of nearly three hundred wells; d) coordination of managed aquifer recharge and well pumping to ensure piezometric heads are maintained above established minimum levels; e) mitigation of legacy saltwater intrusion by maintaining 'state of nature' subsurface saline outflow to San Francisco Bay, and extracting brackish water and converting it for potable use through desalination; f) metering of well pumping (including private wells); and, g) administration of a replenishment assessment program (collecting fees from private pumpers to help pay for groundwater replenishment).

The "production" of groundwater is defined in the Replenishment Assessment Act as the extraction of groundwater by pumping or any other method from shafts, tunnels, wells, excavations, or other sources of groundwater for domestic, irrigation, industrial, or other beneficial uses. Most pumping from the basin is classified as production. Production is categorized as Municipal, Industrial, Non-Municipal Recreation, Agricultural, Municipal Recreation, Aquifer Reclamation, and any other reported pumping as identified in the annual Survey Report on Groundwater Conditions. The District's groundwater pumping includes pumping at the District's Peralta-Tyson and Mowry Wellfields, and pumping from the District's Aquifer Reclamation Program (ARP) wells. Groundwater supplied to the District's distribution system comprises of water pumped from the District's two wellfields and water delivered to the Newark Desalination Facility from certain ARP wells. Saline groundwater outflows represent the groundwater outflows from the Newark Aquifer to San Francisco Bay. As is typical in coastal groundwater basins, groundwater outflows

are required to prevent saltwater intrusion from occurring.

As required by the District's Replenishment Assessment Act, the District meters active wells in the District, and prepares an annual Survey Report on Groundwater Conditions which summarizes the total well production, estimated recharge, and changes in groundwater storage. A summary of groundwater pumping, recharge and change in storage is provided in Table 4-2. As indicated in the table, annual groundwater supply from the District's production wells (Peralta-Tyson and Mowry wellfields) has ranged from 5,900 AF/yr to 18,500 AF/yr over the past ten years. Over the same period, aquifer reclamation pumping has ranged from 4,900 to 12,000 AF/yr and private groundwater pumping has ranged from 1,900 to 3,000 AF/yr. Annual groundwater recharge has ranged from 13,000 AF to 41,500 AF/yr.

Future Use of Groundwater

As described in the District's Integrated Resources Planning Study, the District will continue to rely on the Niles Cone Groundwater Basin as a source of supply for the service area. The District will continue to sustainably manage the groundwater basin whereby groundwater pumping and saline outflows are balanced with groundwater recharge. Year to year variations in recharge, pumping, and saline outflows will occur due to variations in local hydrologic conditions and other factors. Therefore, in some years recharge may exceed the sum of pumping and saline outflows resulting in a temporary imbalance. Similarly, in some years pumping and saline outflows may exceed groundwater recharge, also resulting in a temporary imbalance. However, over the long-term, the operation of the basin will be balanced to ensure that the basin is protected from saltwater intrusion and that reclamation of the basin from previous saltwater intrusion continues. It is anticipated that the District's future groundwater pumping will continue to occur at the Mowry Wellfield, Peralta-Tyson Wellfield, and the Aquifer Reclamation Program wells. The District's projected future use of groundwater under normal and dry year conditions is summarized in Chapter 9 – Water Supply Strategy.

Table 4-1
Summary of the District's Groundwater Management Programs

Groundwater Program	*Description*
Water Supply Management	Planning, managing, and optimizing the District's sources of supply: watershed runoff, SWP water for recharge, SWP water for treatment, SFPUC water for blending, and water banking.
Groundwater Replenishment	Operation of the District's groundwater recharge facilities to optimize 1) capture of local runoff, 2) replacement of water extracted from production and ARP wells, and 3) maintenance of groundwater levels to prevent saltwater intrusion.
Watershed Protection and Monitoring	Assisting in the protection and monitoring of the watershed to optimize the quality of runoff water available for water supply.
Basin Monitoring	Sampling and measuring wells to assess and evaluate 1) groundwater quality, 2) water pressures within the basin, and 3) the direction of groundwater flow.
Wellhead Protection Program	Identify sensitive recharge and groundwater areas, maintain an inventory of potential threats within these areas, assess the vulnerability of source water, and develop management strategies to minimize the potential for groundwater quality impacts.
Aquifer Reclamation Program	Pump brackish water from degraded aquifers in order to 1) increase useable basin storage, 2) improve overall water quality, 3) prevent movement of brackish water toward the District production wells, and 4) provide (future) supply augmentation through treatment to potable water standards.
Groundwater Protection Program	Maintain an active role in 1) assisting with the identification of potential groundwater contamination, 2) implementing monitoring systems at hazardous materials storage sites, and 3) providing technical oversight for investigations and cleanups at hazardous materials spill sites.
Well Ordinance Administration	As enforcing agency for the District's Ordinance No. 2010-01 governing construction, repair, or destruction of wells, exploratory wells and other excavations, the District provides inspection services, collects fees, and performs field searches for abandoned wells which could act as a conduit for contamination of groundwater; and coordinates with city development review processes.

Table 4-2
Groundwater Budget for the Niles Cone Groundwater Basin (AF/yr)
(Source: Annual Survey Report on Groundwater Conditions)

Groundwater Budget Item	*Fiscal Year*									
	2005/06	*2006/07*	*2007/08*	*2008/09*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*2014/15*
Total Net Recharge[1]	41,500	32,400	31,600	28,500	32,400	33,900	18,200	13,000	17,300	31,000
Pumping										
Production Wells	17,500	18,500	14,800	14,200	15,300	12,100	10,500	8,900	8,300	5,900
ARP Wells	11,600	9,900	6,600	4,900	7,000	11,300	12,000	11,000	11,400	11,200
Private Wells	3,000	3,000	2,200	2,100	1,900	2,000	2,600	1,900	2,000	2,000
Total Pumping	**32,100**	**31,400**	**23,600**	**21,200**	**24,200**	**25,400**	**25,100**	**21,800**	**21,700**	**19,100**
Saline Groundwater Outflows	8,400	6,800	7,400	7,400	6,800	6,100	4,700	3,600	300	2,200
Change in Storage	1,000	-5,800	600	-100	1,400	2,400	-11,600	-12,400	-4,700	9,700

Note: (1) Total Net Recharge is calculated as recharge from deep percolation of rainfall and applied water plus recharge at the District's groundwater percolation facilities (including recharge of imported water) less the sum of evaporation losses and "Other Outflows" (as described in the District's annual Groundwater Survey Reports).

CHAPTER 5
DESALINATION

This chapter describes local opportunities for desalination, including the District's Newark Desalination Facility and its associated long-term water supply and water quality benefits.

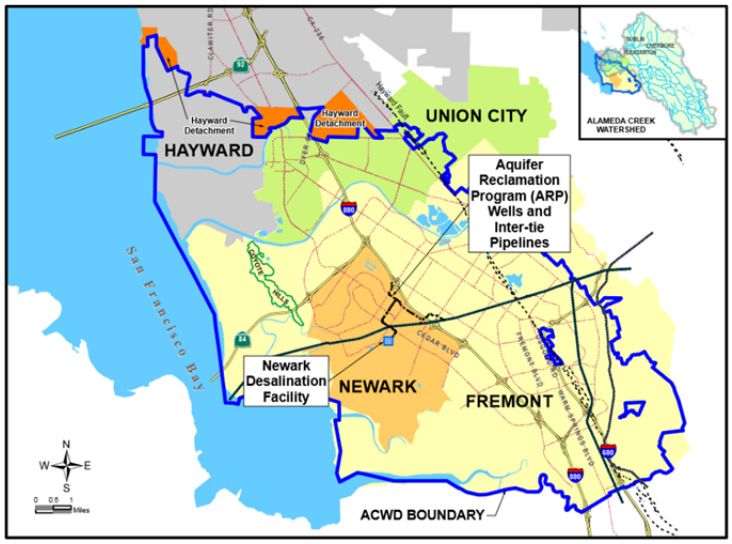
5.1 DESALINATION FACILITY OVERVIEW

The District owns and operates the Newark Desalination Facility (Desal Facility, see Figures 5-1 and 5-2), which uses a reverse osmosis process (RO) to produce up to 10 mgd of RO permeate. Because RO permeate is so low in minerals, it needs to be blended with a small amount of groundwater, which increases the total blended production from the plant up to 12 mgd. The blending process is important to maintain uniform water hardness, meet drinking water standards, and provide necessary corrosion control within the distribution system and customer homes. The source water for the Desal Facility is brackish groundwater provided by the District's Aquifer Reclamation Program (ARP) wells.

Figure 5-1
The Newark Desalination Facility

The purpose of the ARP is to pump out brackish groundwater that is trapped in portions of the otherwise freshwater Niles Cone Groundwater Basin. The brackish water is the result of saltwater intrusion from the bay after many years of historical overdraft and unbalanced operation of the Niles Cone. Today, the ARP is restoring the aquifers and the Desal Facility is providing the District's customers with high quality, low cost, and highly reliable water supply that is locally controlled.

Figure 5-2
Map of the Newark Desalination Facility and Other Facilities



5.2 AQUIFER RECLAMATION PROGRAM

In the early and mid-twentieth century, long before the Desal Facility was commissioned, the groundwater within the Niles Cone Groundwater Basin was drawn far below sea level which resulted in saltwater from the San Francisco Bay being pulled into the aquifer system. Due to efforts made by the District, the saltwater intrusion was halted and reversed in the second half of the twentieth century (Figures 5-3 (a) and 5-3 (b)). Recovery from saltwater intrusion is known to take a long time: decades or even centuries in some cases. The continued recovery of the Niles Cone Groundwater Basin is accelerated with the District's ARP.

Figure 5-3
(a) Areas of the Niles Cone Groundwater Basin impacted by historic saltwater intrusion (1962), and (b) brackish groundwater remaining in the Niles Cone Groundwater Basin (April 2013).

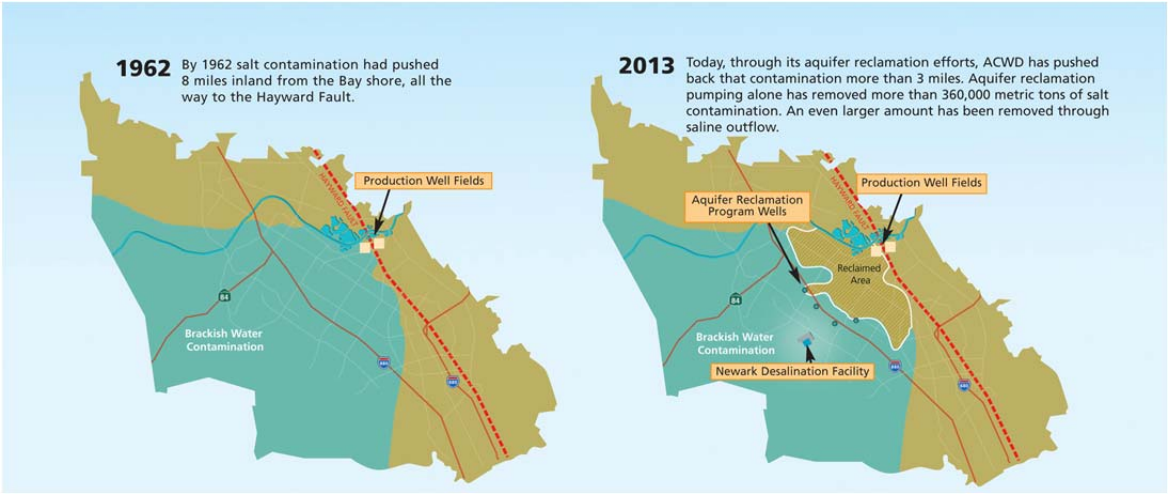
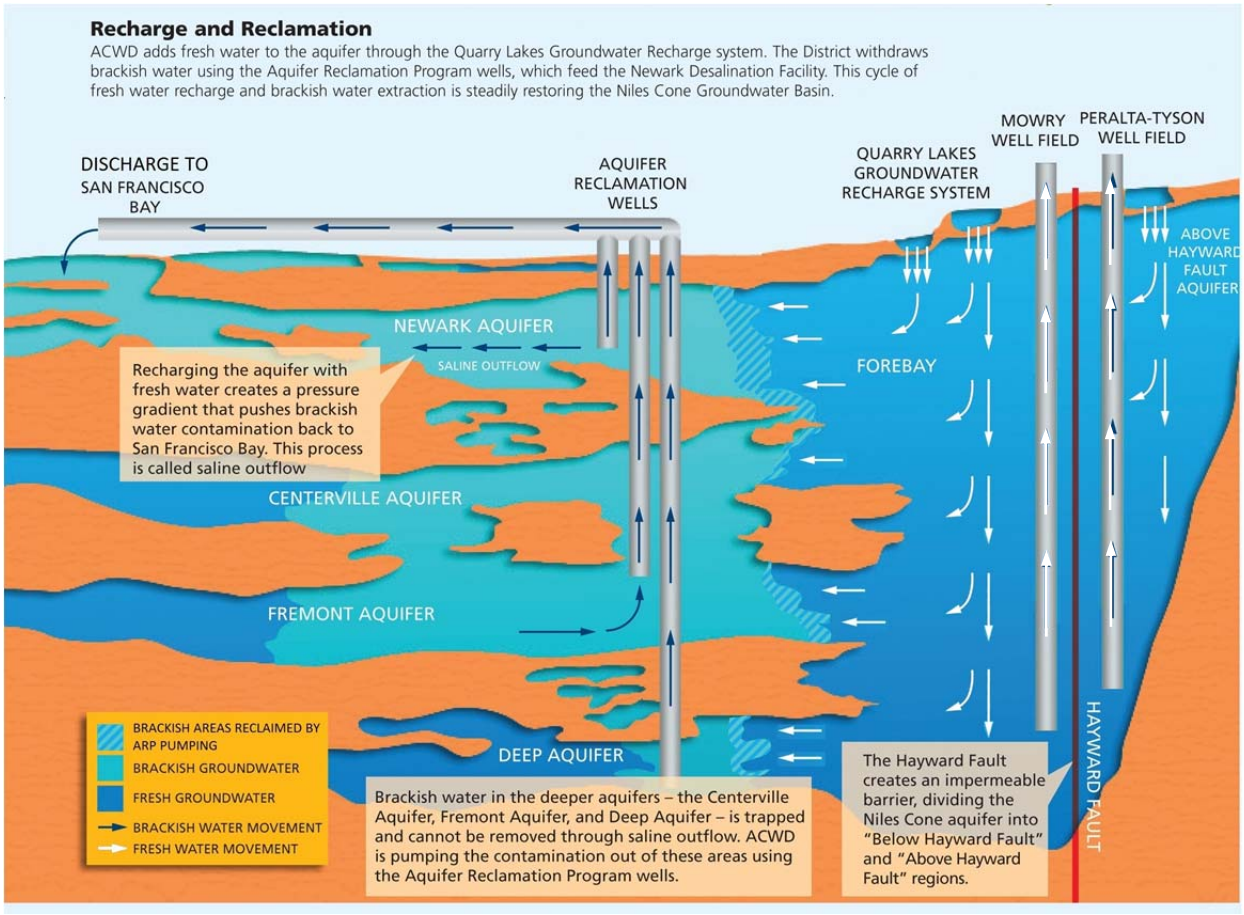


Image source: Reliability by Design, Integrated Resources Planning at Alameda County Water District 2014

The ARP was developed and begun in the 1970s to facilitate the reversal of the impacts of historic saltwater intrusion. For several areas within the Niles Cone Groundwater Basin, especially the deeper confined aquifers, there is no natural outlet for the brackish water. Under the ARP, the "trapped" brackish groundwater that remains from the previous saltwater intrusion is pumped out by groundwater wells. From 1972 to 2003, this brackish groundwater was discharged to San Francisco Bay (Figure 5-4).

The District's ARP has targeted 6 to 7 mgd average annual production (approximately 7,000 AF/yr) as an optimal rate for reclaiming the Niles Cone Groundwater Basin since 1972. Every unit of brackish water pumped from the basin must be replaced with an equal amount of freshwater at the District's recharge facilities in Quarry Lakes Regional Recreational Area. Therefore, while the amount of brackish water in the Niles Cone Groundwater Basin is vast, the annual extraction is limited by the sustainable yield of the freshwater recharge available. ARP is an important aspect of the District's Groundwater Management Policy.

Figure 5-4
Recharge and Reclamation



ARP pumping removes brackish groundwater from the Niles Cone Groundwater Basin, creating more storage space for fresh groundwater recharged through the District's groundwater recharge facilities and other sources. From 1972 to 2003 this brackish groundwater was discharged to the San Francisco Bay.

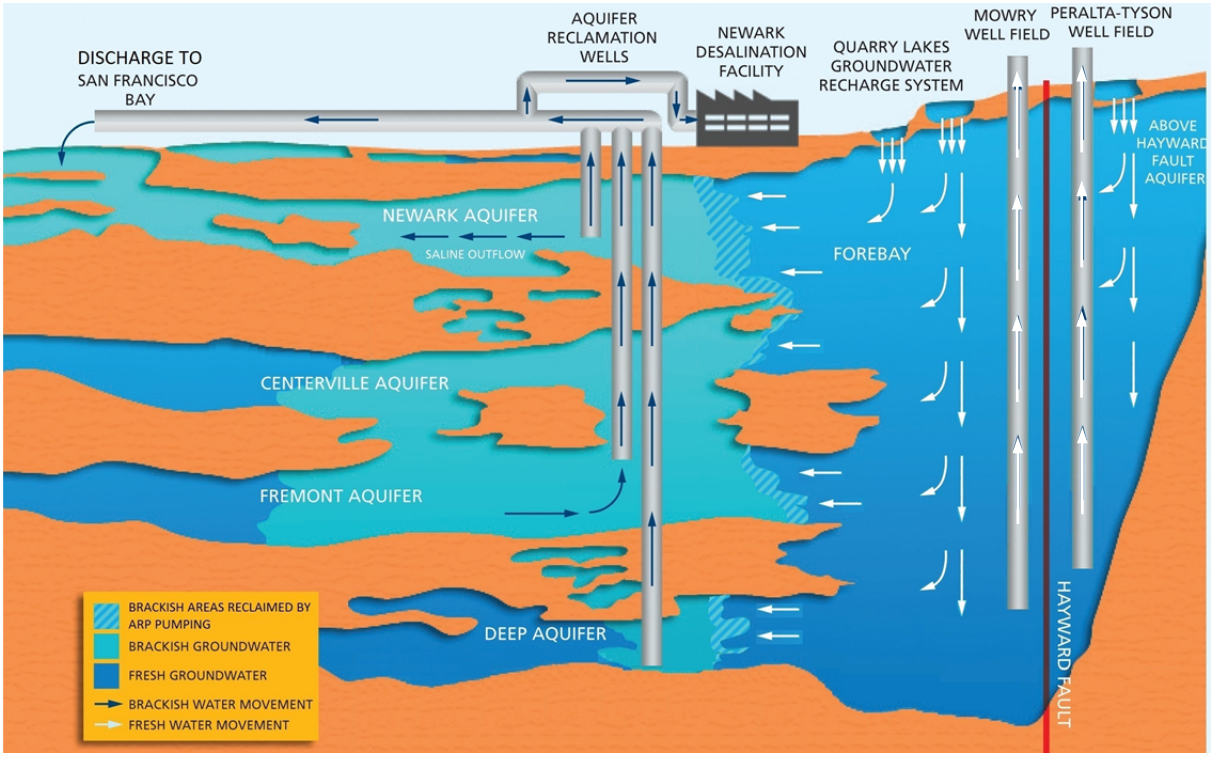
5.3 DESALINATION IN THE DISTRICT'S INTEGRATED RESOURCES PLANNING

As part of the development of the District's 1995 IRP, the District evaluated an extensive list of potential water supply alternatives including both brackish groundwater desalination and bay-water desalination. Brackish groundwater desalination was found to be the preferred option due to substantially lower power requirements and less concentrated brine discharge. Key to the selection of brackish groundwater desalination was the availability of a pre-existing brackish supply from the ARP discharge. The Desal Facility would effectively 'reclaim' about 70% of water being discharged to San Francisco Bay and create a high quality drinking water instead (Figure 5-5). The original IRP recommended building the Desal Facility in two phases, and in subsequent planning the phases were further defined. In Phase I, 6 mgd of final blended product water capacity would be built, and in Phase II the capacity would be increased to 12 mgd.

5.4 CURRENT DESALINATION CAPACITY AND USE

On September 19, 2003, the District dedicated the Desal Facility, the first brackish water desalination facility in northern California (Figure 5-5). The Desal Facility uses reverse osmosis to produce potable water by removing salts and other minerals from brackish groundwater. The Desal Facility, as commissioned in 2003, had an original production capacity of 6 mgd. In 2010, the District completed the Phase 2 expansion of the Desal Facility to double the overall capacity to 12 mgd of final production, its current capacity. The expansion of the Desal Facility capacity to 12 mgd allows additional operational flexibility to use surplus supplies, and to provide peak summer capacity.

Figure 5-5
ARP Discharge Used to Supply Desal Facility



The Desal Facility, with local source water and reliably high quality produced water, improves both the quality and reliability of the District's water supply. Specific water supply and water quality benefits include:

Improved dry year water supply reliability: The District's 1995 IRP identified potential dry year water supply shortages of up to 50% in 2030 without further action. To improve dry year supply reliability, the District adopted a water management strategy that includes conservation, reclamation, off-site groundwater banking, and desalination. The Desal Facility improves the District's dry year supply reliability by providing a new, locally controlled source of potable supply for the service area.

Improved water system reliability and security: The Desal Facility improves the overall reliability and security of the District's supplies by providing a source of supply west of the Hayward Fault and Calaveras Fault. The District's imported water supplies are conveyed via aqueducts (South Bay Aqueduct and Hetch-Hetchy Aqueduct) that are susceptible to failure due to earthquakes along these faults. The Desal Facility provides the District with increased local production capacity, which is key for the District in the event of temporary loss of imported water supplies or production facilities east of the Hayward Fault due to a seismic event.

Increased water production capacity: In addition to the District's dry year reliability needs, the District's 1995 IRP also identified the need for additional water production capacity to meet peak summer demands. Although both natural and programmatic water conservation have already reduced the District's projected peak demands, the production capacity of the Desal Facility is beneficial in meeting peak demands in the service area. The Desal Facility production capacity also provides additional system redundancy to allow for facility maintenance outages and operational flexibility.

Improved water quality: Because the District's existing potable groundwater supplies are relatively high in hardness, the District blends these groundwater supplies with San Francisco Public Utilities Commission supplies to reduce the overall hardness and improve water quality. Implementation of the Desal Facility has allowed the District to increase groundwater utilization without requiring additional expensive SFPUC purchases, further improving water quality for the District's customers at a reasonable cost.

Reduced future reliance on imported supplies: The Desal Facility allows the District to reclaim local, brackish groundwater for potable use, reducing the District's need for additional reliance on imported water supplies from the Delta to meet increasing demands in the service area.

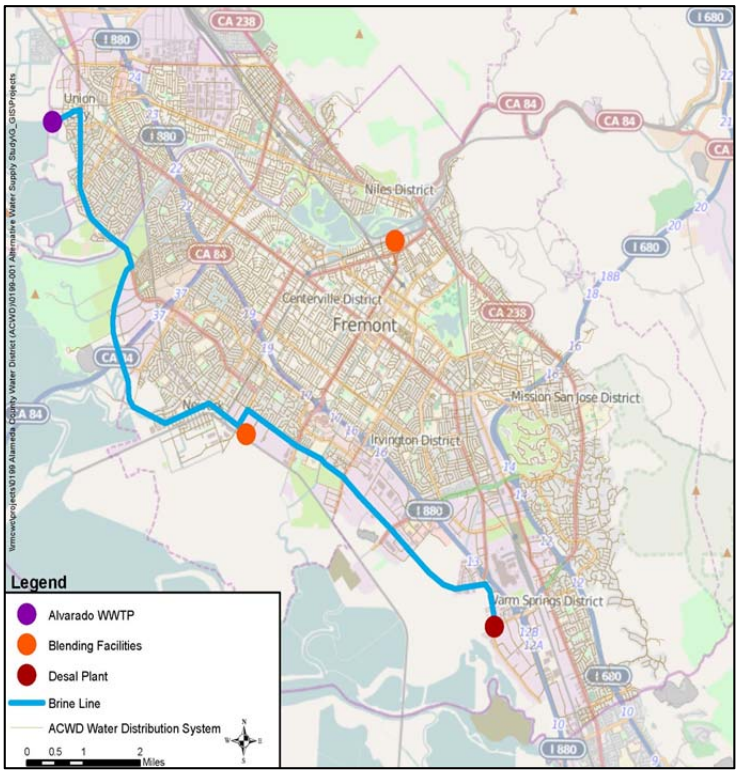
Groundwater basin protection and reclamation: The source water for the Desal Facility is the Niles Cone Groundwater Basin. The Aquifer Reclamation Program is an on-going program in which the District has been removing groundwater impacted by saltwater intrusion in order to restore the Niles Cone Groundwater Basin to freshwater conditions in portions of the Niles Cone Groundwater Basin that have been impacted by saltwater intrusion from San Francisco Bay. Historically, the District has pumped the brackish groundwater out of the basin and discharged it back to San Francisco Bay. However, the Desal Facility now allows the District to utilize this brackish groundwater as a potable supply.

5.5 FUTURE OPPORTUNITIES FOR DESALINATION

The District has continued to evaluate additional desalination opportunities. Because the supply used for a brackish desalination facility is limited by the availability of fresh water to recharge the Niles Cone Groundwater Basin, the current brackish desalination program is effectively at full capacity. In 2014, the District studied opportunities to build bay-water desalination. The study found that bay-water desalination would likely be constrained by restrictions on discharging the brine concentrate, requiring costly infrastructure to take the brine to USD's existing wastewater discharge line (Figure 5-6). Bay-water desalination remains one of the most promising water supply options as far as dry-year reliability and expansion potential however at this time the cost remains prohibitively high, estimated at $4,500 per acre-foot compared to $500 for the District's existing Desal Facility supply or $2,200 for the District's most

expensive supply from the SFPUC. The District will continue to explore alternative options and technologies which may make this option more realistic.

Figure 5-6
Bay Desalination Concept with Brine Discharge Line



CHAPTER 6
WATER RECYCLING

This chapter describes the Union Sanitary District's wastewater system (which serves the District's service area), and the opportunities for the use of recycled water in the District service area.

6.1 WATER RECYCLING OVERVIEW

California Water Code defines recycled water (a.k.a. reclaimed water, water reuse) as water which, as a result of treatment, can be put to beneficial use. While not defined as such, it is commonly understood to be water originating as municipal wastewater. Beneficial uses typically include any use that offsets the demand for limited and higher quality potable water supply, but can also include enhancing or even creating ecosystems such as providing streamflow augmentation or wetland inflows.

In recent years the interest in and technology needed to develop recycled water have increased dramatically. The following are the most commonly discussed forms of recycled water:

Non-potable use: Historically the term recycled water has meant the use of non-potable water, either secondary or tertiary treated wastewater, that is delivered via a separate distribution system (purple pipe, non-potable system) primarily for landscape irrigation and industrial use. The most commonly thought of example is recycled water used to irrigate an existing golf-course (an "anchor customer"), thereby displacing an existing demand for potable water supply that can then be saved for human consumption. Anchor customers are a critical requirement for a non-potable project to be cost-effective as they provide a large demand at a single location, thereby reducing the extent of the purple pipe system.

Potable Reuse: In recent years there have been significant new developments in the use of advanced treated recycled water for potable purposes. Full Advanced Treatment (FAT) includes the use of reverse osmosis (RO) and multiple disinfection barriers to produce water quality that replicates Sierra snow melt. Such technology is currently in use throughout the United States. Potable reuse falls into two further sub-categories:

> ***Indirect Potable Reuse (IPR):*** FAT water is used to supplement potable water supplies by either blending into surface water reservoir storage for later treatment at a traditional water treatment facility, or as supplemental recharge of potable groundwater supplies. IPR relies on specified blending ratios with the receiving waters as well as retention time before being produced for consumptive use. California adopted regulations for IPR via groundwater recharge in 2014. Currently, California is developing regulations for IPR via surface water reservoir augmentation.
>
> ***Direct Potable Reuse (DPR):*** enhanced FAT water that is then used directly as a raw water source to be further treated at a traditional water treatment plant before going to consumptive use or used directly in a potable water supply distribution system. DPR is currently not permitted in California.

Greywater and onsite-reuse are typically included under conservation discussions but are in fact water that is recycled on the customer's own premises and are included here for sake of completeness. *Greywater* (a.k.a. graywater) is the onsite collection of water from bathroom sinks, showers, bathtubs and clothes washing machines for reuse as irrigation water on the premises. *Onsite-reuse* refers to water that is used, treated, and reused onsite, commonly done by commercial and industrial customers.

6.2 AGENCY COORDINATION

As described below, Union Sanitary District (USD) provides wastewater transport, treatment, and effluent disposal for the Cities of Fremont, Newark, and Union City (encompassing the District service area). In 1993, the District coordinated with USD in the development of a recycled water master plan (1993 Master

Plan) which served as the basis for the District's recycled water use planning, as outlined in the District's Integrated Resources Plan. Since 1993, the District and USD have regularly updated the master plan to reflect changed conditions including current and projected future demand for recycled water, and advances in treatment technology. Past updates were conducted in 2000, 2003, and 2010. The District and USD are currently in the process of another update, the District-USD Recycled Water Feasibility Study (2015 Feasibility Study) scheduled to be completed in June of 2016.

6.3 WASTEWATER SYSTEM DESCRIPTION

The following provides a description of USD's facilities and operations, as previously summarized in USD's District-Wide Master Plan.

Wastewater Transport

Wastewater generated within the USD service area is collected and conveyed by gravity sewers to three major pump stations. The Irvington Pump Station serves the southern portion of the service area, the Newark Pump Station serves the central portion and the Alvarado Pump Station serves the northern portion. Wastewater collected in the southern and central areas is transported to the Alvarado Wastewater Treatment Plant (Alvarado WWTP) in Union City via dual 33-inch and 39-inch force mains. The northern drainage area wastewater is pumped directly to the WWTP headworks from the Alvarado Pump Station.

Wastewater Treatment

The Alvarado WWTP uses activated sludge as the biological liquid treatment process to meet the National Pollutant Discharge Elimination System (NPDES) permit requirements for secondary treatment. Additional treatment processes include primary and secondary clarification, and chlorination. The capacity of the WWTP is 33 mgd.

Solids handling at the WWTP includes: sludge thickening, digestion and dewatering. Sludge thickening is accomplished by gravity thickeners that are equipped with odor scrubbers. After thickening, the sludge is stabilized by anaerobic digestion and dewatered to about 24 percent solids using centrifuges. Most of the dewatered sludge is then transported by truck to approved agricultural fields in Sacramento County, (also Solano and Alameda Counties) where biosolids are surface applied and incorporated into the soil. The balance (approx. 25% or 5K wet tons) is hauled to a composting facility and further treated to create a class A biosolids. The Alvarado WWTP treated and discharged 24,226 AF of wastewater in 2015.

Effluent Disposal

All wastewater generated within the USD service area, including peak wet weather flows, receives full secondary treatment and is discharged to the East Bay Dischargers Authority's (EBDA) system for disposal in San Francisco Bay. Currently, there are no wet weather bypasses or overflows from the USD's facilities. The EBDA system conveys treated effluent for discharge to the Bay from several local agencies. The facilities consist of approximately 58,000 feet of pipeline ranging in diameter from 60 inches, where USD discharges into the system, to 96 inches at the outfall. USD's contractual discharge capacity is about 43 mgd.

A portion of the USD's effluent is diverted from the EBDA pipeline to supply fresh water to the Hayward Marsh, a constructed wetland located just north of the San Mateo Bridge. In 1991, USD assumed responsibility for the Hayward Marsh Project. Located just north of the San Mateo Bridge, the marsh consists of 145 acres of fresh and brackish wetland, with wide-ranging environmental benefits. Before the marsh was restored from abandoned salt ponds, there was no wildlife habitat at the site. Now the marsh is a popular stop for migratory waterfowl and includes a preserve for the endangered Salt Marsh Harvest Mouse. High quality treated effluent supplied by USD is the fresh water source for this marsh ecosystem.

Existing and Projected Dry Weather Flows

The average dry weather flow treated at the Alvarado WWTP in 2015 was approximately 21.63 mgd. As part of its regular, individual basin master plan updates, USD developed dry weather flow projections. The sum of the latest dry weather flow projection for each of its three basins is 37.6 mgd. These dry weather flow projections were based on a review of existing and planned growth in the service area (based on the cities' General Plans) and were used for the sizing and phasing of future planned wastewater conveyance and treatment facilities.

6.4 CURRENT USES OF RECYCLED WATER

Currently there are no uses of recycled water in the District service area which off-set demand for potable water. However, as described above, a portion of USD's effluent is provided to the Hayward Marsh Project (located within the District service area) as a fresh water source for the marsh ecosystem. Approximately 3.5 mgd (3,900 AF/yr) of high quality, treated effluent is provided to the marsh from USD's Alvarado WWTP.

6.5 FUTURE RECYCLED WATER OPPORTUNITIES

The use of recycled water to offset the demand for potable water is included as part of the District's long-term water supply strategy in the IRP. Developed in 1995, the IRP only contemplated non-potable options as that was the only permitted technology at that time.

The District and USD have evaluated several opportunities for recycled water use as a non-potable water supply in the service area. Potential sources of recycled water include treated wastewater from: the USD Alvarado Wastewater Treatment Plant; from a satellite treatment facility located in the southern service area; or from the purchase of recycled water from the South Bay Water Recycling Program. Each of these opportunities is described in greater detail below.

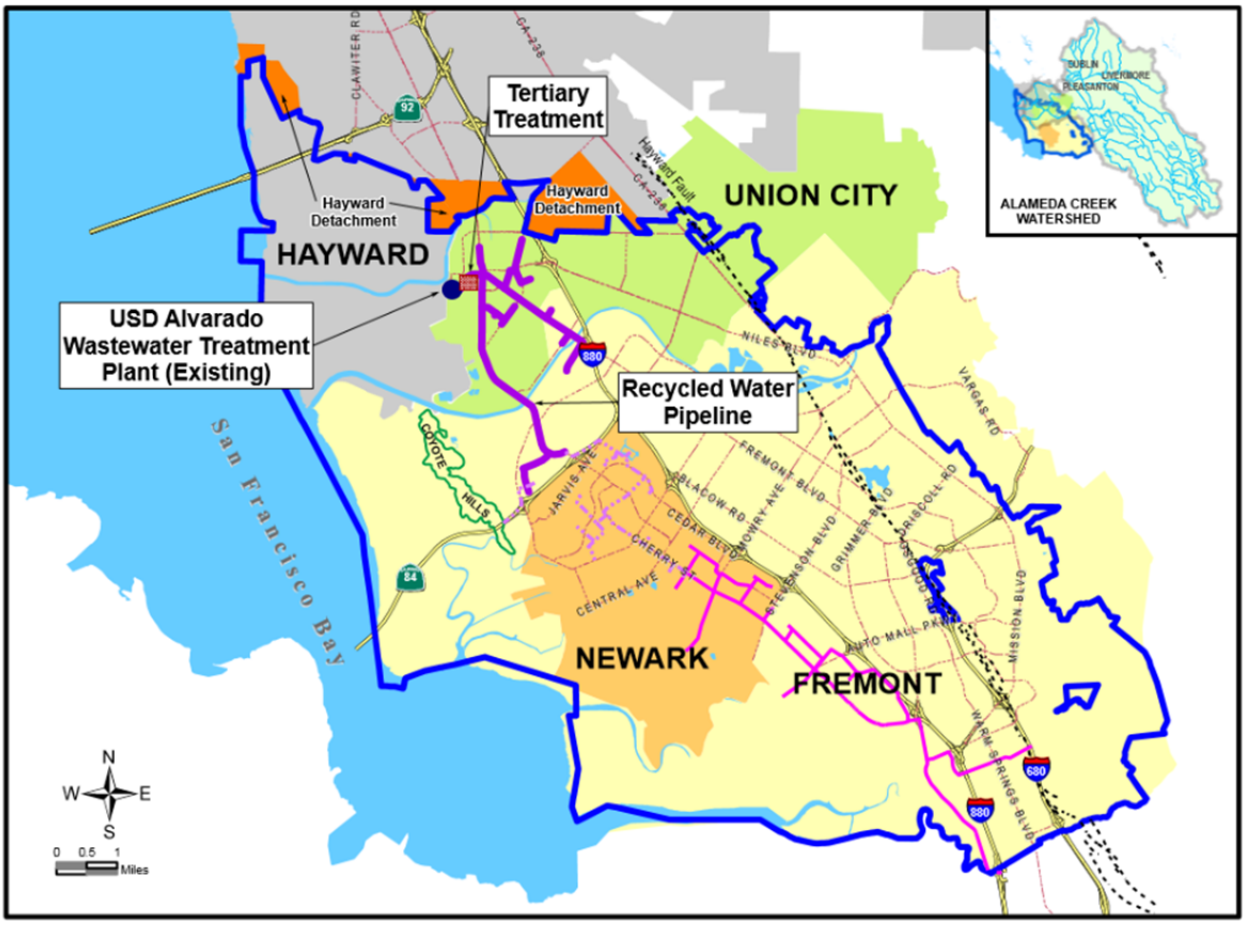
Recycled Water Treatment at USD's Alvarado Waste Water Treatment Plant

This alternative is based on providing a recycled water source from a new tertiary treatment facility at USD's existing Alvarado WWTP in Union City. The 1993 Master Plan recommended a three phase implementation plan which allows for the most cost-effective users (i.e. those in the northern service and central service areas, known as the Phase 1 and Phase 2 service areas, respectively) to be connected to the system first.

Since 1993, a number of changes have occurred which prompted updates to the 1993 Master Plan, including potential new demands and new regulatory requirements. The 2010 Feasibility Study identified potential demands of approximately 550 AF/yr. Because of the large landscape irrigation component, the demand peaks during the summer irrigation season and is minimal during the winter. The maximum day demand during the summer (peak month) is projected to be 1.08 mgd with a peak hour demand of approximately 3.21 mgd.

The recycled water would originate at the Alvarado WWTP, located at the north end of the service area (Figure 6-1). For a system such as that proposed for the District and USD, the recycled water must be suitable for application on unrestricted use sites such as schoolyards, parks, playgrounds and food crops. This requires a high level of treatment that Title 22 designates as "disinfected tertiary recycled water." Following secondary treatment of the wastewater, this treatment level requires chemical addition, flocculation/coagulation, filtration and disinfection. Alternatively, membrane technology could be utilized to provide tertiary treatment.

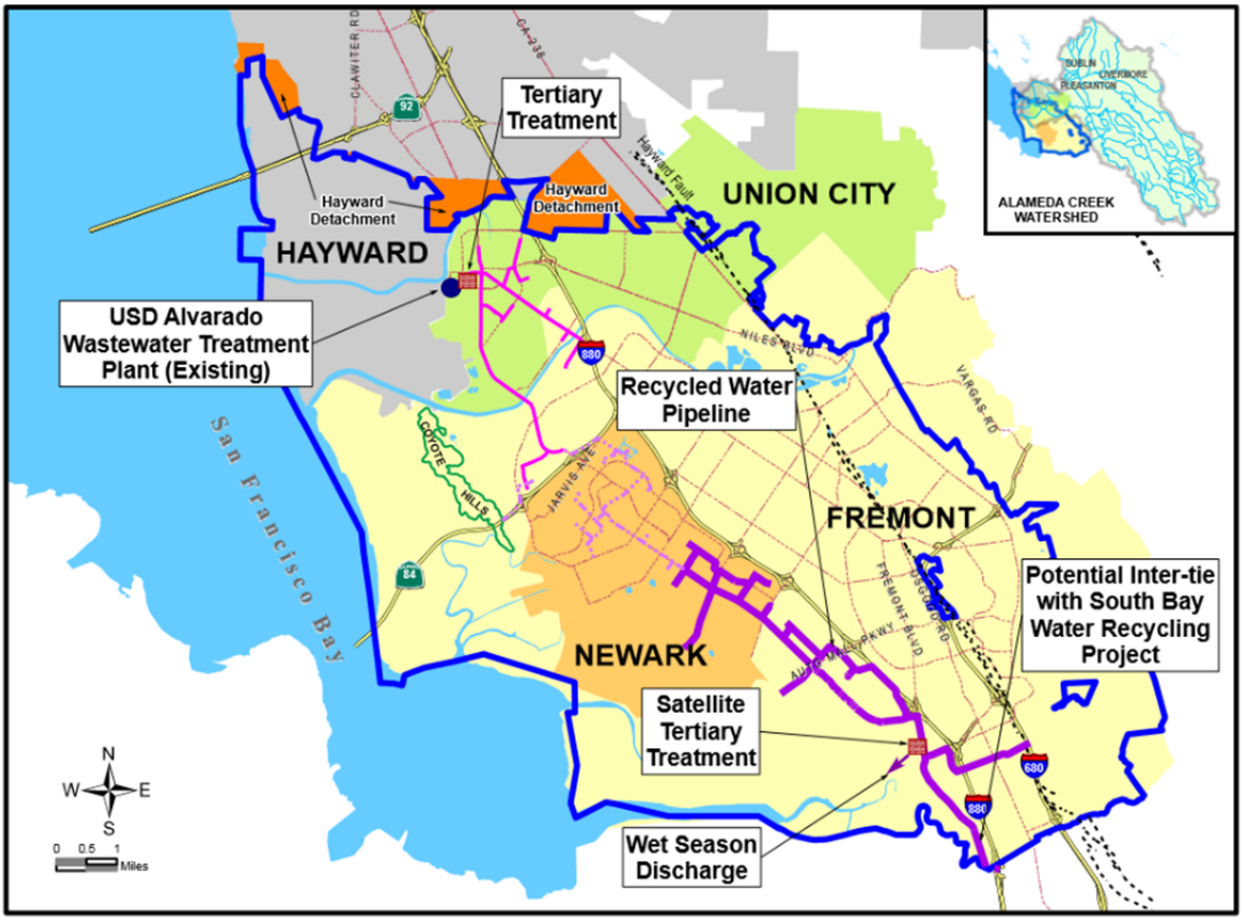
Figure 6-1
2010 Recycled Water Feasibility Study Update: Alvarado Wastewater Treatment Plant Alternative



Recycled Water Treatment at a Satellite Treatment Facility

As an alternative to constructing a recycled water treatment facility at the Alvarado WWTP, in 2003 the District and USD completed an evaluation of the feasibility of constructing a satellite recycled water treatment facility in southern Fremont at USD's Irvington Pump Station (Figure 6-2). This alternative was further evaluated in the 2010 Feasibility Study. This satellite facility would benefit the District by providing a recycled water source for customers in southern and central Fremont, and would potentially benefit USD by providing advanced treatment for a potential new wet-season outfall. The 2010 Feasibility Study Update identified a potential future recycled water demand of approximately 1,500 AF/yr in the District's southern service area. However, much of this projected demand is for a planned golf course (Newark Area 3 and 4), which has not yet been constructed.

Figure 6-2
2010 Recycled Water Feasibility Study Update: Satellite Treatment Plant Alternative



South Bay Water Recycling Program Alternative

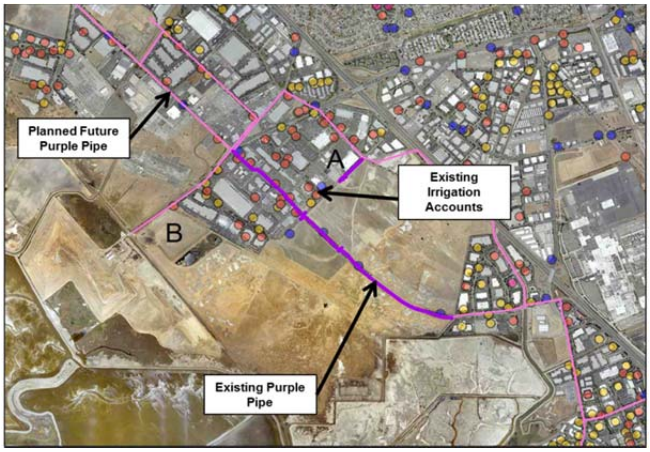
This alternative would involve connecting to the South Bay Water Recycling (SBWR) Project in northern Milpitas (Santa Clara County) to serve customers in the southern portion of the District service area (see Figure 6-2). As identified in the 2010 Recycled Water Feasibility Study, the total potential recycled water demand for this alternative is approximately 250 AF/yr. It is likely that a purchase agreement for recycled water from SBWR would also require approval from the Santa Clara Valley Water District. In addition, because of concerns regarding water transfers across county boundaries, such an agreement would likely be for a limited duration. Therefore, the 2010 Feasibility Study identified this alternative as an interim source of supply, until a long term supply at the satellite treatment plant (as described above) becomes available.

Non-potable Water System

As part of the 2013 IRP review, the District evaluated the potential to develop a “non-potable” water system. This concept would entail delivering raw, untreated groundwater to existing non-potable irrigation customers currently served off of the existing purple pipe network. To distinguish this concept and the water source from recycled water, the District would instead call the distribution system a “non-potable” system. With time, as the appropriate demands develop that cost-justify the development of a suitable tertiary treated supply, the non-potable system could deliver both recycled water and raw groundwater

This concept would allow the District to initiate delivery of 'non-potable' water and to develop Title 22 procedures while continuing the arduous task of developing and expanding the existing purple pipe network ahead of the availability of a suitable tertiary treated supply. See Figure 6-3.

Figure 6-3
2013 Integrated Resources Plan Review: Non-Potable Concept



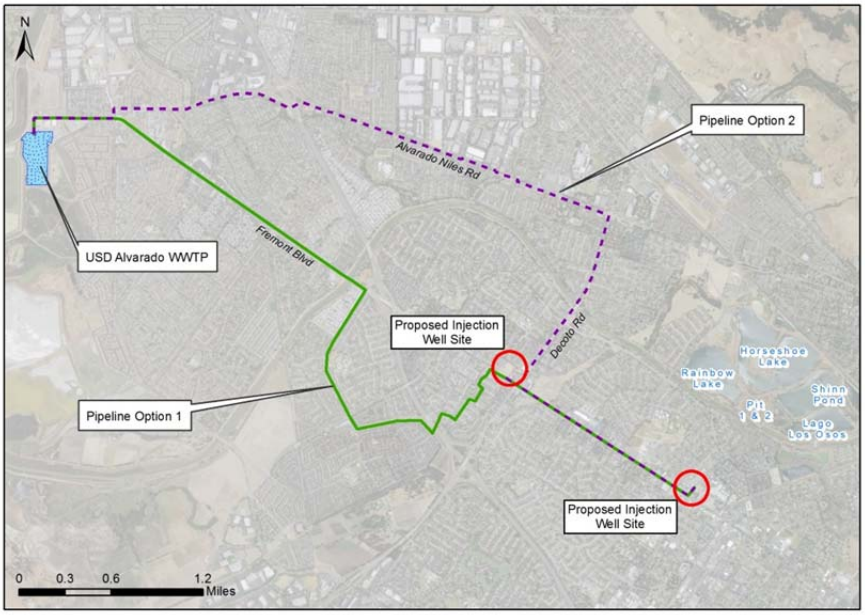
Since this concept utilizes supplies from the Niles Cone Groundwater Basin, it does not constitute a new source of supply. However, this option could potentially provide a cost savings to existing rate payers as the production costs of raw groundwater are relatively low. Further, such a system could provide additional aquifer reclamation pumping benefits, helping to further clean up the Niles Cone Groundwater Basin.

Indirect Potable Reuse

In addition to updating the potential for non-potable recycled water use, the 2015 Feasibility Study's major emphasis is to evaluate the potential for Indirect Potable Reuses (IPR) of water. Specifically, this concept is evaluating the potential to take FAT wastewater from the Alvarado WWTP and inject it into the Niles Cone Groundwater Basin near Quarry Lakes for the purpose of later extraction and potable use (see Figures 6-4). Such a project has many advantages over conventional, non-potable recycled water. IPR creates a reliable, drought-proof and locally controlled potable water supply, does not have restricted uses, and reduces USD discharges to the Bay. Finally, because IPR does not require the extensive parallel distribution system that a non-potable recycled water project would, the cost to develop an IPR supply can be dramatically lower.

IPR projects are relatively new in California and public perception and acceptance of potable reuse is still in its very early stages. While the District is evaluating the cost and feasibility of this concept, it currently has no plans to develop an IPR project. If a future IPR project were to be actively pursued by the District it would be preceded by an extensive public information and awareness campaign.

Figure 6-4
Groundwater Recharge – Injection Wells for Niles Cone Supply



6.6 OPTIMIZATION OF RECYCLED WATER SUPPLIES

As described above, the District's IRP strategy includes provisions for a potential future recycled water project. The planned implementation of a recycled water project in the District service area is still at least ten years away. However, as part of the Water Supply Assessments and other approvals for some new developments in the potential recycled water service area, the District has required that these developments: 1) install separate distribution systems for the use of recycled water for landscape irrigation purposes; and 2) accept recycled water (when it becomes available) for landscape irrigation in-lieu of potable water.

Future updates to this UWMP will update the documentation of the optimization plan as the recycled water project planning continues. However, potential actions that might be taken by the District and USD to encourage customers to accept the use of recycled water include the following:

- Financial Incentives: This would provide an incentive by offering customers a lower rate for recycled water than for potable supplies from the distribution system. Other financial incentives might include reduced connection charges and service charges.

- Guarantee of Firm Supply: This would provide an incentive for recycled water use by guaranteeing that the recycled water supplies would not be subject to voluntary or mandatory cutbacks during droughts and/or water supply shortages.

The actions described above have not been formally adopted by the District or USD but represent potential actions that might be taken in the future as recycled water becomes available. In addition, projections of the quantities of recycled water that might be utilized as a result of these potential actions have not yet been developed. These projections will be developed as recycled water planning in the service area progresses and will be included in future updates to this Urban Water Management Plan.

6.7 CHALLENGES OF DEVELOPING A RECYCLED WATER SUPPLY

The burden of constructing and funding the parallel purple pipe network needed for a non-potable system remains the greatest challenge to further developing a recycled water project. Coupled with the lack of a sufficiently sized "anchor customer", such as a golf course, the high cost and small benefit of recycled water remains too cost prohibitive for the District to pursue. Indirect potable reuse holds the most promise from a cost-effectiveness and water supply management stand point, however it is still considered a 'future concept' given that public acceptance for potable re-use will likely take a long time.

Table 6-1
Cost Comparisons

Study	Identified size (AF/yr)	Unit cost ($/AF)
2009 Study	1,600 to 2,500	$6,530
2015 Study- Indirect Potable Reuse *(preliminary findings)*	4,000	$1,500
District remaining programmatic conservation target	1,600	$410[1]

(1) Fully loaded cost of the District's historic conservation program and savings achieved through 2013, as reported in *Reliability by Design, 2014*

Revised Model Water Efficient Landscape Ordinance (MWELO): As discussed in Chapter 7, the State of California has revised the MWELO. These efficiency gains in landscape water use will result in reduced future potential demand for non-potable water.

CHAPTER 7
DEMAND MANAGEMENT

7.1 DEMAND MANAGEMENT OVERVIEW

This chapter provides detailed information about the District's Demand Management Program. This program serves several purposes: 1) The program originally came out of the District's Integrated Resource Planning (IRP) process and continues to be evaluated in terms of this process; and 2) the program serves to comply with the District's commitment as a signatory to the Memorandum of Understanding (MOU) on Urban Water Conservation through the California Urban Water Conservation Council (CUWCC); and 3) the program was further adapted to ensure that the District meet its SBX7-7 targets. A detailed discussion of the District's SBX7-7 targets and the District's plan to meet these targets is provided in Chapter 8.

7.2 DEMAND MANAGEMENT STRATEGY

Demand management is an integral part of the District's long term water management strategy. As part of the District's IRP process, potential demand management programs are evaluated at the same level of detail as other supply-side options. In some instances, it may be more cost-effective to implement demand management programs than it would be to secure additional supplies and production/treatment facilities to meet existing and growing demands. A discussion of the District's water supply strategy and how demand management plays a key role in this strategy is provided in Chapter 9.

As is the case with supply-side options, a systematic approach was applied to develop the conservation options as part of the District's IRP process. The conservation analysis included the following steps:

- Disaggregate demand data to determine water-use patterns and end uses of water in the District;
- Carefully screen conservation measures to determine the ones that are appropriate for identified end-uses in the District;
- Target specific water uses with cost-effective conservation measures;
- Design appropriate delivery mechanisms, including incentives and marketing approaches;
- Characterize the programs, including participation levels, program costs, water savings, revenue impacts, demand hardening impacts[1], and staffing requirements; and
- Package conservation programs into logical groups for integration with supply options.

The IRP recommended a water conservation program that focuses greater effort on reducing seasonal (outdoor) demands (thereby reducing the need for additional production and storage facilities to meet peak summer demands).

[1]Demand hardening is a term used to describe the diminished ability or willingness of customers to reduce demand during a supply shortage.

7.3 IMPLEMENTATION STATUS OF DEMAND MANAGEMENT PROGRAM

Based on IRP recommendations, commitments to meeting SBX7-7 targets, and commitments to CUWCC's MOU on Urban Water Conservation Best Management Practices (BMPs), the District has a multi-faceted demand management program that includes a variety of activities that reach out to residential, business, industrial, institutional, and landscape customers.

In this section, the District's SBX7-7 target status, MOU compliance status, key water conservation activities and implementation progress are described. A summary of CUWCC's BMP requirements and the District's progress in meeting its commitments to the MOU is also provided in Table 7-1; water conservation activities to date, and over the past five years, are summarized in Table 7-2. The District is on track to meet IRP demand management recommendations, SBX7-7 targets, and CUWCC BMP implementation commitments.

SBX7-7 Compliance

The District has met its 2015 SBX7-7 targets and is on track to meet its target for 2020. For an in depth discussion of the District's SBX7-7 target determination, and the District's plan to continue to meet these targets, see Chapter 8.

Demand Management Measures and CUWCC MOU Compliance

In addition to implementing demand management measures as part of its IRP program, the District is a signatory to CUWCC's MOU on Urban Water Conservation, and is committed to implementing those water conservation BMPs which are cost-effective for the District. As a signatory to the MOU, the District is also committed to providing bi-annual reports to the CUWCC on the status of the District's BMP implementation. Copies of the most recent annual reports (2013-2014) are provided in Appendix D.

Water Code Section 10631 (f) requires a water supplier to provide a description, within their Urban Water Management Plan, of each demand management measure (DMM) implemented over the past five years and those scheduled for implementation to achieve its water use targets pursuant to Section 10608.20 (SBX7-7 Targets); Section 10631 (i) states that a water supplier will be "deemed in compliance with the requirements of subdivisions (f) by complying with all the provisions of the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated December 10, 2008, as it may be amended, and by submitting the annual reports required by Section 6.2 of that Memorandum." Furthermore, the UWMP Guidebook states that:

> *CUWCC members have the option of submitting their 2013–2014 Best Management practice (BMP) annual reports in lieu of, or in addition to, describing the DMMs in their UWMP. The option of submitting the CUWCC BMP report in lieu of describing the DMMs is only available if the supplier is in full compliance with the CUWCC's Memorandum of Understanding (MOU). The submitted reports must include documentation from the CUWCC that supplier has met the MOU coverage requirements and is in full compliance with the MOU.*

The District has submitted the required annual reports for 2013-2014 to the CUWCC to comply with the MOU under the Gallons Per Capita Per Day (GPCD) implementation method, and the CUWCC has verified that the District is in full compliance with the BMPs (Appendix D). Under the GPCD implementation method for 2013-2014, the District determined its baseline GPCD (average annual Potable Water GPCD for 1997 through 2006) of 165.6[2] GPCD and the District's 2018 GPCD target, per the CUWCC MOU, of 135.8 GPCD (see Appendix D).

In addition to fulfilling the requirements under Water Code Sections 10631(f) through submission of data documenting full compliance with the CUWCC MOU under GPCD implementation, the District has also included detailed information about all of its demand management measures in this section of the UWMP.

[2] CUWCC MOU and SBx7-7 baseline GPCD and targets vary slightly as they use different baseline periods and are refreshed when new population figures are available.

Partnerships

The District has developed numerous partnerships over the years to help maximize implementation of its demand management program. Partnerships provide financial, marketing and program administration benefits and include coordination with water agencies, cities, schools and other organizations. The District is always looking for additional partnerships opportunities. The District's current partnership programs are summarized below; additional information about these programs is provided within the program description section.

Local Cites: The District coordinates with Fremont, Newark and Union City on several programs as well as customer outreach. The District works closely with each service area city to ensure that its programs are consistent with city ordinances and policies. Most recently, during the drought, the District worked closely with its service area cities to help them comply with and provide outreach for the District's Water Shortage Emergency Ordinance.

Local School Districts and Community Colleges: The District works closely with the local school districts and community colleges to promote water use efficiency at their facilities. The District provided incentives to change out urinals for all Fremont Unified School District schools and provided a grant to help establish a water efficient landscape at Ohlone Community College's "Green" Campus in Newark. Most recently, the District conducted water use efficiency surveys and provided water use efficiency recommendations for eight Newark Unified School District facilities, which included six elementary schools, the middle school, the high school and the administration building.

Union Sanitary District (USD): Since 2006, the District has formally partnered with USD on several cost share programs including residential and commercial high-efficiency clothes washer rebates and commercial high-efficiency toilet rebates.

Bay Area Water Supply and Conservation Agency (BAWSCA): The District is a member of BAWSCA and participates in several BAWSCA programs including a residential landscape class program, the development of the water wise gardening tool, and rebates for high-efficiency toilets (HETs) and rain barrels.

California Youth Energy Services (CYES): Since 2009, the District has partnered with the California Youth Energy Services to implement a residential water and energy use survey program, which combines green job training and energy and water savings assistance to the community. The city of Fremont, Union City, Pacific Gas & Electric and the California Public Utilities Commission are all partners in this effort.

StopWaste/Bay-Friendly: The District partners with Alameda County Waste Management Authorities' StopWaste Program and the Bay-Friendly Coalition on several programs including resource-efficient landscape contractor qualification trainings, "Lawn to Garden" parties (converting turf to low water use plants using sheet mulching), and co-promotion of turf removal programs. The District's Drought Tolerant Garden is a Bay-Friendly certified garden, a designation given to gardens that employ the seven Bay-Friendly Gardening Principles, which include: landscape locally, landscape for less to the landfill, nurture the soil, conserve water and energy, protect water and air quality, and create wildlife habitat, and as such has been a lecture stop on tours of Bay Area gardens that meet and exceed Bay-Friendly Gardening standards. The District has also signed a pledge to employ these principles for all landscaping the District maintains. The District continues to work with these agencies on a public outreach campaign to educate the public about environmentally sound landscaping practices, including water efficient landscaping.

Alameda County Green Business Program: The Alameda County Water District works with businesses who would like to be certified as a green business through the Alameda County's Green Business Program. The District uses this as an opportunity to conduct water use efficiency surveys for businesses.

Table 7-1
Summary of District Water Conservation BMP Implementation

	BMP Category	BMP #	BMP	District Progress	Meets BMP Requirements
Foundational	Operations Practices	1.1.1	Conservation Coordinator	· Conservation Coordinator position is staffed	*Yes*
		1.1.2	Water Waste Prevention	· Water Waste Prevention Ordinance in effect at all times (addressing new development and existing users) · Drought Ordinance implemented during water shortage emergencies, like the current one.	*Yes*
		1.1.3	Wholesale Agency Assistance Programs	- Not applicable, the District is a retail water agency	*Yes*
		1.2	Water Loss Control	· Annual system audit conducted using AWWA water auditing tool · Component analysis conducted every four years · Water Audit Data Validity score over 71 · On average, over 40 miles of the District's distribution system is checked for leaks bi-annually · Leak Detection and notification program	*Yes*
		1.3	Metering with Commodity Rates	· All accounts are metered and customers charged by volume of use · Program to test, repair and replace meters · Feasibility study conducted to separate landscape use from mixed use meters	*Yes*
		1.4	Retail Conservation Pricing	· Currently using uniform rate structure where revenue from volumetric charge is > 70% of total revenue · Alternative conservation rate structures being evaluated · Implemented a tiered (drought surcharge) rate structure during the current drought	*Yes*
	Education Programs	2.1	Public Information Programs	· Program includes newsletters, bill messages, new customer packets, brochures, newspaper ads, postcard reminders, press releases, website, targeted email promotions, and speaking and participation at community events. · During the current drought program also included: Postcards regarding the District's Ordinance, an online drought resource center on the District's website, yard signs for customers complying with Ordinance requirements, and yard signs for customers participating in the District's landscape rebate program	*Yes*
		2.2	School Education Programs	· Program includes classroom presentations, assemblies, free resource materials, teacher training/workshops, grants, poster/slogan contest, and water treatment plant tours.	*Yes*

Table 7-1 (continued)
Summary of District Water Conservation BMP Implementation

	BMP Category	BMP #	BMP	District Progress	Meets BMP Requirements
Programmatic	Residential	3.1	Residential Assistance Program	· Water use efficiency surveys provided to residential customers, including the CYES summer survey program · Low flow devices distributed to residential customers · SFR High Water Use Notification program and a Water Smart Home Water Use Report program targeting the District's top 20% of users based on irrigable landscape area and number of people in household · Leak Detection and notification program · Low-income Water Savings Assistance Program (surveys, leak checks, low flow device installation) ·	Yes, the District meets the requirements for these BMPs through the GPCD compliance approach
		3.2	Landscape Water Survey	· SFR High Water Use Notification program and a Water Smart Home Water Use Report program targeting the District's top 20% of users based on irrigable landscape area and number of people in household Water efficient landscape rebate (turf removal) program · Landscape classes/workshops · Seasonal irrigation reminders	
		3.3	High-Efficiency Clothes Washing Machine Rebates	· Rebates offered through a regional program with PG&E	
		3.4	WaterSense Specification (WSS) toilets	· Low-income Water Savings Assistance Program (Ultra HET installation) · HET rebates offered for residential customers.	
	CII	4	Commercial, Industrial, Institutional Programs	· Water use efficiency surveys provided to CII customers · Commercial HET and washing machine rebates offered in conjunction with Union Sanitary District · Pre-rinse spray nozzle replacement program for local restaurants, hotels, schools	
	Landscape	5	Large Landscape Programs	· Landscape water budget program implemented for dedicated landscape accounts · Landscape survey program for all large landscape accounts (DL and mixed use) · Rebates offered for weather-based irrigation controllers and turf removal · Recognition awards for businesses demonstrating landscape water use efficiency	

RESIDENTIAL PROGRAMS

The District has a variety of residential demand management programs that target both indoor and outdoor residential water use. Each program is initially and continually evaluated for cost-effectiveness. Programs include providing customers with free devices/tools, incentives, education, technical information and support. A summary of conservation activities to date, and over the past five years, for each of these programs is listed in Table 7-2.

Residential High-Efficiency Clothes Washer Rebate Program

The District has been offering rebates for high-efficiency clothes washers since 1997; the most water and energy efficient clothes washers on the market are eligible for a rebate. These water efficient washers are estimated to save almost 8,000 gallons per year, compared to conventional washers. The purpose of the program is both to encourage customers to purchase high-efficiency clothes washers, and to encourage manufacturers to develop and market these washers. The District partners with other water agencies, USD and Pacific Gas & Electric Company to offer these rebates.

Residential Conservation Device Distribution Program

In 1997, the District initiated an aggressive program to market and distribute free water conservation devices to residential customers in pre-1992 homes (i.e., homes built prior to the implementation of laws requiring the use of low flow plumbing fixtures). Free conservation kits, which include a high quality low-flow showerhead, faucet aerators, leak detection tablets, and flapper valves, are offered through the District's newsletter, website, flyers, direct mailings, and events. In addition, these free water conserving fixtures are provided to qualifying multi-family complexes that participate in the District's survey program. The District also developed a program to market and distribute free water conservation kits to townhouse and condominium owners in the Tri-Cities area.

Single Family and Multi-Family Residential High-Efficiency Toilet Rebate Program

During the current drought, the District began offering toilet rebates to all residential[3] customers for the first time since its conservation program began. The drought created an immediate need to reduce residential water use, and the District determined that moving to the replacement of the remaining 3.5 (or greater) gallon per flush toilets was cost-effective for the District, especially in light of newly awarded State grant funds. This program is administered, in part, though BAWSCA. This will accelerate the change out of older, higher volume toilets in the District's service area.

Residential Surveys

Multi-Family Residential Survey Program: The District offers a multi-family residential survey program where conservation staff conduct onsite reviews of water use practices and fixtures, check for leaks, and provide recommendations for improving water use efficiency (both indoor and outdoor). Free water conservation kits and/or individual devices are provided on an as-needed basis. The District also offers surveys through the California Youth Energy Services water and energy audit program (program described below).

Partnership with California Youth Energy Services (CYES): Beginning in 2009, the District partnered with CYES to hire youth/students to conduct water and energy audits within its service district each summer. The initial program was set up in cooperation with the City of Fremont, but audits were conducted in the surrounding communities of Union City and Newark. In 2011, Union City began officially participating in this program. The audits are conducted by youth/students ages 15-22. During each audit the auditors collect information about water and energy consumption, and provide residents with tips and tools for improving water use efficiency. Inefficient devices, including showerheads, bathroom sink aerators, and kitchen sink aerators are installed, when needed.

[3] The District implemented a low-income focused multi-family program in 2010.

Low-Income Water Savings Assistance Program

The District developed a new program in 2013 to address concerns that the low-income segment of the District's customer base may not be fully served by the District's conservation program. The Water Savings Assistance Program was launched to provide low-income qualified single-family homeowners with free water use efficiency upgrades to help reduce water use. Participants had to meet certain income and household size requirements to qualify. Participants received a free water use efficiency survey by a certified green plumber to help identify water savings opportunities and to identify any potential leaks. Leaking toilet flapper valves, and overflow tube adjustments in toilets were repaired through the program, but if the toilet was flushing at greater than 1.6 gallons per flush, the toilet was replaced with a 0.8 gallon per flush ultra-high-efficiency toilet. The plumber also replaced showerheads and faucet aerators, and checked for other leaks by observing if there was a run on the meter.

Residential High Water Use Notification Programs

WaterSmart Home Water Use Report Program: In 2014, the District began participating in the WaterSmart Home Water Use Report Program. Through this program, every residential customer received an initial home water use report evaluating their water use compared to homes with similar characteristics (household size and irrigable landscape area). After the initial report, any District customer could elect to continue to receive these reports, and the top ten percent of water users within each cohort (similar household size and lot size) were automatically opted in to continue to receive these reports. Customers can choose to receive the reports via mail or email. There is a web portal where the customer can sign in to view information about their water use and see customized recommendations for reducing their water use. In 2015, the District expanded the program to reach the top twenty percent of water users within each cohort.

Single Family Residential High Water Use Notification Program: Prior to implementing the WaterSmart program, the District utilized GIS (Geographic Information System) data linked with its customer service database to compare similar household water use based on parcel size. Those customers in the top two percent for water consumption were sent high water use alert letters. A list of

possible reasons for their much higher than average water use were suggested, along with conservation tips, and customers were encouraged to call to discuss their water use practices with a conservation staff member. On-site surveys were offered to customers through this program. The District ran the program every year (beginning in 2004), and reached about 1,000 customers each time. Issues identified through this program were over-irrigation (~50%) and leaks (~15%). Large families (~25%) provided opportunities to maximize low flow device installation.

Residential Leak Detection and Notification Program

Leak detection is an on-going part of the District's bi-monthly meter reading program. If abnormally high water consumption is detected, the meter reader is alerted to double check the meter reading and meter movement. The meter reader looks at the meter to see if the flow indicator is moving indicating constant usage. If the flow indicator is moving, the meter reader will knock on the door to check if anyone is home. If no one answers they leave a door hanger that states water was in use at the time or there may be a leak. If someone is home they have them turn off all water in the house, look at the flow indicator again, and if it is still moving they inform the customer of movement on the flow indicator, indicating continuous usage and a potential leak. Meter readers carry conservation devices and leak detection dye tablets, which are provided to the customers that are home, along with instructions for identifying leaks. For billing purposes, the meter reader enters a leak report code indicating whether or not the abnormal read may be the result of a leak at the residence.

Residential Seasonal Landscape Irrigation Reminder Program

Residential landscape irrigation represents one of the single largest uses of water in the District's service area, and also provides an opportunity for one of the largest sources of water savings through improved efficiency. In 1998, the District implemented a program to provide residential customers with landscape irrigation guidelines. As part of this program, the District provides seasonal notices through postcards, newsletters and/or our web site for adjusting irrigation rates depending on the season. These seasonal notices are provided in the fall (to indicate that watering times should be reduced to 50% of their summer schedule), in the winter (to indicate that sprinkler systems should be turned off), and in the spring (to provide maintenance and efficient watering tips). During the current drought, the District also sent out postcards to remind customers about the District's Water Shortage Emergency Ordinance landscape watering restrictions.

Residential Landscape Workshops and Garden Tours

The District regularly hosts/co-hosts residential landscape workshops/classes and co-sponsors garden tours in its service area. A spring and fall workshop series, of two classes each season, is offered through a partnership with BAWSCA. Topics have included efficient irrigation, water efficient design elements, low water use plants and lawn alternatives. The District also partners with groups that coordinate tours of gardens that showcase water efficient gardening practices, such as the "Bringing Back the Natives" garden tour which features gardening with native plants that are adapted to the climate and require less water. The District also co-hosts, with StopWaste, "Lawn to Garden" parties where a District customer elects to convert their lawn to a water efficient garden with the help of friends and neighbors, while also providing an opportunity for their neighbors to learn how to do a project themselves.




"Water-Wise Gardening in the Bay Area" Online Tool

In partnership with BAWSCA and other water agencies, the District helped develop a tool which contains images of gardens around the Bay Area that are employing water efficient landscaping techniques. It includes a searchable plant database and information about gardening techniques, irrigation scheduling and maintenance. The tool was originally available as a CD but has since been migrated to an online platform.

Residential Rain Barrel Rebate Program

In 2014, during the current drought, the District began offering rebates for rain barrels to all customers, including residential customers. Customers can purchase any rain barrel provided it holds 50 gallons or more of water and is installed properly, the District will issue a rebate to help pay for the barrel. This program is administered, in part, by BAWSCA.

Residential Water Efficient Landscape Rebate (Turf Removal) Program

The District launched its turf removal incentive program in early 2011. The purpose of the program is to permanently reduce landscape water use in the District's service area by providing an incentive to encourage customers to convert water-thirsty lawns to water efficient landscapes. Landscape water use accounts for about 40% of total water use and turf has one of the highest water requirements of any landscape plants. Lower water use plants thrive on a fraction of the water (about 30% less). Significant water savings can be achieved by replacing large non-functional turf areas with low water use plants. In addition, these savings reduce peak summer demand. Customers renovating non-functional turf areas receive a rebate based on the square footage of turf removed and replaced with low water use landscaping. The program is available to single-family residential, multi-family residential, and commercial customers.

COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL PROGRAMS

A significant part of the District's conservation effort is directed at the business community. Commercial, Industrial and Institutional (Commercial) customers present important opportunities for conservation-directed programming. Commercial programs include incentives for installing water efficient fixtures and landscaping, as well as a water use efficiency survey program. See Table 7-2 for program activity numbers.

Commercial Survey Program

The District's commercial survey program is tailored to meet the specific needs of our customers. The survey program is targeted at hotels, restaurants and other commercial, industrial and institutional facilities with high indoor water use (e.g., restrooms, laundry, food preparation/clean up, cooling systems, water purification systems, and other industrial processes). Some of the surveys are coordinated through a partnership with the Alameda County Green Business Certification program. In-house water conservation staff conducts most surveys, while larger commercial and industrial surveys have been conducted by consultants. On-site surveys include a comprehensive review of existing water use, identification of areas for improvement, and water use efficiency recommendations provided to the customer. These recommendations include an analysis of potential water and cost savings, as well as a payback analysis. Free conservation devices and follow-up assistance are offered to participating commercial customers.

Commercial High-Efficiency Toilet and Urinal Rebate Program

In 2000, the District and USD initiated a program to provide rebates to commercial customers and low-income multi-family homes to replace non-efficient toilets with water efficient toilets and urinals. The purpose of this program is to target District customers that have the highest potential water savings when their older, non-efficient toilets are replaced with efficient models. Analysis by the CUWCC and others has indicated that commercial customers, such as restaurants and gas stations, as well as multi-family residential units, have the highest potential water savings. This program began focusing on the installation of WaterSense labeled HETs in 2007. The program is marketed through the Commercial survey program, the Green Business Certification program, and other Commercial programs.

Waterless Urinal Installation at Local Schools

In 2008, the District partnered with USD and the Fremont Unified School District (FUSD) to replace all urinals throughout FUSD's schools (36 schools and facilities) with waterless urinals. In 2009, the District worked with another area school, Fremont Christian School, to replace all of their standard urinals with waterless models, again with USD's cost-share assistance. The District continues to partner with schools, most recently in Union City and Newark, to identify opportunities to upgrade urinals and other water using fixtures and devices.

Commercial Clothes Washer Rebate Program

The District has offered rebates for qualifying commercial clothes washing machines with matching funds from USD for over 15 years. Participants include laundromats and apartment complexes with on-site laundry facilities**.**

Spray and Rinse Valve Installation Program

The District participated in a statewide grant program that partnered with water agencies and their energy providers (i.e. Pacific Gas & Electric Company) to install water and energy efficient spray valve nozzles in service area restaurants. These spray valves are water and energy efficient and were installed at no cost to the restaurants. This program was co-funded by the California Public Utilities Commission and local water agencies. The District continues to seek opportunities to incentivize the installation of pre-rinse spray nozzles.

Commercial Custom Water and Energy Efficient Equipment Incentives

The District partners with Pacific Gas & Electric Company to provide customized incentives for businesses and organizations to upgrade inefficient equipment with water and energy efficient equipment, such as dishwashing systems, ozone laundry systems, connectionless food steamers, etc. Incentives are based on estimated water savings. Sites must be pre-qualified through the survey program.

LANDSCAPE PROGRAMS

Landscape water use accounts for as much as 40% of the total water use in the service area. The District has developed programs that promote efficient landscape water use including incentives, landscape budgets and surveys. See Table 7-2 for program activity numbers.

Dedicated Landscape Partnership (DLP) Program

The District has over 2,200 dedicated irrigation (DL) accounts at multi-family, commercial, industrial and institutional sites. In order to ensure that these sites are being irrigated efficiently, the District initiated a water budget and survey program in 1999.

Landscape Water Use Reports: In 1999/2000, the District ranked customers with dedicated landscape (DL) accounts according to use, those accounts with the highest consumption were offered a free landscape survey to determine landscaped areas (turf and non-turf). Information from these surveys was entered into an application that created individual reports comparing actual water use with calculated

landscape water needs at each site. In 2011/2012, the District further expanded the program to include all DL accounts with consumption. Several interns were hired to digitize landscape areas in GIS for all the additional sites. Close to 1,000 landscape sites are now receiving these reports, and staff estimates that over 90% of DL account consumption is now captured in the water budget reporting program. Reports are issued every four months to customers and their landscape contractors.

City Park Landscape Water Use Reports:
Since 2001/2002, the District has used GIS to identify turf and non-turf areas and to match parcels to meter numbers for large municipal parks in the service area. The District provides park landscape water use budget reports for the cities of Fremont, Newark, and Union City.

Landscape Conservation Business of the Year Awards: The District recognizes those Dedicated Landscape Partners that remain within their annual water budget through a "Water Conservation Business of the Year" awards program. These recipients are recognized for their achievements in May, during the District's outreach efforts for Water Awareness Month.

Landscape Audits: Through the water budget program, sites that are consistently over budget are identified and offered onsite landscape water use efficiency surveys. Surveys include an evaluation of current and past usage, a review of landscape area measurements, a walkthrough of the irrigation system to identify maintenance issues and inefficiencies, and an assessment of landscape characteristics. Findings and recommendations are provided at the end of the survey, followed by a report that summarizes this information. Recommendations may include participation in the District's other landscape programs such the "smart" irrigation controller program or the turf removal program. Some surveys are conducted by in-house staff, but for larger sites with complex irrigation systems, a consultant is hired by the District to conduct these audits.

Workshops and Trainings for Landscape Contractors

The District partners with various organizations including BAWSCA, Bay-Friendly, irrigation supply manufacturers/distributors, and other interested parties to provide landscape water use efficiency training geared toward landscape contractors.

Water Efficient Landscape Rebate (Turf Removal) Program

As described under the Residential Programs section, the District provides rebates to single-family residential, multi-family residential and commercial customers for removing turf. The rebate is based on the square footage of turf removed and replaced with low water use landscaping.

Weather Based Irrigation Controller Rebate Program

The District provides rebates to large landscape customers who install weather based irrigation controllers, also known as "Smart Controllers". Smart Controllers use weather data and site information to automatically adjust irrigation scheduling and are effective tools for reducing landscape water use. More efficient watering means less waste, reduced run-off, and healthier plants. A pilot program was initiated in 2006, as part of a statewide grant funded program. Results from the initial program indicated that savings were close to 20% for controllers installed in the District's service area. The District's current program began in 2010. Program implementation was modeled after the initial program but improved based on lessons learned. While the initial program included single-family residential customers, the current program focuses on commercial and multi-family customers.

California Irrigation Management Information System

The California Irrigation Management Information System (CIMIS), operational since 1982, is a repository of climate data collected from computerized weather stations located throughout California. CIMIS helps agricultural growers and turf managers administering parks, golf courses and other landscapes to develop water budgets for determining when to irrigate and how much water to apply. Providing information for improving water and energy management through efficient irrigation practices is the primary use of the CIMIS system. CIMIS was developed by the California Department of Water Resources and the University of California at Davis. Access to CIMIS is free and the system operates 24 hours a day, every day of the year, except during maintenance hours. There has been a CIMIS station in the District's service area since 2000. The District, the Department of Water Resources, and Union City joined forces to open a station at Town Estates Park in Union City. Union City CIMIS Station #171 meets all the conditions needed to provide accurate weather information. This station provides the weather data the District uses to develop its dedicated landscape water budget report.

SCHOOL EDUCATION PROGRAMS

The District's school education program is a Clair A. Hill award winning program reaching students each year through innovative, hands-on programs, classroom presentations, and assemblies. It was established prior to 1991 and has been used as a model by other water agencies. The school education program includes the following:

Classroom Instruction: The District provides trained staff to conduct water supply and conservation programs at public and private schools in the District's service area. Programs are available for kindergarten through 12th grade and are aligned with California education content standards. They are taught as special classes in which a District instructor substitutes for the regular teacher and are activity-based. The District provides all of the necessary resource materials required for these programs. Please see below for a description of each program.

School Assembly Program: Each year, the District sponsors a water conservation school assembly program for schools in its service area. The program stresses the various facets of water conservation through the use of music, storytelling, and drama and is appropriate for kindergarten through 6th grade.

"Saving Blue" Program: During the 2010-2011 school year, *ZunZun*, a musical duo specializing in water conservation school assemblies, performed shows at the District's service area schools. As part of the assembly, entitled, "Saving Blue," classrooms were given the opportunity to participate in a contest for a chance to perform on a special CD being produced by *ZunZun*. Classes were asked to write a verse for a new *ZunZun* water conservation song. The three winning classes were recorded singing their verses and these recordings were included on the CD. The recording sessions were also videotaped and the video was posted on the District's website and the District's YouTube channel. The video may also be used as a public service announcement on local television stations. All classrooms participating in the contest received a free copy of the CD.

"Bird and Butterfly Starter Kit" Program: During the 2013-2014 school year, the District continued to offer the *ZunZun* assembly program to area schools. At the conclusion of each assembly students received a "Your Bird and Butterfly Starter Kit" to encourage conservation and wildlife gardening. Each kit included a pack of Alameda County wildflower seeds, instructions on planting and information on the benefits of gardening with native wildflowers.

"Slow the Flow" Program: The ZunZun assembly program continuously receives positive feedback in post-program teacher evaluations. During the 2014-2016 school years, the District continued assemblies yet created a new, interactive take home project. The "Slow the Flow" Program provided each student with a flow bag labeled with instructions on how to test the flow rate of their showerheads and kitchen and bathroom sinks. Students were directed to the District webpage (www.acwd.org/flow) to enter their findings and receive a free gift. For those who reported findings greater than 1.5 gallons per minute (GPM), they also received low-flow showerheads and faucet aerators.

Educational Resource Materials: The District provides resource materials for teachers to use in teaching about water supply and water conservation. These materials include workbooks, lesson plans, curriculum guides, brochures, pamphlets, videos, posters, maps, games, stickers, pencils, rulers, and magnets. All materials are provided to schools and teachers upon request.

Tours: The District offers tours of the District's facilities to local schools. These tours include visits to our water treatment and groundwater recharge facilities. All tours are led by District staff.

Water Conservation Poster and Slogan Contest: Each year, through 2015, the District sponsored an extremely popular Water Conservation Poster and Slogan Contest. First through 6th grade students were invited to enter posters and slogans that encourage water conservation. Winning entries were included in a Water Conservation Calendar that was distributed to teachers in the District's service area. The District will continue to engage students through a poster/slogan contest, or something similar in nature, moving forward.

Other: Students who participate in District sponsored activities are encouraged to visit our home page (http://www.acwd.org), which includes educational material and water conservation material. In addition, the District participates in Water Awareness Month by providing teachers with free water conservation lesson plans developed by the California Water Awareness Campaign. The District also sponsors a mini-grant program for local teachers,, conducts free educational workshops (Project WET, etc.), and encourages student groups to meet and consult with water conservation staff on special projects they have for school and/or extra-curricular activities (Girl/Boy scouts, etc.)

PUBLIC INFORMATION PROGRAMS

The District's public information program was also established prior to 1991. The public information program includes the following:

***Demonstration garden*:** The District maintains a drought resistant demonstration garden and provides brochures of the garden and irrigation system for our customers. The garden is currently being renovated to provide an even better demonstration of residential and commercial applications of drought tolerant landscaping, as well as stormwater capture. The District's demonstration garden is and will continue to be a Bay-friendly certified garden, a designation given to gardens that employ the seven Bay-friendly Gardening Principles, which include: landscape locally, landscape for less to the landfill, nurture the soil, conserve water and energy, protect water and air quality, and create wildlife habitat. The District's Drought Tolerant Garden has been a stop on tours of Bay Area gardens that meet and/or exceed Bay-Friendly Gardening standards, which include water use efficiency. During tours, conservation staff spends time discussing water conservation, the District programs, and the use of drought tolerant plants with visitors. The District has also assisted Union City with the development of a demonstration garden at their City offices, provided a grant to help establish a water efficient landscape at Ohlone College's "Green" Newark Campus, and assisted East Bay Regional Park District with an installation of a drought-tolerant garden at Quarry Lakes.

***The Aqueduct newsletter*:** The District's newsletter is mailed to every physical address in Fremont, Newark, and Union City up to three times per year. The newsletter includes information about water conservation, the drought and Water Shortage Emergency Ordinance, statewide restrictions, leak detection, water quality, water rates, and other District related information. Water conservation messaging is also included with every bill the District sends out.

***New customer packet*:** All new District customers receive a packet that includes information on water conservation and leak detection.

Brochures: The District has a wide variety of water conservation brochures on such topics as leak detection, water conservation devices and measures, irrigation guidelines, and drought resistant landscaping

***Previous use shown on bill*:** The customer's consumption from the previous year is provided on all customer billing statements for comparison to their current use, and each customer's average annual use is compared to the average annual use of other customers within their same lot size group.

***Community Events*:** The District routinely participates in a wide variety of community events and other local events. During the current drought, the District held several community workshops on the District's water supply situation, drought actions, state regulations, and conservation efforts. District staff also presented at over 30 community meetings and events in 2014-2016.

***Internet home page*:** The District maintains a home page on the Internet (http://www.acwd.org), with a link to the Drought Resource Center which provides a wide variety of information on the drought, the District's Water Shortage Emergency Ordinance and water use restrictions, ways to report water waste, water conservation programs including rebates and water saving kits, leak detection, and drought resistant landscaping.

Social media: The District utilizes social media to regularly inform the public about a variety of District topics, including: the drought and conservation tips, water quality, groundwater, water supply reliability, infrastructure improvements, main cleaning, rates, and District meeting and workshop dates.

CONSERVATION ACCOMPLISHMENTS AND FUTURE PLANS

The District has successfully worked with other water agencies on large scale conservation programs and has actively pursued conservation grant opportunities. Close to $2 million in grant funding has been awarded to the District for conservation programs, since 2003, and about $1 million of this was available for conservation program rebates during the current drought. The District has developed the in-house capacity to conduct commercial and landscape water use efficiency surveys and has creatively utilized new technologies, such as GIS, to advance conservation programming.

In 2010, the District received the Clair A. Hill Award for excellence in water management and innovation from the Association of California Water Agencies. As the honored recipient, the District was privileged to administer the Clair A. Hill Scholarship for the 2011-2012 academic year. Offered in the name of water leader Clair A. Hill, this $5,000 scholarship was awarded to a qualified student in a water resources-related field of study.

In 2015, the District received the Silicon Valley Water Conservation Award under the Water Utility category for its low-income customer-focused Water Savings Assistance Program described in detail in the residential program section of this chapter. That same year, the District nominated a service area student, Akhil Dua, under the Water Champion category, for a turf removal project he spearheaded as a hopeful Eagle Scout, in partnership with the City of Union City. He also received an award that year for his efforts.

In 2010, the District conducted a comprehensive study of alternative billing rate structures to its current uniform rate structure. These alternatives are designed to incentivize efficient water use, address affordability, and provide the reliable revenue generation needed to cover the rising costs of water service in California. In doing so, such rate structures are less sensitive to variations in demand and can help to avoid unpredictable, year-over-year rate increases. Further steps to implement an alternative rate structure have been delayed due to the current drought (see Chapter 10 for further discussion). The District continues to evaluate alternative water efficiency based rate structures for possible implementation after the drought.

In addition to the programs detailed above, District conservation staff will continue to seek grant funding to maintain, identify, develop and implement projects that contribute toward meeting the District's demand management goals. The District will continue to creatively use new technologies to maximize program effectiveness (e.g. installation of weather-based irrigation controllers, the use of GIS and other applications, rebates for higher efficiency appliances), work with other agencies, and participate in regional and statewide conservation programming.

Table 7-2
Detailed Program Activity
(see table on following three pages)

Detailed Program Activity Table

Residential Programs

Program/Activity	Activity Numbers/Description
Residential High Efficiency Clothes Washer Rebate Program	Washer Rebates Issued:33,629
Residential Low-Flow Device Distribution Program	WC Kits Distributed: 24,266 Leak Detection Kits Distributed: 140
Single Family and Multi-Family Residential High Efficiency Toilet Rebate Program	Rebates Issued: 639
Multi-Family Residential Survey Program	Multi-family Units Surveyed: 9,788
Partnership with California Youth Energy Services (CYES)	Single-family and Multi-family Units Surveyed: 2,821
Low Income Water Savings Assistance Program	Homes Surveyed: 116 UHETs installed: 224 Shower heads installed: 205 Faucet aerators installed: 275 Toilet Repairs:177
Residential High Water Use Notification Program	WaterSmart Home Water Use Reports: Program targets the top 20% of water users or about 19,000 customers annually Single Family High Water Use Notices: Program targeted the top 2% of water users or about 1,000 customers.
Residential Leak Detection and Notification Program	Leak Notices (door hangers left by meter readers): ~750 per year
Residential Seasonal Irrigation Reminder Program	Irrigation reminders are sent on a seasonal basis to single-family residential customers to update them on current landscape irrigation requirements. Reminders are sent via postcards and/or with the water bills three times a year since 1998.
Residential Landscape Workshops, landscape events, and Garden Tours	Partner with Bay Area Water Supply and Conservation Agency (BAWSCA) and Bay-Friendly Gardening to provide workshops to residential customers on efficient water use in the landscape throughout the Spring and Fall. Topics include efficient irrigation, water efficient design elements, low water use plants and lawn alternatives. In the past five years 24 workshops were held and were attended by 847 people. In addition the District sponsors and promotes local garden tours including the Bringing Back the Natives Garden Tour and the Bay-Friendly Garden Tour. The District participates in local landscaping events including StopWaste sheet mulching parties and garden supply store vendor events.
"Water-Wise Gardening in the Bay Area" Online Tool	District referred customers to this web tool as a resource for water efficient landscaping projects.
Residential Rain Barrel Rebate Program	Rebates Issued: 50
Single-Family and Multi-Family Residential Water Efficient Landscape Rebate (Turf Removal) Program	Square feet of turf removed: 233,971 Sites: 181

Commercial, Industrial, and Institutional Programs

Program/Activity	Activity Numbers/Description
Commercial Survey Program	Surveys conducted: 683
Commercial High Efficiency Toilet (HET) and Urinal (HEU) Rebate Program and Waterless Urinal Installation at Local Schools	HET/HEU rebates Issued: 682
Commercial Clothes Washer Rebate Program	Rebates Issued: over 300
Spray and Rinse Valve Installation Program	Spray Valves Installed: over 570
Commercial Custom Water and Energy Efficient Equipment Incentives	Incentives Offered: 1

Large Landscape Programs

Program/Activity	Activity Numbers/Description
Landscape Water Use Reports	There are currently close to 900 sites in the program representing the majority of dedicated landscape water consumption. Reports are provided three times per year.
City Parks Landscape Water Use Reports	City parks in Fremont (46), Newark (12), and Union City (31) are included in the program for a total of 89 parks. Reports are provided twice a year.
Landscape Conservation Business of the Year Awards	Awards provided to customers who customers who met their landscape water use budgets. In 2015, 413 sites were eligible to receive the award.
Landscape Audits	Audits completed:178
Workshops and Trainings for Landscape Contractors	Partner with Bay-Friendly, BAWSCA, Irrigation supply manufacturers/distributors, and other interested organizations to provide landscape water use efficiency training in the service area.
Water Efficient Landscape Rebate Program (Commercial, Industrial, and Institutional and Multi-Family Customers)	Square feet of turf removed: 271,194 Sites: 19
Weather-based Irrigation Controller Rebate Program	Controllers installed: 192
California Irrigation Management Information System	Partner with DWR and Union City to host a CIMIS station at a park in Union City. The station provides climate data that is used for programs such as the landscape water budget program. The District maintains the station on a monthly basis.

Public Information and School Programs

Program/Activity	Activity Numbers/Description
School Education Programs	Program to work with children in the service area to better equip them for understanding and practicing water conservation techniques. Program includes classroom programs, assembly programs, poster/slogan contest (1,500 submissions annually), and special activities. The District's classroom programs reach over 7,000 students annually, and the District sponsored assembly program reaches approximately 17,000 students annually.
Avenues for Public Outreach	District website, Aqueduct newsletter, social media, bill messages, new customer packets, postcards, brochures, newspaper advertisements, press releases, community meetings, and participation at community events.
Customer Service and Conservation Material Distribution	Address customer questions about water conservation whether in person, via phone or email. Mail out print materials to assist customers in achieving conservation goals.

Other Conservation Activities at the District

Program/Activity	Activity Numbers/Description
System Leak Detection and Repair	Evaluate the distribution system for leaks and make necessary repairs to the system. On average, the District surveys over 39 miles of pipeline for leaks bi-annually.
Metering	All District accounts are metered.
Billing	All District accounts are billed based on the amount of water used.

CHAPTER 8
WATER CONSERVATION BILL OF 2009 (SBX7-7)

The Water Conservation Bill of 2009 (SBX7-7), requires a statewide 20% reduction in urban per capita water use by 2020. It requires that urban water retail suppliers determine baseline water use and set reduction targets according to specified requirements, and requires agricultural water suppliers to prepare plans and implement efficient water management practices.

On June 9, 2011, the District held a public hearing to consider and adopt the method for determining the District's water use targets under SBX7-7, including obtaining community input regarding the District's implementation plan and considering the economic impacts, if any, for implementing that plan.

As set out in SBX7-7, the Department of Water Resources (DWR) adopted an alternative "Method 4" for setting targets through a public process. Method 4 was released in October of 2010, revised February of 2011, and deemed "provisional" until December 31, 2014. It was revisited by an Urban Stakeholder Committee established by DWR. The Committee reviewed the existing Method 4 in 2014 and recommended that DWR not make any revisions. Therefore, is unchanged since the 2010 UWMP. DWR, in consultation with the California Urban Water Conservation Council (CUWCC), also developed standardized technical methodologies and criteria for calculating per capita water use, baseline use, population and other analytical metrics. DWR also convened a representative Commercial, Industrial and Institutional (CII) Task Force to develop standard metrics and best management practices (BMPs) for CII water use. Their final report was issued to the Legislature on October 21, 2013.

As required under SBX7-7, urban retail water suppliers, including the District, must determine their base per capita water use and develop water use reduction targets using one of four specified methods:

- Option 1: 80% of baseline per capita daily water use
- Option 2: Sum of specified performance standards
- Option 3: 95% of DWR Hydrologic Region target
- Option 4: A flexible alternative designed by DWR to adjust for local circumstances

In the 2010 UWMP, which was adopted by the District's Board of Directors on June 9, 2011, the District selected Method 4 for its compliance target. It was determined that between District customers' ongoing and anticipated future efforts to improve water use efficiency, that the District would be able to meet both the 2015 and 2020 compliance targets. For the 2015 UWMP, DWR has developed new standardized methodologies for calculating both baseline use and the Method 4 target.

The purpose of this chapter is to document the District's approach for complying with SBX7-7, including baseline water use, target determination, compliance with the 2015 interim target, and proposed methods to ensure 2020 per capita water use targets are met (i.e. water use reduction plan).

8.1 BASELINE AND TARGET DETERMINATION

Beginning with the 2010 UWMP, SBX7-7 (CWC §10608.20 (e)) requires each urban retail water supplier to include the following in its UWMP:

- Baseline daily per capita water use - how much water is used within the supplier's distribution system area on a per capita basis. It is determined using water use and population estimates from a defined range of years.

- Urban water use target - the planned daily per capita water use in 2020 within the supplier's distribution system area, taking into account current and planned water conservation practices.

- 2015 Interim urban water use target compliance - verify whether or not the supplier's daily per capita water use in 2015 is in compliance with the interim target, a value halfway between the baseline and 2020 target year.

In 2015 and 2020, each water supplier will also determine the compliance daily per capita water use to assess progress toward meeting interim and 2020 urban water use targets. Determining and tracking use levels and targets will support the goal of reducing the state's per capita urban water consumption by 20%. This section provides documentation on the District's determination of these numbers and the supporting information that they are based on.

Process Overview

The Water Conservation Bill of 2009 describes the overall process by which a water supplier complies with the requirements. It specifically identifies three methods for establishing a urban water use target and requires DWR to develop a fourth. Additionally, it requires DWR to develop technical methodologies for consistent implementation of the Water Conservation Bill of 2009 requirements. These technical methodologies and the fourth target method were developed in close consultation with the Urban Stakeholders Committee (USC) during spring and summer 2010. Target methods are the four options an urban water supplier has to determine its urban water use target. They are referred to as Target Method 1, Target Method 2, etc. These methods identify specific steps water suppliers will follow to establish targets. Each urban water supplier (or regional alliance) must use one of the four target methods to perform the required calculations. Technical methodologies are procedures and guidance for conducting some of the specific steps identified in the target methods. There are nine technical methodologies. Multiple methodologies may be needed for completion of a target method calculation.

The Water Conservation Bill of 2009 provides flexibility in how an urban water supplier determines the baseline and target numbers for its water service area. It also indicates that water suppliers can cooperatively determine and report progress toward achieving these targets through a regional alliance. A water supplier may determine the targets on a fiscal year or calendar year basis, but must clearly state in its UWMP the basis for its reporting.

Although the legislation provides flexibility in how an individual or group of water suppliers approaches baseline and target compliance, it also requires method and methodology consistency over time. So, technical methods and methodologies used by a water supplier to determine use levels and develop targets in 2010 are to be the same as those used in 2015 and 2020. A water supplier may select a different Target Method in its 2015 UWMP, but not in any amended 2015 UWMPs or in the 2020 UWMP. A water supplier has the opportunity to modify its target method during the implementation period, but any changes must be retroactive, as described in Technical Methodology 9: Regional Compliance.

Baseline Periods

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

- 10- to 15-year base period: This is a 10-year or 15-year continuous period used to calculate baseline per capita water use.

- 5-year base period: This is a continuous 5-year period used to determine whether the 2020 per capita water use target meets the legislation's minimum water use reduction requirements of at least a 5 % reduction per capita water use.

If the urban retail water supplier's base daily per capita water use calculated using the 5-year base period is 100 gallons per capita per day (GPCD) or less, then the urban water supplier is exempt from the 5 % minimum required reduction. It must document in subsequent UWMPs in 2015 and 2020 that it has maintained the 100 GPCD compliance level of water use.

Meeting Water Conservation Bill of 2009 Requirements

There are four overall steps a water supplier completes to meet the 2010 UWMP requirements identified in the Water Conservation Bill of 2009:

- Step 1: Determine Base Daily Per Capita Water Use
- Step 2: Determine Urban Water Use Target
- Step 3: Compare Urban Water Use Target to the 5-year Baseline
- Step 4: Determine Interim Urban Water Use Target

Each of these steps and its application to the District service area is described below.

Step 1: Determine Base Daily per Capita Water Use

Gross Water Use

The Water Conservation Bill of 2009 requires each urban retail water supplier to include in its UWMP an estimate of base daily per capita water use. Base daily per capita water use, measured in GPCD, is established for an initial period of time, which is referred to as the 10- to 15-year base period.

The District delivers water to its customers in two ways. The first is through a conventional potable distribution system. All points of entry to this distribution system are metered (Figure 3-4). The second is through recharge of the local aquifer for extraction by privately-owned groundwater wells. All private wells are individually metered and billed quarterly by District staff in accordance with the District's Replenishment Assessment Act. Gross Water Use is a combination of these two demands and is reflected in Table 8-1.

Estimating Service Area Population

As described in Chapter 1, section 1.5, the Alameda County Water District service area encompasses the Cities of Fremont, Newark and Union City (Figure 1-1). The District is a Category 1 Water Supplier as defined in Methodology 2 and relies on the 2010 US Census data and California Department of Finance (CA DOF) for population estimates. For this 2015-2020 UWMP, the District recalculated its baseline water demand using the population estimates from the full US Census data that became available in 2011. These figures are reflected in Table 8-1.

Calculating Base Daily per Capita Water Use

The District does not currently have a recycled water supply that offsets potable water use; therefore the base daily per capita water use is simply an average of the annual Gross Water divided by the estimated population. The District has identified its base daily per capita usage, by the ten year period between January 1, 1995 and December 31, 2004 (see Table 8-1).

Step 2: Determine Urban Water Use Target

The water supplier has four different methods for determining the urban water use target:

Method 1: 80% of Base Daily Per Capita Water Use

Method 1 is the simplest approach and defines the water use target as 80% of the baseline value, or (0.8 x 170 GPCD) = 136 GPCD.

Table 8-1
District Data for Analysis and Compliance with SBX7-7

Calendar Year	Population Est.	Gross Water Use (Ac-Ft / year)			Annual Daily per Capita Water Use (GPCD)	Base Daily per Capita Water Use (10 yr Average)	Base Daily per Capita Water Use (5 yr Average)
		District Production Facilities	Private Well Pumping	Total Gross Water			
1995	278,182	47,958	4,823	52,781	169		
1996	280,812	52,115	4,501	56,616	180		
1997	286,734	55,797	4,580	60,377	188		
1998	295,661	51,549	3,158	54,707	165		
1999	304,006	54,532	2,845	57,377	168		
2000	312,753	55,727	3,901	59,628	170		
2001	316,401	55,751	2,984	58,735	166		
2002	319,589	55,574	3,540	59,114	165		
2003	319,048	54,204	3,466	57,670	161		
2004	317,523	55,082	3,846	58,928	166	170	
2005	316,780	52,815	3,290	56,105	158	169	
2006	316,304	52,526	2,864	55,390	156	166	
2007	317,739	54,497	2,577	57,074	160	164	160
2008	320,468	54,302	2,081	56,383	157	163	160
2009	323,043	49,018	2,129	51,147	141	160	155
2010	325,741	46,596	1,709	48,305	132	156	149
2011	329,427	46,810	1,764	48,574	132	153	145
2012	332,732	48,140	2,033	50,173	135	150	139
2013	336,033	50,250	1,759	52,009	138	148	136
2014	340,390	40,555	2,106	42,661	112	142	130
2015	344,278	36,519	2,057	38,576	100	136	123

Method 2: Performance Standards

Method 2 is the most complex approach and defines the target per capita demand as the sum of defined performance standards for indoor residential, landscape and commercial, industrial, and institutional (CII) Water Use. This method accounts for local conditions through its consideration of actual local weather conditions and customer landscaping, however the data required to confirm these standards is extensive and far beyond what is typically available to water agencies. The District was able to analyze Method 2 in the 2010 UWMP based mostly on available data, but was heavily reliant on assumptions. Given the complexity and cost of collecting the necessary data to fully comply with Method 2, the District decided not to select this option.

The results of the 2010 analysis have been reproduced in this report (Table 8-2) but have not been updated to reflect the revised population data; they are included here for sake of completeness.

Table 8-2
2010 UWMP Results of District's Method 2 Analysis [1]

Calendar year	*Residential Indoor Target (GPCD)*	*CII Target (GPCD)*	*Estimated Landscape Demand [2] (GPCD)*	*Annual Target (GPCD)*
2010	63	38	51	151
2015	59	36	50	145
2020	55	34	49	137

(1) 2010 UWMP Figures in this table do not reflect revised population data published since the 2010 UWMP; values are included for completeness of reporting on all Method Target options.
(2) An additional 0.4 GPCD is typical used per year for fire-lines and temporary hydrant meters supporting construction activities. SBX7-7 does not stipulate that these demands can be added into the annual target and have therefore been omitted from this table.

Method 3: 95% of Regional Target

Method 3 relies on regional targets defined for specific hydrologic regions of the State of California. The District falls inside of the San Francisco Bay Region which has defined a baseline of 157 GPCD and 2020 target of 131 GPCD x 95% or 124 GPCD.

This target is notably lower than all other targets for the District. The San Francisco Bay Region (Region) on whole encompasses mostly cooler and wetter micro-climates than that of the District service area, as illustrated by the Region's average annual precipitation of 21.4", 16% greater than the District service area average of 18.4". This regional target does not sufficiently account for the efficient and reasonable use of water for landscape demands in the southeasterly portion of the Region (i.e., District service area), and therefore is not considered by the District.

Method 4: DWR Methodology

Target Method 4 was developed by DWR under direction from the State legislature. It was deemed provisional in the 2010 UWMP and the Water Code provided DWR the opportunity to update it prior to December 31, 2014. Even though Method 4 was deemed to be provisional, Method 4 was an appropriate target method for water suppliers to select. DWR elected not to update Method 4 and it has therefore remained unchanged since the 2010 UWMP.

Method 4 assumes savings between the baseline period and 2020 from the metering of unmetered water connections and the achievement of conservation measures in residential indoor, CII and Landscape water use, water loss and other unaccounted-for water (non-revenue water). DWR developed a spreadsheet calculator for use by individual agencies to determine their target. The calculator incorporates savings assumptions developed from a study of 52 randomly selected water suppliers in California with a variety of climatic and demographic characteristics. For the 2015 UWMP, DWR updated the calculator and further simplified the inputs. A summary of Method 4 input data is listed in Table 8-3, and Figure 8-1 shows the Method 4 target calculated by the DWR spreadsheet tool.

Table 8-3
Method 4 Specific Inputs for the District

Input	*District Selection*	*Details*
Baseline period	Jan 1, 1995 to Dec 31, 2004	District selection
Baseline Water Use GPCD	170 GPCD	See Table 8-1
Population in Midpoint Year	304,006	Ca. DoF estimate, Table 8-1
CII Consumption in Midpoint Year	12,097 AF/yr	Billed CII consumption in 1999 without adjustment for water-loss
Number of unmetered Connections in Midpoint Year	0	District does not have unmetered connections

Figure 8-1
Method 4 Target Calculated by DWR Spreadsheet Tool Assuming Default Savings

Target Calculation -- Provisional Method 4 Target

Step 1. Calculation of Landscape Water Use and System Water Loss

Urban Supplier	1995-2004 Baseline GPCD	—	Assumed Indoor Residential per Capita Water Use GPCD	—	CII per Capita Water Use GPCD	=	Estimated Landscape Water Use and System Water Loss GPCD
Alameda County Water District	170.0		70.0		35.5		64.5

(Alternate) Step 2. Calculation of Savings Using Default Indoor Residential Savings

Urban Supplier	Default Resi-dential Indoor Savings	+	Metering Savings BMP 1.3	+	CII Savings BMP 4	+	Land-scape + Water Loss Savings 21.6%	=	(alt) Total Savings GPCD
Alameda County Water District	15.0		0.0		3.6		13.9		32.5

Step 3. Calculation of Urban Water Use Targets

Urban Supplier	1995-2004 Baseline GPCD	—	Total Savings GPCD	=	**Compute d 2020 Target GPCD**	**Less Than 95% of 5-Year Baseline**	**Final 2020 Target**	**Final 2015 Target**
Alameda County Water District	170.0		32.5		**137.5**	**TRUE**	**137.5**	**153.8**

Target Selection

The results of the four target method calculations are summarized in Table 8-4. The District has elected to use Target Method 4 in 2010. The District re-evaluated the target selection prior to the adoption of the District's UWMP update in 2015 and again the District elects to use Target Method 4.

Table 8-4
District Target Compliance

	GPCD	***Assumption***
Baseline	172	Sec. 10608.20: Highest 10-yr average ending no earlier than Dec 31, 2004
Method 1 Target	136	80% of baseline
Method 2 Target	137	Sum of performance guidelines (Estimated value from 2010 UWMP, not updated)
Method 3 Target	124	95% of regional 131 GPCD
Method 4 Target *	138	Default Method 4 calculation provided by DWR
Alternative Minimum / 95% of 5-yr baseline	152	Sec. 10608.22: 95% of '03-'07 Average 160 GPCD. Selected target must be less than this figure.

**** Selected Method***

Step 3: Confirm Urban Water Use Target

In order to confirm that the District's selected water use target meets a minimum reduction established by statute, the District's selected target must be less than 95% of 5-year baseline demand ending no earlier than 12/31/2007. The District's selected 5-Year Base Period is CY 2003 through 2007, with a base daily per capita water use of 160 GPCD (see Tables 8-1 and 8-4). The target minimum 95% of 160 GPCD is 152, which is greater than any of the Method 1 through 4 targets calculated (Table 8-4).

Step 4 – Determine Interim Water Use Target

Table 8-6 provides a summary of the baseline, 2015, and 2020 daily per capita water use targets, per the Method 4 approach, discussed above.

Table 8-5
District Selected Water Use Target from Method 4

Calendar year	Population Estimate	Annual Target (GPCD)	Actual & Forecast	SBx7-7 Status
Baseline		170		
2015	344,278	154	100	In Compliance
2020	353,300	138	124	On Target

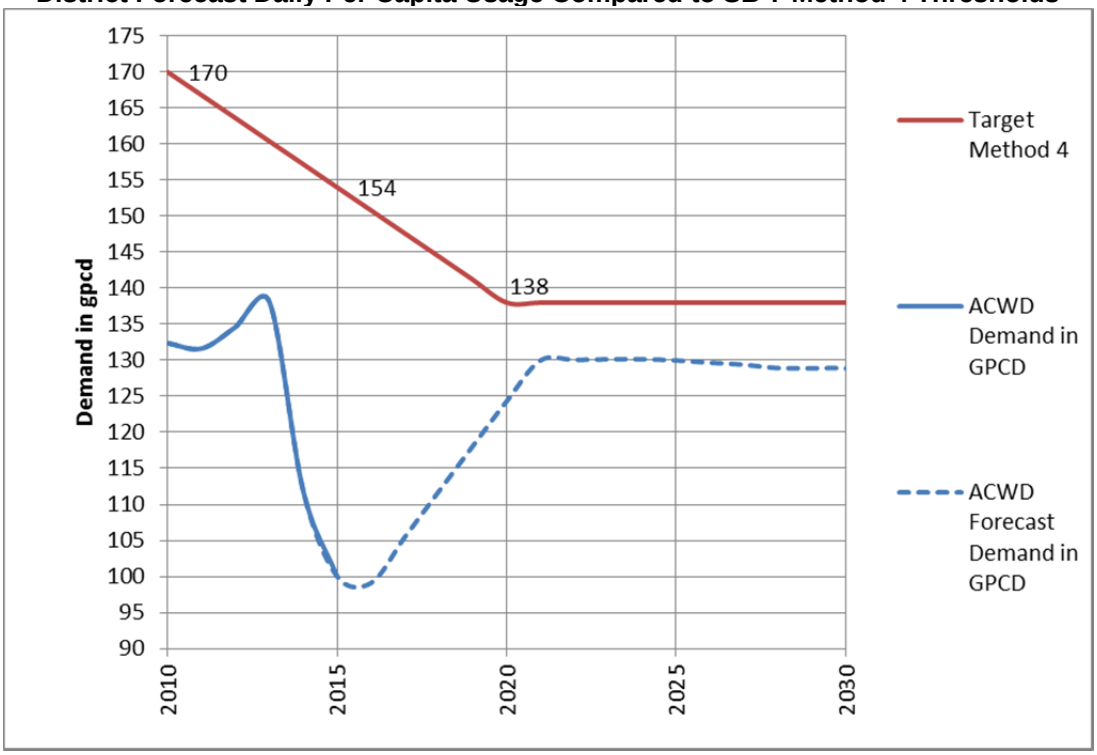
8.2 COMPLIANCE WITH SBX-7-7 WATER USE TARGETS

The District is required to determine the 2015 Interim compliance daily per capita water use target to assess progress toward meeting the 2020 urban water use target. As can be seen in Table 8-5, the District is meeting the 2015 interim target. In order to evaluate the projected 2020 compliance with the SBX7-7 water use targets, the following provides a comparison of the District's water demand forecast with the water use targets. In addition, specific measures are identified to help ensure that the District will comply with the SBX7-7 targets.

Comparison of water use targets to projected demands

The District's projected water demands are provided in Chapter 2 of this UWMP Update. In order to compare the projected water demands with the SBX7-7 targets, the projected distribution system demands, combined with the private groundwater pumping demands, are divided by the population forecasts. The results of this comparison are shown on Figure 8-2. As shown on the figure, the District's projected per capita water use is below the SBX7-7 target for 2015. The District's projected per capita water use is below the SBX7-7 target for 2020 and beyond. Therefore, based on current actual consumption and forecast demand for water, the District is currently meeting the 2015 compliance target and is projected to continue to comply with SBX7-7 in year 2020 and beyond.

Figure 8-2
District Forecast Daily Per Capita Usage Compared to SB-7 Method 4 Thresholds



Measures for future compliance with the 2009 Water Conservation Act

A key assumption in the analysis of the District's compliance with the SBX7-7 water use targets is that the per capita water use in the service area will not fully rebound to pre-drought conditions. In order to ensure that the gains in water efficiency over the past four years are not lost (and that the District complies with the SBX7-7 targets), the District is planning on the following measures:

Water use monitoring and tracking: The District routinely monitors water consumption, production and population in the service area. As part of this effort, on an annual basis staff will also calculate per capita water use, and compare the per capita water use with the SBX7-7 targets.

Continued implementation of water conservation programs: As described in Chapter 7, the District has implemented a comprehensive water conservation program. The District plans to continue to implement water existing water conservation measures and develop new measures, as appropriate. A key focus of the District's conservation program will continue to target improvements in outdoor water use efficiency.

Consideration of water use efficiency rate structure: The District currently has a base uniform water rate structure for all customer classifications. In order to further promote water use efficiency, the District has been evaluating alternative rate structures, including tiered-rates and budget-based rates, which are accepted methods of improving efficiency by incentivizing the efficient use of water

Economic Impacts Analyses

Water Code Section 10608.26 requires that urban retail water suppliers consider potential economic impacts of the implementation plan for complying with SBX7-7. As described above, the District is in compliance with the 2015 SBX7-7 water use target and is currently projected to be in compliance with the 2020 SBX7-7 water use target. No additional water reduction measures, beyond the water conservation programs already planned by the District, are anticipated to be needed to meet the District's water use targets. Therefore, the District does not anticipate that there will be additional economic impacts beyond those already contemplated as a result of the District's compliance with SBX7-7, nor will there be any disproportionate burden placed on any customer sector. In addition, compliance with SBX7-7 water use targets will not require that the District's existing customers undertake changes in product formulation, operations, or equipment that would reduce process water use.

CHAPTER 9
WATER SUPPLY STRATEGY

The District's Integrated Resources Plan recommended a water supply strategy to meet the District's planning objectives for water supply reliability, costs, water quality, environmental protection and risk. Included in the District's water supply strategy are programs for additional conservation, recycled water, brackish groundwater desalination and water banking/transfers. This chapter summarizes the planning criteria utilized by the District in developing the District's water supply strategy as part of the IRP process, followed by a summary of the recommended water supply strategy for the District and the implementation status of key IRP recommended programs.

9.1 PLANNING CRITERIA

The IRP utilized the following planning criteria in the formulation and evaluation of potential water supply strategies:

Costs: In addition to avoiding rate shocks, key IRP objectives related to costs are to 1) minimize resource costs, and 2) maintain low average customer bills. The District believes that keeping costs, and therefore customer bills, low is a paramount objective.

Reliability: The District intends to maintain a high level of service reliability for its current and future customers. The IRPs' primary focus was long-term water supply reliability because the District has internal standards to address short-term reliability issues (e.g., storage and peak-day capacity standards) and contingency plans for supply disruptions. Through public and stakeholder input during the IRP process, the District determined that a shortage of greater than 10% in 1 out of every 30 years is unacceptable. Likewise, frequent small shortages have also been deemed unacceptable. Hence, resource strategies that result in shortages of greater than 10% or chronic shortages were not considered.

Water Quality: In addition to maximizing the health-related treated water quality, non-regulatory aesthetics standards are also extremely important to District customers. The District's IRP water quality objectives include avoiding sudden changes in water taste or appearance. One determinant of taste is hardness, expressed as mg/L, or parts per million (ppm) as $CaCO_3$. A key criterion used in the IRP process was to provide greater uniformity of water quality by targeting specific hardness levels and limiting the maximum monthly hardness.

Environmental Impacts: The District's planning objective was to avoid or mitigate environmental impacts. For a resource option to be considered viable, appropriate mitigation needs to be provided such that any significant environmental impacts are reduced to levels that are less than significant.

Local Control: The District's imported supplies have always been hampered by uncertainties, and therefore the District determined that local control of future resources is desirable. Factors considered in evaluating local control include:

1. The number of entities involved in developing or acquiring the supply options;
2. The firmness of the District's water rights or contractual allocations;
3. The amount of water that the District would have to share with other contractors; and
4. Whether state or federal agencies are involved in allocating water deliveries.

Risk: The last key planning objective was to minimize risks due to future uncertainty. These risks include:

- ***Financial risk:*** The likelihood of spending more money than expected or spending money unnecessarily. This rating is affected by factors such as the ratio of fixed to variable cost, construction and permitting lead times and resource size. For example, resources with high

capital cost are more financially risky than resources characterized by variable costs.

- ***Water quality regulatory risk:*** The likelihood of being unable to comply with future health-related water quality regulations. Even though the cost of treatment needed to comply with current standards is included for all source options, some sources have an inherently higher risk of not meeting future standards with existing treatment facilities.

- ***Availability risk:*** The likelihood that a supply source is not available due to external legal or regulatory changes or uncertainties in the quantity of supply provided or saved. For example, agricultural transfers may be risky because of contractual and through-Delta delivery issues.

9.2 WATER SUPPLY STRATEGY AND IMPLEMENTATION STATUS

As part of the District's IRP process, the District evaluated a wide range of water supply and water conservation options. These options were packaged into nine alternative water supply strategies, each of which was evaluated against the District's planning objectives (described above). The recommended water supply strategy, chosen because it best met the District's objectives, included desalination, recycled water, conservation, groundwater management and off-site banking/transfers. Table 9-1 provides a summary of the key projects incorporated in the District's water supply strategy and their current implementation status followed by a discussion greater detail below.

Table 9-1
District Water Supply Strategy and Implementation Status

IRP Component	*2000*	*2010*	*2020*	*2030*	*Implementation Status*
Conservation	Package 2 (IRP)	Package 2 (IRP)	Package 2 (IRP)	Package 2 (IRP)	All cost-effective BMPs are being implemented. New programs focused on landscape irrigation in place.
Desalination (mgd)	3	8			Phase 1 Desal (5 mgd) completed and in operation in 2003. Phase 2 (10 mgd) completed and operational in 2010.
Off-Site Storage/Banking Capacity (1,000 AF)	65	95	100	140	Secured 150,000 AF of off-site banking storage capacity at Semitropic Groundwater Banking Program.
Groundwater Management (Min. Inland GW Elev., ft mean sea-level)	1	-5	-5	-5	Completed the Quarry Lakes rehabilitation project to enhance groundwater recharge capacity (1996).
Recycled Water	---	---	Phase 1, timing is dependent on project needs, future recycled water customers and funding availability.		District/USD Recycled Water Feasibility Study to be completed in 2016.

Desalination

As described in Chapter 5, the IRP recommended developing a brackish groundwater desalination facility which would provide a new production facility to maximize use of local water supply by removing salts and other minerals from brackish (slightly salty) groundwater in the western portion of the groundwater basin.

The source water for the desalination facility comes from a series of wells that remove brackish water from the western portion of the Niles Cone Groundwater Basin. This program, called the Aquifer

Reclamation Program (ARP), began in 1972 and was developed to stop the spread of brackish water already in the groundwater basin and to reclaim the aquifers of the basin for future potable use. Every year, the District was pumping billions of gallons of brackish water out of the basin and discharging it to the San Francisco Bay. With the start-up of the Newark Desalination Facility in 2003, a portion of that brackish groundwater being pumped and discharged to the Bay began to be reclaimed and treated for subsequent potable use. This represented a new source of supply as the brackish groundwater pumping through the ARP is an essential program to reclaim the Niles Cone Groundwater Basin and to protect the District's potable Mowry Wellfield.

The District completed construction of the first phase (5 mgd permeate production capacity) of the Newark Desalination Facility in 2003. In 2010 the Phase 2 expansion of the Newark Desalination Facility was completed, providing a total treatment capacity of 10 mgd. The District was awarded a $2.8 million grant from the California Department of Water Resources for this expansion. The Newark Desalination Facility utilizes state-of-the-art reverse osmosis technology to convert brackish water to potable water. This process forces water under pressure across a semi-permeable membrane. The membrane allows water molecules to pass through but stops dissolved minerals such as salts and iron. The water produced by the Desalination Facility is so nearly pure that it needs to be blended with a small amount of groundwater to order add some minerals back into the final product and to achieve a more consistent aesthetic water quality.

Recycled Water

The District's long-term supply strategy includes a potential recycled water program, to provide between 1,600 and 3,000 AF/yr of non-potable supply for appropriate uses (e.g. landscape irrigation and industrial process water). As described in Chapter 6 of this report, the source of recycled water will likely be from a joint project with the District and Union Sanitary District (USD). As an interim supply, another potential source is the purchase of recycled water from the South Bay Water Recycling Program. Recycled water distribution pipelines will be separate from the District's existing potable distribution system and, therefore, would not adversely affect existing potable supply operations. The volume of recycled water produced would be the same in drought years as in normal years, thus providing what is called a "firm source of supply." Demand for recycled water for irrigation purposes is highest in the summer months, therefore, in addition to increasing total water supply, recycled water also helps to meet peak monthly and daily production capacity needs.

In 2010, the District and USD completed the District/USD Recycled Water Feasibility Study Update. This study identified two potential recycled water projects with a potential combined supply of up to 2,500 AF/yr. However, most of this supply would be to meet future demands from land use projects (including a golf course) that, as of 2016, have not yet been developed and are in various stages of the planning process. In addition, because of changing economic conditions, the current drought, and other factors, the existing and projected water demands in the District service area are significantly lower than previously forecast. Because of the low projected demands over the UWMP planning horizon and the uncertainty of future developments that could use recycled water, recycled water is not included in the 25-year planning horizon of the water supply-demand comparisons provided in this UWMP.

Recycled water remains the most likely "next source" of water supply for the District should existing supplies either become insufficiently reliable or local development and corresponding demand for water increase substantially beyond what is currently and regional planned. Accordingly, the District continues to evaluate its potential future development. In 2016, the District and USD are studying an alternate form of Recycled Water, Indirect Potable Reuse (IPR), which is the Full Advance Treatment (FAT) of wastewater to standards suitable for human consumption. To further protect human health and safety, IPR would be used as a recharge source for the Niles Cone Groundwater Basin where it would go through further dilution and natural filtration before being used as a water supply. IPR offers several benefits including (a) its uses are not limited to specific and uncertain future developments (e.g. a golf course) and (b) it does not require a costly, parallel distribution system ("purple pipe") and therefore is less expensive.

Demand Management

As discussed in Chapter 7, demand management is a key component of the District's long-term water supply and management strategy. The IRP recommended program ("Package 2") includes components to reduce both indoor and outdoor use for all customer groups within the District's service area. However, the focus of the recommended program is to reduce peak summer demands in order to reduce the need for additional production and storage facilities. In addition, in order to meet SBX7-7 water use targets, and as a signatory to the MOU on Urban Water Conservation, the District is committed to implementing locally cost-effective water conservation best management practices ("BMPs"), as developed by the California Urban Water Conservation Council (CUWCC). A summary of the District's water conservation program is presented in Chapter 7 and Appendix D (CUWCC BMP Implementation Report), and the District's target water use and SBX7-7 compliance strategy is provided in Chapter 8.

As part of the IRP process, the District estimated that the total long-term savings from District sponsored conservation measures would range from approximately 1,600 AF/yr to 4,900 AF/yr. For planning purposes, an average annual projected savings of 2,900 AF/yr between the years 2000 and 2020 was utilized in the District's previous UWMPs. However, due to increased public acceptance of conservation, advances in technology, and an extended drought which further accelerated the implementation of conservation measures by customers, the District has exceeded the previous 2020 goal. The 2015-2020 UWMP assumes that the remainder of the original IRP target, or approximately 1,600 AF/yr of additional programmatic conservation savings will be achieved by the year 2040 for a total District sponsored savings of 4,900 AF/yr. The existing level of conservation savings (or "baseline" conservation) and additional savings are already accounted for in the demand projections.

Groundwater Management

As stipulated in the District's Groundwater Management, it is the policy of the District to efficiently protect and manage the Niles Cone Groundwater Basin to ensure a reliable supply of high quality water that satisfies present and future municipal, industrial, recreational and agricultural water needs in the District service area (see Chapter 4 for a more detailed discussion of local groundwater management). In order to protect the Basin from saltwater intrusion, the District's operational goals are to maintain groundwater levels above sea-level in the Newark Aquifer system (the upper aquifer which is hydraulically connected to San Francisco Bay). However, during critically dry periods, the District may temporarily reduce groundwater levels slightly below sea-level (as low as 5 feet below mean-sea-level), in the Newark Aquifer in the Forebay (inland) area. Detailed modeling analysis has indicated that temporarily drawing the aquifer down in this inland area could provide additional supply in critically dry years without impacting the integrity of the Basin. This analysis assumes that (1) there are no new parties pumping from the Basin, and (2) that groundwater outflows from the Basin are not increased due to increased pumping in adjacent groundwater basins that are hydraulically connected with the Niles Cone Groundwater Basin.

A key component of the District's management of the Niles Cone Groundwater Basin is the capability to recharge the groundwater system through the District's groundwater percolation ponds. In order to maintain the recharge capacity at these ponds, the District completed a rehabilitation of these percolation ponds in 1997. Under an agreement with the East Bay Regional Park District, the Quarry Lakes rehabilitation project also allowed for joint use of these percolation ponds for recreation and wildlife purposes.

Off-Site Banking and Transfers/Exchanges

Even with new programs for water conservation, recycled water and desalination, the District identified the need for additional supplies during dry and critically dry years. In 1999, the District completed an evaluation of a wide-range of alternatives to meet our dry year water needs. The report identified the potential methods to secure dry year supplies through both off-site banking and transfers/exchanges.

Off-site storage involves storing excess District SWP supplies during wet and above normal years, for use during dry years. Because the District has limited local storage in the Niles Cone Groundwater Basin,

storage needs to take place at off-site surface reservoirs or groundwater basins. The IRP shows a total need of 100,000 AF of off-site storage capacity by the year 2020, and 140,000 AF by the year 2030. To meet these goals, in 1997 the District secured 50,000 AF of storage capacity at the Semitropic Groundwater Banking Program and in 2001 secured an additional 100,000 AF, for a total combined storage capacity of 150,000 AF. As of March 2016, the District has approximately 107,000 AF of water in storage at the Semitropic Groundwater Bank

A key limitation to the Semitropic Banking Program is the capacity to return water to the District during dry years. Under the District's water banking agreements with Semitropic, the amount of return (or "take" capacity) from the program is based on the total amount of storage capacity. In order to secure sufficient "take" capacity, the District secured more storage at Semitropic than was originally recommended in the IRP, as noted above. Through continued IRP analyses, however, the District has identified and is currently implementing storage management options that utilize this surplus storage in non-drought years to optimizing all of the District's water supplies and contribute to keeping costs lower without sacrificing dry-year reliability.

The successful operation of returning Semitropic supplies to the District for use in dry years requires coordination amongst State and regional water agencies and is subject to limitations including Delta pumping restrictions and other factors. During the most critical droughts (e.g. 1977 conditions), the District may still not have adequate take capacity from the Semitropic Banking Program to meet all in-District water demands. During the recent drought, in 2014 Semitropic was able to return more banked supplies than the District's "take" capacity; however, poor Delta water quality conditions prevented the water from being transferred through the Delta, significantly contributing to the water shortage emergency declaration. Conditions such as these are not hydrologic (water supply) and are addressed in Chapter 10 Water Shortage Contingency Plan.

Another option to meet dry year water supply needs is for the District to enter into exchange agreements for dry year supplies or to purchase raw water supplies in dry years. Typically, these options would involve purchasing Delta water supplies from an entity which could temporarily use a local groundwater supply in-lieu of surface water supplies provided to the District. The District currently participates with the Department of Water Resources and State Water Contractors on an annual basis to evaluate potential water transfer opportunities. In 2014, the District experienced a water supply emergency and initiated a cooperative agreement with Contra Costa Water District that provided for the use of Los Vaqueros Reservoir for a one-time storage and exchange/transfer of 5,000 AF of water utilized by the District during the summer of 2014 to meet demands, which were reduced by 20% system-wide due to customer conservation efforts.

Perennial updates to the District's Integrated Resources plan

A key recommendation in the District's 1995 Integrated Resources Planning Study was that the implementation status and planning assumptions be reviewed frequently. In 2006, the District completed the 2006 IRP Update Review, which confirmed the overall water supply strategy recommended in the 1995 IRP. In 2014 the District published an updated study "Reliability by Design" which further refined direction and implementation of IRP recommendations moving forward. Since the 2010-2015 Plan was adopted, the State of California has been in a serious drought, and the District has been able to test many of the components of the IRP including critical dry year operations of the Semitropic groundwater bank and customers' ability to achieve a 20% demand reduction under a water shortage contingency plan.

9.3 WATER SUPPLY AND DEMAND COMPARISONS

The District has completed its analysis of the projected water supply availability and demands under average year, single dry year, and multiple dry year conditions. While Chapter 3 provides information on the water supply availability for each of the District's supplies individually, this chapter provides the results of the District's computer simulations that analyze the District's water supply portfolio's ability to meet demand in aggregate over the entire **planning hydrology**. As described in Chapter 3, the planning hydrology refers to the specific hydrologic sequence of water years 1922 through 2003, but assumes

current day water supply infrastructure and demand. The extended simulation over the planning hydrology provides the District insights on how to optimally manage our water supplies as well as performance results during extended dry period. The results of these analyses are presented in Tables 9-2 through 9-8.

As indicated in Table 9-2, under normal year water supply conditions, the District will have sufficient supplies to meet projected future water demands, as adjusted for estimated future water conservation savings. This analysis also indicates that during these hydrologic conditions, the District would have sufficient supplies available (in excess of the projected demands) for placing into groundwater storage (locally or at the off-site Semitropic Groundwater Bank) for later use in the service area in dry years. However, as demand in the District service area continues to grow through the year 2040, the amount of projected supply available for dry year banking will be reduced.

Table 9-2
Projected Normal Year Water Supply and Demand Comparison (AF/yr)

SUPPLY/DEMAND	Year					
	2015	2020	2025	2030	2035	2040
SUPPLY COMPONENT						
Imported Supplies						
- State Water Project	28,700	27,500	27,500	27,500	27,500	27,500
- San Francisco Regional	15,400	15,400	15,400	15,400	15,400	15,400
Total Imported Supplies	44,100	42,900	42,900	42,900	42,900	42,900
Local Supplies						
- Groundwater Recharge	24,000	24,200	23,900	23,600	23,300	23,000
- Groundwater Storage	N/A	N/A	N/A	N/A	N/A	N/A
- Del Valle	4,700	5,000	5,000	5,000	5,000	5,000
- Desalination	5,100	5,100	5,100	5,100	5,100	5,100
- Recycled Water	0	0	0	0	0	0
Total Local Supplies	33,800	34,300	34,000	33,700	33,400	33,100
Banking/Transfers						
- Semitropic Banking	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL SUPPLY	*77,900*	*77,200*	*76,900*	*76,600*	*76,300*	*76,000*
DEMAND COMPONENT						
- Distribution System Demand	36,500	47,200	51,500	53,200	53,700	54,100
- Groundwater System Demands	16,100	15,700	15,500	15,400	15,600	15,700
TOTAL DEMAND	*52,600*	*62,900*	*67,000*	*68,600*	*69,300*	*69,800*
SUPPLY & DEMAND COMPARISON						
- Supply Totals	77,900	77,200	76,900	76,600	76,300	76,000
- Demand Totals	52,600	62,900	67,000	68,600	69,300	69,800
- Difference	25,300	14,300	9,900	8,000	7,000	6,200
- Difference as % of Supply	32%	19%	13%	10%	9%	8%
- Difference as % of Demand	48%	23%	15%	12%	10%	9%

Notes:
1. Normal Year conditions are based on the median supply availability based on a review of 1922-2003 historical hydrologic conditions. The year 1971 was selected as it is the closest year to the statistical median for each individual water supply source.
2. Distribution System Demand incorporates remaining future programmatic conservation potential, as well as the expected permanent demand reduction due to the current drought, as discussed in Chapter 1.
3. Groundwater System Demands include: (1) required ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows, and (4) discharge from Newark Desalination Facility associated with desalination production beyond the required ARP groundwater production. Since significant components of the Groundwater System Demands exhibit lag times of more than one year, for Normal Year Conditions the long term average over 1922-2003 hydrologic conditions is reported.
4. Desalination supplies are recovered from required Aquifer Recovery Program pumping that historically was discharged to San Francisco Bay. Thus the available "new" supplies due to Desalination are restricted by the amount of required Aquifer Recovery Program pumping that was determined in the District's Integrated Resources Plan, factoring in the recovery rate of the Desalination facility. The District expanded the Newark Desalination Facility blended product water capacity from 6 mgd to 12 mgd in the year 2010.
5. Under Normal Year conditions, the District does not anticipate utilizing Groundwater Storage (groundwater use in excess of recharge) or Semitropic Groundwater Banking, thus they are listed above as not available, "N/A". These supplies would be used under dry year conditions when imported and local supply availability would be reduced.
6. State Water Project allocations shown above assume 1971 hydrologic conditions, as provided in DWR's 2015 Delivery Capability Report (DCR). The District uses the 2015 DCR "Base" scenario for 2015 operating conditions, and for future operating conditions uses the 2015 DCR "Early Long Term" scenario, which accounts for early effects of climate change and sea level rise.

Table 9-3 provides a summary of the supply availability under the most severe single-year drought in the planning hydrology, occurring in 1977. This drought year represents the projected minimum water supply availability considering all of the District's water supplies (i.e. State Water Project, San Francisco Regional and local supplies). Under this dry year scenario, the District's SWP supplies would be cut back by approximately 90%, and the District would need to rely on local and off-site groundwater storage to help make up for this shortfall. Under near-term conditions, while demands remain suppressed due to the current drought emergency, the District would incur no additional supply shortfall under a repeat of 1977 conditions. However, under future projected levels of demand, the District can expect to incur shortages of up to 15% under this scenario. In the event that there is insufficient local groundwater storage or that the District is unable to recover its full contractual amount from the Semitropic Groundwater Banking Program, the District would look to secure additional supplies through a DWR drought water bank or similar water purchase/transfer program. In addition, the District would also likely implement the drought contingency plan described in Chapter 10 of this Plan as was done in 2014.

Tables 9-4 through 9-8 provide summaries of the projected supply availabilities under a long-term (5-year) drought for 2016-2020, 2021-2025, 2026-2030, 2031-2035, and 2036-2040 demand conditions. This multiple year drought sequence is based on the supply availability under the most severe 5-year period in the planning hydrology, occurring between 1987 and 1992. The results from these analyses are similar to the single dry year analyses and find that under current, drought-suppressed demands, the District could withstand a repeat of the 1987-1992 conditions without any additional shortages (Table 9-4). However, as demand rebound after the drought and with future demand growth, the District can expect to have interim year shortages of up-to 10% under this scenario. As with the single dry year condition, both local groundwater storage and off-site groundwater storage in Semitropic will play key roles in offsetting shortfalls in the District's other local and imported supplies.

Table 9-3
Projected Single Dry Year Water Supply and Demand Comparison (AF/yr)

SUPPLY/DEMAND	Year					
	2015	2020	2025	2030	2035	2040
SUPPLY COMPONENT						
Imported Supplies						
- State Water Project	4,500	3,400	3,400	3,400	3,400	3,400
- San Francisco Regional	7,700	8,200	8,500	8,900	9,300	9,600
Total Imported Supplies	12,200	11,600	11,900	12,300	12,700	13,000
Local Supplies						
- Groundwater Recharge	13,500	15,100	15,200	15,200	15,200	15,200
- Groundwater Storage	10,000	10,000	10,000	10,000	10,000	10,000
- Del Valle	0	0	0	0	0	0
- Desalination	5,100	5,100	5,100	5,100	5,100	5,100
- Recycled Water	0	0	0	0	0	0
Total Local Supplies	28,600	30,200	30,300	30,300	30,300	30,300
Banking/Transfers						
- Semitropic Banking	13,500	13,500	13,500	13,500	13,500	13,500
TOTAL SUPPLY	*54,300*	*55,300*	*55,700*	*56,100*	*56,500*	*56,800*
DEMAND COMPONENT						
- Distribution System Demand	36,500	47,200	51,500	53,200	53,700	54,100
- Groundwater System Demands	13,500	12,300	12,400	12,600	12,700	12,900
TOTAL DEMAND	*50,000*	*59,500*	*63,900*	*65,800*	*66,400*	*67,000*
SUPPLY & DEMAND COMPARISON						
- Supply Totals	54,300	55,300	55,700	56,100	56,500	56,800
- Demand Totals	50,000	59,500	63,900	65,800	66,400	67,000
- Difference	4,300	-4,200	-8,200	-9,700	-9,900	-10,200
- Difference as % of Supply	8%	-8%	-15%	-17%	-18%	-18%
- Difference as % of Demand	9%	-7%	-13%	-15%	-15%	-15%

Notes:
1. Single Dry Year conditions are based on the projected supply availability under 1977 drought conditions.
2. Distribution System Demand incorporates remaining future programmatic conservation potential, as well as the expected permanent demand reduction due to the current drought, as discussed in Chapter 3.
3. Groundwater system demands include: (1) required ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows, and (4) discharge from Newark Desalination Facility associated with desalination production beyond the required ARP groundwater production. Under dry year conditions, the District's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.
4. Desalination supplies are recovered from required Aquifer Recovery Program pumping that historically was discharged to San Francisco Bay. Thus the available "new" supplies due to Desalination are restricted by the amount of required Aquifer Recovery Program pumping that was determined in the District's Integrated Resources Plan, factoring in the recovery rate of the Desalination facility. The District expanded the Newark Desalination Facility blended product water capacity from 6 mgd to 12 mgd in the year 2010.
5. State Water Project allocations shown above assume 1977 hydrologic conditions, as provided in DWR's 2015 Delivery Capability Report (DCR). The District uses the 2015 DCR "Base" scenario for 2015 operating conditions, and the 2015 DCR "Early Long Term" scenario, which accounts for early effects of climate change and sea level rise, for future operating conditions.
6. SFPUC supply availability shown above is based on reliability data provided by SFPUC in Paula Kehoe's 1/5/2016 letter to Andree Johnson; however, the District assumes only 50% of the reported reliability improvements shown in the letter will occur. The SFPUC supply availability shown above also assumes BAWSCA Tier 2 drought allocations based on estimated provided by Andree Johnson to the District on 2/9/2016.

Table 9-4
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2016-2020 (AF/yr)

SUPPLY/DEMAND	Year				
	2016	2017	2018	2019	2020
SUPPLY COMPONENT					
Imported Supplies					
- State Water Project	9,000	8,000	26,200	11,000	6,700
- San Francisco Regional	10,500	7,900	8,000	7,900	7,900
Total Imported Supplies	19,500	15,900	34,200	18,900	14,600
Local Supplies					
- Groundwater Recharge	13,300	14,900	14,500	13,700	14,400
- Groundwater Storage	5,300	4,000	N/A	2,900	5,300
- Del Valle	900	300	500	200	4,600
- Desalination	5,100	5,100	5,100	5,100	5,100
- Recycled Water	0	0	0	0	0
Total Local Supplies	24,600	24,300	20,100	21,900	29,400
Banking/Transfers					
- Semitropic Banking	14,800	14,300	24,600	15,900	13,600
TOTAL SUPPLY	*58,900*	*54,500*	*78,900*	*56,700*	*57,600*
DEMAND COMPONENT					
- Distribution System Demand	36,500	39,200	41,900	44,500	47,200
- Groundwater System Demands	15,400	13,600	12,300	11,700	10,400
TOTAL DEMAND	*51,900*	*52,800*	*54,200*	*56,200*	*57,600*
SUPPLY & DEMAND COMPARISON					
- Supply Totals	58,900	54,500	78,900	56,700	57,600
- Demand Totals	51,900	52,800	54,200	56,200	57,600
- Difference	7,000	1,700	24,700	500	0
- Difference as % of Supply	12%	3%	31%	1%	0%
- Difference as % of Demand	13%	3%	46%	1%	0%

Notes:
1. Multiple Dry Year conditions are based on the projected supply availability under 1987-91 drought conditions.
2. Distribution System Demand incorporates remaining future programmatic conservation potential, as well as the expected permanent demand reduction due to the current drought, as discussed in Chapter 3.
3. Groundwater system demands include: (1) required ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows, and (4) discharge from Newark Desalination Facility associated with desalination production beyond the required ARP groundwater production. Under dry year conditions, the District's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.
4. Desalination supplies are recovered from required Aquifer Recovery Program pumping that historically was discharged to San Francisco Bay. Thus the available "new" supplies due to Desalination are restricted by the amount of required Aquifer Recovery Program pumping that was determined in the District's Integrated Resources Plan, factoring in the recovery rate of the Desalination facility. The District expanded the Newark Desalination Facility blended production water capacity from 6 mgd to 12 mgd in the year 2010.
5. State Water Project allocations shown above assume 1987-1991 hydrologic conditions, as provided in DWR's 2015 Delivery Capability Report (DCR). The District uses the 2015 DCR "Base" scenario for 2015 operating conditions, and the 2015 DCR "Early Long Term" scenario, which accounts for early effects of climate change and sea level rise, for future operating conditions. Operating conditions between 2015 and 2020 assume linear interpolation between the "Base" and "Early Long Term" scenario allocations.
6. SFPUC supply availability shown above is based on reliability data provided by SFPUC in Paula Kehoe's 1/5/2016 letter to Andree Johnson; however, the District assumes only 50% of the reported reliability improvements shown in the letter will occur. The SFPUC supply availability shown above also assumes BAWSCA Tier 2 drought allocations based on estimated provided by Andree Johnson to District on 2/9/2016.
7. Use of groundwater storage in 1989 is shown as not applicable, "N/A" because the groundwater basin undergoes slight re-filling under 1989 hydrologic conditions.

Table 9-5
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2021-2025 (AF/yr)

SUPPLY/DEMAND	Year				
	2021	2022	2023	2024	2025
SUPPLY COMPONENT					
Imported Supplies					
- State Water Project	9,100	6,400	25,900	11,200	6,700
- San Francisco Regional	12,000	8,300	8,400	8,200	8,300
Total Imported Supplies	21,100	14,700	34,300	19,400	15,000
Local Supplies					
- Groundwater Recharge	15,200	16,200	13,500	14,500	14,500
- Groundwater Storage	8,400	9,200	N/A	4,300	5,100
- Del Valle	900	300	500	200	4,600
- Desalination	5,100	5,100	5,100	5,100	5,100
- Recycled Water	0	0	0	0	0
Total Local Supplies	29,600	30,800	19,100	24,100	29,300
Banking/Transfers					
- Semitropic Banking	14,900	13,500	24,400	16,100	13,600
TOTAL SUPPLY	*65,600*	*59,000*	*77,800*	*59,600*	*57,900*
DEMAND COMPONENT					
- Distribution System Demand	49,900	50,300	50,800	51,200	51,500
- Groundwater System Demands	15,000	11,600	10,900	11,100	10,100
TOTAL DEMAND	*64,900*	*61,900*	*61,700*	*62,300*	*61,600*
SUPPLY & DEMAND COMPARISON					
- Supply Totals	65,600	59,000	77,800	59,600	57,900
- Demand Totals	64,900	61,900	61,700	62,300	61,600
- Difference	700	-2,900	16,100	-2,700	-3,700
- Difference as % of Supply	1%	-5%	21%	-5%	-6%
- Difference as % of Demand	1%	-5%	26%	-4%	-6%

Notes:
1. Multiple Dry Year conditions are based on the projected supply availability under 1987-91 drought conditions.
2. Distribution System Demand incorporates remaining future programmatic conservation potential, as well as the expected permanent demand reduction due to the current drought, as discussed in Chapter 3.
3. Groundwater system demands include: (1) required ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows, and (4) discharge from Newark Desalination Facility associated with desalination production beyond the required ARP groundwater production. Under dry year conditions, the District's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.
4. Desalination supplies are recovered from required Aquifer Recovery Program pumping that historically was discharged to San Francisco Bay. Thus the available "new" supplies due to Desalination are restricted by the amount of required Aquifer Recovery Program pumping that was determined in the District's Integrated Resources Plan, factoring in the recovery rate of the Desalination facility. The District expanded the Newark Desalination Facility blended product water capacity from 6 mgd to 12 mgd in the year 2010.
5. State Water Project allocations shown above assume 1987-1991 hydrologic conditions, as provided in DWR's 2015 Delivery Capability Report (DCR). The District uses the 2015 DCR "Early Long Term" scenario, which accounts for early effects of climate change and sea level rise, for future operating conditions.
6. SFPUC supply availability shown above is based on reliability data provided by SFPUC in Paula Kehoe's 1/5/2016 letter to Andree Johnson; however, the District assumes only 50% of the reported reliability improvements shown in the letter will occur. The SFPUC supply availability shown above also assumes BAWSCA Tier 2 drought allocations based on estimated provided by Andree Johnson to the District on 2/9/2016.
7. Use of groundwater storage in 1989 is shown as not applicable, "N/A" because the groundwater basin undergoes slight re-filling under 1989 hydrologic conditions.

Table 9-6
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2026-2030 (AF/yr)

SUPPLY/DEMAND	Year				
	2026	2027	2028	2029	2030
SUPPLY COMPONENT					
Imported Supplies					
- State Water Project	9,100	6,400	25,900	11,200	6,700
- San Francisco Regional	12,200	8,700	8,800	8,500	8,600
Total Imported Supplies	21,300	15,100	34,700	19,700	15,300
Local Supplies					
- Groundwater Recharge	15,500	16,300	13,000	15,000	14,600
- Groundwater Storage	8,000	9,500	N/A	5,400	4,900
- Del Valle	900	300	500	200	4,600
- Desalination	5,100	5,100	5,100	5,100	5,100
- Recycled Water	0	0	0	0	0
Total Local Supplies	29,500	31,200	18,600	25,700	29,200
Banking/Transfers					
- Semitropic Banking	14,900	13,500	24,400	16,100	13,600
TOTAL SUPPLY	*65,700*	*59,800*	*77,700*	*61,500*	*58,100*
DEMAND COMPONENT					
- Distribution System Demand	51,800	52,200	52,400	52,800	53,200
- Groundwater System Demands	15,000	11,500	11,000	11,200	9,800
TOTAL DEMAND	*66,800*	*63,700*	*63,400*	*64,000*	*63,000*
SUPPLY & DEMAND COMPARISON					
- Supply Totals	65,700	59,800	77,700	61,500	58,100
- Demand Totals	66,800	63,700	63,400	64,000	63,000
- Difference	-1,100	-3,900	14,300	-2,500	-4,900
- Difference as % of Supply	-2%	-7%	18%	-4%	-8%
- Difference as % of Demand	-2%	-6%	23%	-4%	-8%

Notes:
1. Multiple Dry Year conditions are based on the projected supply availability under 1987-91 drought conditions.
2. Distribution System Demand incorporates remaining future programmatic conservation potential, as well as the expected permanent demand reduction due to the current drought, as discussed in Chapter 3.
3. Groundwater system demands include: (1) required ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows, and (4) discharge from Newark Desalination Facility associated with desalination production beyond the required ARP groundwater production. Under dry year conditions, the District's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.
4. Desalination supplies are recovered from required Aquifer Recovery Program pumping that historically was discharged to San Francisco Bay. Thus the available "new" supplies due to Desalination are restricted by the amount of required Aquifer Recovery Program pumping that was determined in the District's Integrated Resources Plan, factoring in the recovery rate of the Desalination facility. The District expanded the Newark Desalination Facility blended product water capacity from 6 mgd to 12 mgd in the year 2010.
5. State Water Project allocations shown above assume 1987-1991 hydrologic conditions, as provided in DWR's 2015 Delivery Capability Report (DCR). The District uses the 2015 DCR "Early Long Term" scenario, which accounts for early effects of climate change and sea level rise, for future operating conditions.
6. SFPUC supply availability shown above is based on reliability data provided by SFPUC in Paula Kehoe's 1/5/2016 letter to Andree Johnson; however, the District assumes only 50% of the reported reliability improvements shown in the letter will occur. The SFPUC supply availability shown above also assumes BAWSCA Tier 2 drought allocations based on estimated provided by Andree Johnson to the District on 2/9/2016.
7. Use of groundwater storage in 1989 is shown as not applicable, "N/A" because the groundwater basin undergoes slight re-filling under 1989 hydrologic conditions.

Table 9-7
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2031-2035 (AF/yr)

SUPPLY/DEMAND	Year				
	2031	2032	2033	2034	2035
SUPPLY COMPONENT					
Imported Supplies					
- State Water Project	9,100	6,400	25,900	11,200	6,700
- San Francisco Regional	12,400	9,000	9,100	8,800	8,900
Total Imported Supplies	21,500	15,400	35,000	20,000	15,600
Local Supplies					
- Groundwater Recharge	15,800	16,500	12,500	15,500	14,700
- Groundwater Storage	7,600	9,700	N/A	6,500	4,600
- Del Valle	900	300	500	200	4,600
- Desalination	5,100	5,100	5,100	5,100	5,100
- Recycled Water	0	0	0	0	0
Total Local Supplies	29,400	31,600	18,100	27,300	29,000
Banking/Transfers					
- Semitropic Banking	14,900	13,500	24,400	16,100	13,600
TOTAL SUPPLY	*65,800*	*60,500*	*77,500*	*63,400*	*58,200*
DEMAND COMPONENT					
- Distribution System Demand	53,400	53,500	53,500	53,600	53,700
- Groundwater System Demands	15,000	11,400	11,100	11,500	9,500
TOTAL DEMAND	*68,400*	*64,900*	*64,600*	*65,100*	*63,200*
SUPPLY & DEMAND COMPARISON					
- Supply Totals	65,800	60,500	77,500	63,400	58,200
- Demand Totals	68,400	64,900	64,600	65,100	63,200
- Difference	-2,600	-4,400	12,900	-1,700	-5,000
- Difference as % of Supply	-4%	-7%	17%	-3%	-9%
- Difference as % of Demand	-4%	-7%	20%	-3%	-8%

Notes:
1. Multiple Dry Year conditions are based on the projected supply availability under 1987-91 drought conditions.
2. Distribution System Demand incorporates remaining future programmatic conservation potential, as well as the expected permanent demand reduction due to the current drought, as discussed in Chapter 3.
3. Groundwater system demands include: (1) required ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows, and (4) discharge from Newark Desalination Facility associated with desalination production beyond the required ARP groundwater production. Under dry year conditions, the District's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.
4. Desalination supplies are recovered from required Aquifer Recovery Program pumping that historically was discharged to San Francisco Bay. Thus the available "new" supplies due to Desalination are restricted by the amount of required Aquifer Recovery Program pumping that was determined in the District's Integrated Resources Plan, factoring in the recovery rate of the Desalination facility. The District expanded the Newark Desalination Facility blended product water capacity from 6 mgd to 12 mgd in the year 2010.
5. State Water Project allocations shown above assume 1987-1991 hydrologic conditions, as provided in DWR's 2015 Delivery Capability Report (DCR). The District uses the 2015 DCR "Early Long Term" scenario, which accounts for early effects of climate change and sea level rise, for future operating conditions.
6. SFPUC supply availability shown above is based on reliability data provided by SFPUC in Paula Kehoe's 1/5/2016 letter to Andree Johnson; however, the District assumes only 50% of the reported reliability improvements shown in the letter will occur. The SFPUC supply availability shown above also assumes BAWSCA Tier 2 drought allocations based on estimated provided by Andree Johnson to the District on 2/9/2016.
7. Use of groundwater storage in 1989 is shown as not applicable, "N/A" because the groundwater basin undergoes slight re-filling under 1989 hydrologic conditions.

Table 9-8
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2036-2040 (AF/yr)

SUPPLY/DEMAND	Year				
	2036	2037	2038	2039	2040
SUPPLY COMPONENT					
Imported Supplies					
- State Water Project	9,100	6,400	25,900	11,200	6,700
- San Francisco Regional	12,600	9,400	9,500	9,100	9,200
Total Imported Supplies	21,700	15,800	35,400	20,300	15,900
Local Supplies					
- Groundwater Recharge	16,100	16,600	11,900	16,000	14,800
- Groundwater Storage	7,300	9,900	N/A	7,600	4,400
- Del Valle	900	300	500	200	4,600
- Desalination	5,100	5,100	5,100	5,100	5,100
- Recycled Water	0	0	0	0	0
Total Local Supplies	29,400	31,900	17,500	28,900	28,900
Banking/Transfers					
- Semitropic Banking	14,900	13,500	24,400	16,100	13,600
TOTAL SUPPLY	*66,000*	*61,200*	*77,300*	*65,300*	*58,400*
DEMAND COMPONENT					
- Distribution System Demand	53,800	53,900	53,900	54,000	54,100
- Groundwater System Demands	15,000	11,300	11,300	11,700	9,200
TOTAL DEMAND	*68,800*	*65,200*	*65,200*	*65,700*	*63,300*
SUPPLY & DEMAND COMPARISON					
- Supply Totals	66,000	61,200	77,300	65,300	58,400
- Demand Totals	68,800	65,200	65,200	65,700	63,300
- Difference	-2,800	-4,000	12,100	-400	-4,900
- Difference as % of Supply	-4%	-7%	16%	-1%	-8%
- Difference as % of Demand	-4%	-6%	19%	-1%	-8%

Notes:
1. Multiple Dry Year conditions are based on the projected supply availability under 1987-91 drought conditions.
2. Distribution System Demand incorporates remaining future programmatic conservation potential, as well as the expected permanent demand reduction due to the current drought, as discussed in Chapter 3.
3. Groundwater system demands include: (1) required ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows, and (4) discharge from Newark Desalination Facility associated with desalination production beyond the required ARP groundwater production. Under dry year conditions, the District's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.
4. Desalination supplies are recovered from required Aquifer Recovery Program pumping that historically was discharged to San Francisco Bay. Thus the available "new" supplies due to Desalination are restricted by the amount of required Aquifer Recovery Program pumping that was determined in the District's Integrated Resources Plan, factoring in the recovery rate of the Desalination facility. The District expanded the Newark Desalination Facility blended product water capacity from 6 mgd to 12 mgd in the year 2010.
5. State Water Project allocations shown above assume 1987-1991 hydrologic conditions, as provided in DWR's 2015 Delivery Capability Report (DCR). The District uses the 2015 DCR "Early Long Term" scenario, which accounts for early effects of climate change and sea level rise, for future operating conditions.
6. SFPUC supply availability shown above is based on reliability data provided by SFPUC in Paula Kehoe's 1/5/2016 letter to Andree Johnson; however, the District assumes only 50% of the reported reliability improvements shown in the letter will occur. The SFPUC supply availability shown above also assumes BAWSCA Tier 2 drought allocations based on estimated provided by Andree Johnson to the District on 2/9/2016.
7. Use of groundwater storage in 1989 is shown as not applicable, "N/A" because the groundwater basin undergoes slight re-filling under 1989 hydrologic conditions.

CHAPTER 10
WATER SHORTAGE CONTINGENCY PLAN

This chapter provides the District's water shortage contingency plan (WSCP), as required under the Urban Water Management Planning Act. Although it is the District's water supply reliability goal to sustain a shortage of no more than 10% during dry and critically dry conditions, the potential exists for interruptions to either imported or local water supplies (due to earthquakes, etc.) that may result in significantly greater shortages and the District may be required to declare a water shortage emergency. In such a case, the District will enact its WSCP at the appropriate level needed to address the water supply shortage up to 50%.

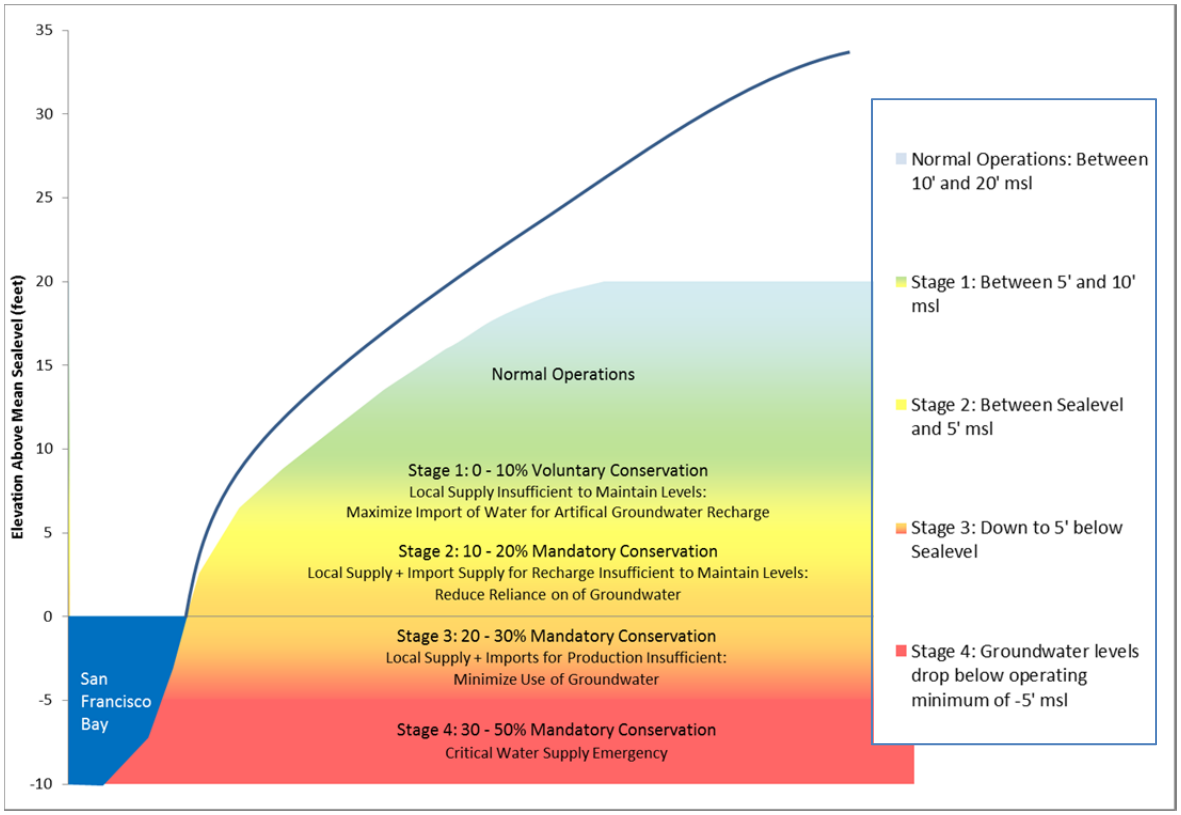
10.1 WATER SHORTAGE CONTINGENCY PLAN OVERVIEW

The District has sufficient water supplies to meet demands in most years, but deficiencies (shortages) can occur as a result of dry winter weather or through an extended interruption of imported supplies. Under normal circumstances the Niles Cone Groundwater Basin provides the storage capacity needed to protect against short-term water supply deficiencies or disruptions. The District will also utilize off-site storage at the Semitropic Water Storage District's Groundwater Banking Program to help meet dry year water supply needs.

The Newark Aquifer, the upper aquifer of the Niles Cone Groundwater Basin, is subject to saltwater intrusion if inland groundwater levels drop and remain below sea level for a prolonged period. Therefore, in order to protect the Niles Cone and the freshwater supplies it contains, the District manages all of its water supplies every year to maintain target levels in the aquifer. Through this practice, the Niles Cone groundwater level becomes the key indicator of water supply conditions; any potential supply shortfall or other water supply emergencies will eventually appear in the form of lower water levels in the Newark Aquifer. The District's annual *Survey Report on Groundwater Conditions* analyzes the demand and supply balance for the year ahead including projected available RWS and SWP supplies and estimates the anticipated groundwater levels for the following September. September levels are generally the lowest levels of the year.

Depending on the projected groundwater levels, the District will take actions to protect local groundwater. Typical actions the District will take to maintain appropriate levels include: (1) maximizing the import of additional water for artificial recharge of the groundwater basin; (2) reducing use of local groundwater; (3) maximizing use of imported supplies. The ability of the District to maintain groundwater levels after these incremental actions have been taken will indicated the potential stage of water supply shortfall and correlated level of reductions the District may need to achieve. Figure 10-1 summarizes the water supply conditions associated with groundwater levels as well as the approximate stage of water shortage and associated management measures taken. Figure 10-2 summarizes the steps the District would take to implement a Water Shortage Contingency Plan in response to determining that a water supply shortfall exists.

Figure 10-1
Water Shortage Response Based on Local Groundwater Levels



10.2 WATER SHORTAGE MITIGATION OPTIONS

The following is a discussion of options that the District can utilize to offset the impacts of water supply shortages:

Augmentation of Supply

In any given year the District strives to achieve a balance between basin supply and overall demand requirements. The goal of this effort is to maintain a basin level that is either at or above sea level, to prevent overdraft and/or saltwater intrusion. In order to meet the District's water supply reliability goals, the District's water supply strategy includes desalination, off-site groundwater banking and the potential development of a recycled water supply. In addition, the temporary drawdown of the groundwater basin to below sea level (5 feet below mean sea level) may be allowed to meet short-term demands. All aspects of supply management are discussed in Chapter 9.

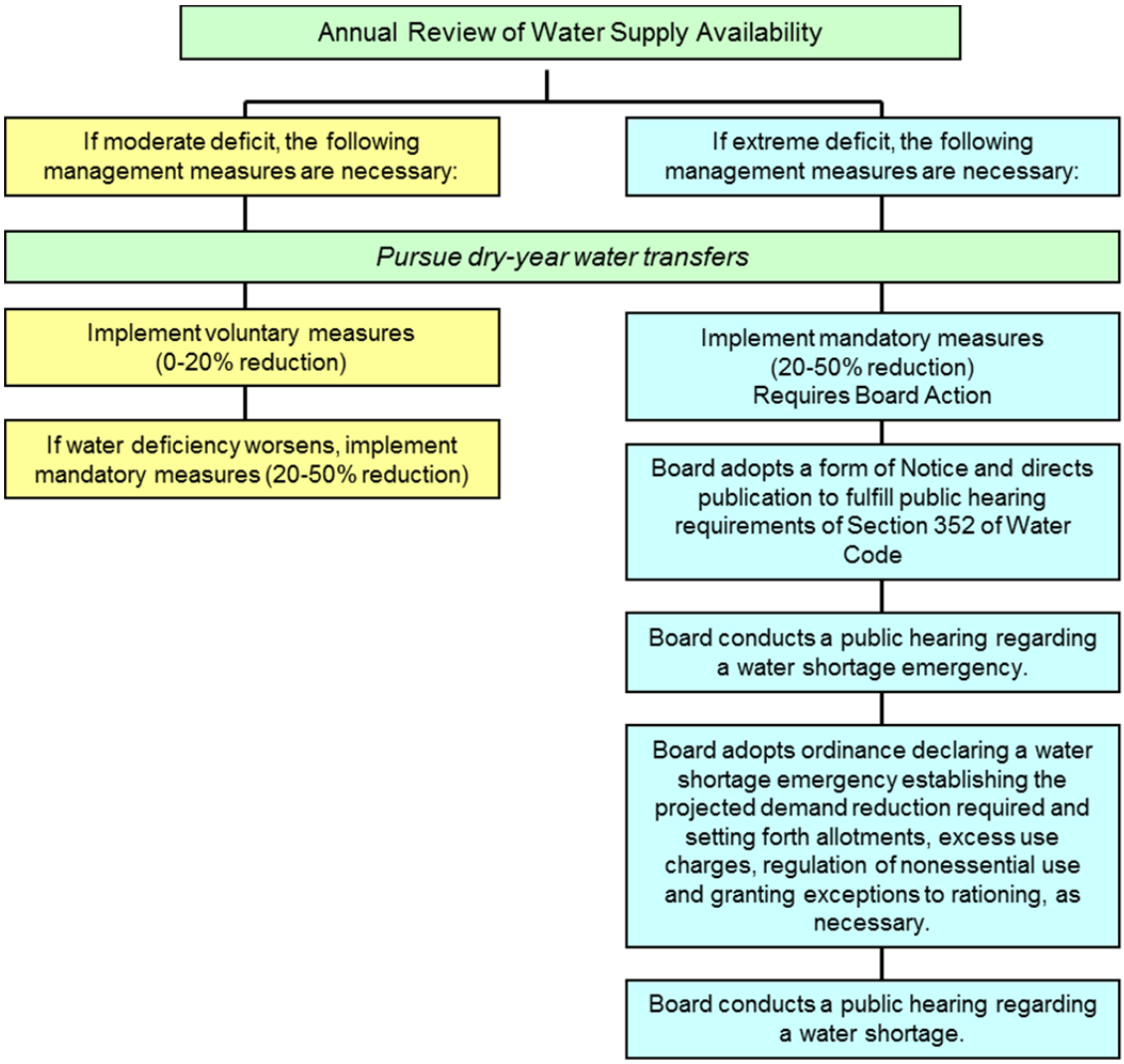
Evaporation

All District distribution reservoirs are covered to minimize evaporation while protecting the water from contamination.

Percolation

The District has percolation ponds which are necessary for the replenishment of its groundwater supply. Since the District's service area covers roughly the same area as the Niles Cone Groundwater Basin, recharge through the District's percolation facilities is an important District supply.

Figure 10-2
Water Shortage Contingency Plan



System Audits

The District has conducted an annual leak detection and repair program since 1987. This program will continue as a regular part of the District's operations.

Modifications to Operations

A blending facility which blends softer San Francisco Regional Water System supplies with harder groundwater has been in operation since 1992. This facility helps the District achieve its hardness goals by creating an equalized level of taste and hardness for all District customers. However, under severe drought or emergency situations when sufficient San Francisco supplies are not available, the hardness criteria may be relaxed and additional, higher hardness groundwater may be utilized.

Emergency Inter-ties

The District also has water distribution system pipeline interconnections with the neighboring cities of Hayward and Milpitas. These have been planned to be used during emergencies such as earthquakes. If appropriate, these interconnections could be used during a water supply emergency as well. In addition, as a SFPUC wholesale customer, the District may also receive emergency supply benefits from a recent inter-tie between the EBMUD system and the San Francisco Regional System.

Drawing from Reserve Supplies

The District is participating in the Semitropic Groundwater Banking Program. The District has 150,000 AF of storage capacity reserved at Semitropic, with over 107,000 AF currently in storage. In a drought situation, the District can retrieve water previously stored at Semitropic to help meet service area demands.

In addition, groundwater modeling of the Niles Cone Groundwater Basin has indicated that the basin groundwater levels may be temporarily drawn down to below mean sea level without causing long-term water quality impacts to the Basin. In a severe drought or water shortage emergency, as documented in the District's Integrated Resources Planning Study, the District may allow the Basin groundwater elevation to be temporarily drawn down as low as 5 feet below mean sea level.

Reduction of Demand

The District is committed to providing a reliable supply of water to its customers and strives to provide the highest standard of service possible at all times. However, in the arid western States, no water supply is 100% reliable and shortfalls are an expected part of water resources planning and management. During a time of water supply shortfall, the first priority is given to meeting health, safety and human consumption requirements.

It is also important that business and industry be allowed to continue to operate, therefore, some consideration is made for these customer classes when demand reduction levels are developed. These levels extend to a potential 50 percent shortfall, in compliance with the requirements of Water Code Section 10632. However, it should be noted that if this level of reduction were to actually occur, there is a potential for major economic impacts among the more water intensive industries in the District's service area. Table 10-2 shows billed water consumption by customer class for CY 2013. Using these figures as a base, Table 10-3 shows a typical sensitivity analysis for demand reduction by customer category and by drought stage.

In the event of a water shortage emergency, the District will first determine the amount of demand reduction necessary to responsibly manage the water supply under current and foreseeable conditions. The District will then enact a program that will include actions required by each customer group. The Water Shortage Contingency Plan for various levels of supply shortage is described in Tables 10-4a through 10-4d.

Table 10-1
CY 2013 Consumption by Customer Class

Customer Class	***Consumption (AF)***
Residential	30,400
Industry	2,400
Business	5,000
Institutional	1,900
Landscape	5,600
Total	***45,300***

Table 10-2
Example Sensitivity Analysis for Reduction in Levels of Consumption by WSCP Drought Stage

	Base Demand	***Stage 1***		***Stage 2***		***Stage 3***		***Stage 4***	
Level of Deficiency	none	10%		20%		30%		Up to 50%	
1. CY 2013 consumption	45,300	45,300		45,300		45,300		45,300	
2. Required net reduction	*N/A*	4,530		9,060		13,590		22,650	
3. Required conservation by customer class	*N/A*	% Reduction	Amount (AF)	% Reduction	Amount (AF)	% Reduction	Amount (AF)	% Reduction	Amount (AF)
Residential[1]	30,400	10%	3,040	20%	6,017	30%	9,120	44%	13,330
Industrial[1]	2,400	10%	240	15%	356	18%	431	40%	960
Business[1]	5,000	10%	500	15%	742	18%	898	40%	2,000
Institutional[1]	1,900	10%	190	15%	282	18%	341	40%	760
Landscape	5,600	10%	560	30%	1,663	50%	2,800	100%	5,600
Total Demand (AF)	*45,300*	*40,770*		*36,240*		*31,710*		*22,650*	
Net Reduction	*0%*	*10%*		*20%*		*30%*		*50%*	
Equivalent Demand in gpcd[2]	*128*	*115*		*102*		*90*		*64*	

Notes:
1. Does not include water use for dedicated landscape accounts (i.e. residential, industrial, business and institutional landscape accounts). This water use is listed separately under the "Landscape" category.
2. Includes 8% unaccounted for water loss.

Table 10-3a
Stage 1 (Voluntary) Water Shortage Contingency Plan
Minimal Shortage (0-10%)

District Actions

- Request voluntary water conservation.
- Initiate public information campaign regarding water supply shortages; explain other water shortage stages and forecast potential future action.
- Engage and inform local governments, community groups, and other stakeholders.
- Develop a "Drought Resource Center" on the District's website.
- Prepare and disseminate educational brochures, bills inserts, newsletters, etc.
- Send technical information to specific customer types regarding ways to save water.
- Attend community events/meetings to provide information.
- Add additional actions, as needed, to coordinate with any State regulations/requirements.

Customer Actions

All Customers

- Implement voluntary water use reductions.
- Identify and prevent any wasteful uses of water.
- Identify water use efficiency opportunities

Residential

- Participate in the District's conservation programs to increase efficiency of homes.

Business/Industrial, Cities/Schools

- Participate in the District's conservation programs to increase efficiency of facilities.
- Research water reuse options.
- Improve industrial process efficiencies (e.g., cooling towers, etc.)

Enforcement

- Educational letters, calls or visits.

Table 10-3b
Stage 2 (Mandatory) Water Shortage Contingency Plan
Moderate Shortage (10-20%)

District Actions

Implement all actions in Stage 1 plus some or all of the following, as necessary to meet the District's reduction target:

- Adopt and enforce an ordinance banning wasteful uses of water and limiting other uses. Prohibitions and restrictions could include (depending on the conservation reduction target):
    - prohibiting excessive run-off from irrigation and other activities,
    - prohibiting hosing down paved surfaces,
    - prohibiting the use of a hose without a shut-off nozzle,
    - requiring that leaks are fixed as soon as practicable,
    - prohibiting the use of non-recirculating water features[1],
    - prohibiting draining and then refilling pools,
    - restricting landscape water use (e.g., limiting the number of days per week customers can irrigate, and/or time of day, and/or only allowing irrigation on specific days).
- Consider setting allocations/budgets and/or restrictions by customer type and/or water use type (e.g., landscape meters).
- Request consumer water use reductions at prescribed levels.
- Consider implementing a rate program with fines or surcharges for excessive water users.
- Accelerate the public information campaign.
- Coordinate drought actions and programs with service area cities.
- Encourage the use of a drought budget (based on ET) for landscape watering.
- Cross-train District staff to interact with and inform the public, especially on leak detection and irrigation issues.
- Conduct water audit program to increase the efficiency of District operations to ensure adequate supply and minimize losses.
- Minimize hydrant flushing.
- Add additional actions, as needed, to comply with State regulations/requirements.

Customer Actions

All Customers

- Adhere to Ordinance, allocations/budgets or other use reduction requests, request an exception if hardship or a health and safety issue arises.
- Do not drain and refill pools except where a health and safety issue exists.
- Implement the use of water recapture/rain catchment systems, if feasible.

Commercial/Industrial, Cities/Schools

- Utilize a drought budget (based on ET) for landscape watering.

Enforcement

- Educational letters, calls or visits, with warnings.
- Possible termination of water service and/or fines if not in compliance.
- If water shut-off, pay reconnection fee and other fines to reinstate service.

[1] For the purposes of the District's Water Shortage Contingency Plan, the term "water features" shall be defined as any ponds, lakes, waterfalls, and fountains that are artificially supplied with water and do not provide a utilitarian service. The term "water features" shall not include swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

Table 10-3c
Stage 3 (Mandatory) Water Shortage Contingency Plan
Severe Shortage (20-30%)

District Actions

Implement all actions in Stage 1 and 2 plus some or all of the following, as necessary to meet the District's reduction target:

- Adopt Base Consumption Allowance for each customer class and establish use charges.
- Advise area planning staffs of possible short-term (temporary) inability to supply new developments/annexations due to shortages to existing customers and/or require new developments to implement extreme (but proven) water use efficiency measures.
- Expand the District's water audit program.
- Flush mains in emergency situations only.
- Add additional actions, as needed, to comply with State regulations/requirements.

Customer Actions

All Customers

- Severely limit landscape watering and only irrigate with drip or low flow/efficient emitters, no overspray type irrigation allowed, except where an exception has been granted.
- Turn off all water features.
- Cover all pools.

Commercial/Industrial, Cities/Schools

- Conduct an internal audit of all water use and provide a summary of findings that identifies non-efficient uses/equipment and demonstrates efforts to improve efficiencies.
- For restaurants/food service facilities, serve water on request only.
- For hotels/hospitality businesses, provide guests the option to not have their linens laundered.

Enforcement

- Same as Stage 2.

Table 10-3d
Stage 4 (Mandatory) Water Shortage Contingency Plan
Critical Shortage (30-50%)

District Actions

Implement all actions in Stage 1, 2 and 3 plus some or all of the following, as necessary to meet the District's reduction target:

- Intensify all District drought actions.
- No potable water used by landscape meters.
- Net zero water demand increase by new developments.
- Revisit Ordinance, allowances, etc. for modification to meet reduction targets.
- Add additional actions, as needed, to comply with State regulations/requirements.

Customer Actions

All Customers

- No landscape watering unless water is from a reuse/rain catchment system or tank truck service.
- No car washing unless water is from a reuse or rain catchment system.
- Monitor water meters for spikes in use.
- Pools covered and refilled with tank truck services only.
- No use of potable water for street cleaning.

Enforcement

- Same as Stage 2/3.

10.3 ADMINISTRATION OF PROGRAM

In keeping with the District's Water Shortage Contingency Plan, after comprehensive study the Board will enact, and staff will implement, a water demand management plan based on actual conditions. As done in 1991 and 2014, a drought rate structure would be developed to augment and support the demand reduction program.

The District typically recovers 70% of operating costs through the variable commodity charge applied to water sales and 30% through fixed charges. Table 10-4 reflects the anticipated revenue impact due to a supply shortfall under the various stages of our WSCP. In the event of a Water Shortage Emergency, after the District has identified the drought stage and corresponding revenue shortfall, the specific extraordinary drought expenses, and after considering utilization of its Emergency/Rate Stabilization Reserve, the Board may enact a drought rate structure or surcharge to address balance sheet as well as to incentivize water-use efficiency.

Table 10-4
Analysis of Impact of Water Shortage on Revenues

	Base	Stage 1	Stage 2	Stage 3	Stage 4
Shortage, up to	**0%**	**10%**	**20%**	**30%**	**50%**
Percent of Total Revenue, Variable	70%	63%	56%	49%	35%
Percent of Total Revenue, Fixed	30%	30%	30%	30%	30%
Revenue Shortfall (Per year)	0%	7%	14%	21%	35%

Impacts on Revenues/Expenditures

In 1987, the District's Board of Directors established a Dry Year Contingency Reserve that was designed to minimize the impacts of future short-term demand reduction on rates. The reserve was based on the assumption that two out of every ten years could be expected to require demand reduction efforts due to drought. When fully funded, it would be able to maintain the District in a revenue-neutral position through two successive years of 25 percent reductions below normal demand levels. The reserve was applied during fiscal year 1991-92 to offset the effects of the drought emergency, and rates did not have to be raised to offset revenue losses caused by the demand reduction.

In 1996 the District replaced the Dry Year Contingency Fund with a Dry Year Water Supply component in the District's Capital Improvement Program. The purpose of this CIP component is to provide funding for the District's dry year water supply program, including the costs of the Semitropic Banking Program, and other potential programs such as purchases from a Drought Water Bank. In 2009, unused funds from this program were put into a reserve fund. This fund will help to reduce impacts on rates during dry years that occur as a result of reduced revenue due to reduced water sales, and additional costs of securing supplies during shortages.

During the current drought, and commensurate with District's water supply emergency ordinance (Ordinance No. 2014-01) the District Board of Directors adopted a drought surcharge to address financial impacts of the drought stemming from the requested decrease in water sales and corresponding revenue, increased water supply costs, and increased water shortage emergency administration costs that would otherwise result in a large, negative cash impact on the District's reserves and impact customers beyond the drought. An Emergency/Rate Stabilization Reserve has also been established, to be maintained at a target level of $10 million, to cover expenses if needed. The $10 million level was calculated as the additional amount of funds needed to purchase water in a year of adverse water conditions.

Adoption of a Water Shortage Contingency Plan

During a severe water supply shortage, the District Board would take action to declare a water supply emergency and enact appropriate ordinances as required by California Water Code Section 350 et seq. In March of 2014, the District's Board enacted Ordinance No. 2014-01 (Appendix E) declaring a water shortage emergency and adopting water use regulations, restrictions and guidelines for the water shortage emergency.

Impact on the Billing System

In order to implement a comprehensive billing program that could include differing rate levels for a drought (or other water supply emergency), the District maintains an up-to-date custom billing and information system that is programed to implement any number of various drought billing rate structures.

Monitoring Use

The District monitors water use in two ways: total water production at each of the District's production facilities is monitored daily and monthly by the Operations Department, and billed consumption is monitored monthly through the Finance Department. Detailed end water use analyses are conducted monthly by the Water Resources Department. The District reads each customer's water meter, and provides a water bill (with consumption information) on a bi-monthly basis.

Coordination with Other Agencies

The District serves the Cities of Fremont, Newark and Union City. Prior to the 2014 adoption of the Water Shortage Emergency Ordinance, District staff met with the Facilities and Maintenance staff of the Tri-City school districts, as well as with city managers and staff of Parks and Recreation and Public Works departments to discuss the ordinance and water use restrictions.

During the 1991 Drought Emergency, Union City enacted an ordinance that supported the District's restrictions, and the City of Fremont set forth a resolution that supported the District's actions. The District also has developed emergency inter-ties with the City of Hayward and the City of Milpitas.

Customer Notification and Assistance

The District has an active Public Information Program that shares information with the public in a variety of forms. The District's website, bill insertions, direct mailings, newspaper articles, a speaker's bureau, school materials, and purchased brochures are examples of this program. In 2014, the District launched WaterSmart Home Water Use Reports for single family residential customers. The initial report and Welcome Letter were sent to approximately 72,000 customers. The reports advise customers how they are doing with their water use compared to other customers with similar characteristics of water use. See Chapter 7 for more information about this program. All District departments assist customers in need of help. Leak detection, service verification, bill adjustments, and engineering support are all offered to our customers at no extra charge.

Enhanced Conservation Efforts

During drought emergencies the District implements additional outreach as part of its Water Shortage Contingency Plan. During the current drought additional outreach was done to inform customers about the conservation programs available to them. The District procured additional water conservation kits (showerheads, faucet aerators, leak detection tablets, and flappers), requested additional funding from the Board for the landscape rebate program, and added funding to the conservation budget to start a high efficiency toilet program. All conservation programs saw an increase in activity, as much as five times non-drought year activity levels. Additional staff was hired to help with the increase in activity, as well as the increase in customer inquiries (calls, emails, walk-ins). The conservation department also cross-

trained other District staff to help with the District's drought actions, including enforcement of the District's Water Shortage Emergency Ordinance. The District ensured compliance with State mandates by tracking and reporting production data as compared to 2013, and tracking violations of State prohibitions with follow up (letters, calls and/or site visits) on each report received.

10.4 CATASTROPHIC INTERRUPTION OF WATER SUPPLIES

Emergency Response Planning

In addition to preparation for water supply shortages due to droughts, the District's Water Shortage Contingency Plan also includes preparation for catastrophic loss of supplies due to earthquakes, power outages, hazardous material spills, fire emergencies, water quality emergencies and malevolent acts and events. The District has in place an emergency response procedure that documents the responsibilities and response procedures for these types of events. These procedures are documented in detail in the District's Emergency Response Manual, and the key actions are summarized below:

- Mobilize using the Standardized Emergency Management System/Incident Command System.
- Assess damage to water system and its infrastructure.
- Evaluate damage and develop remedial action plan.
- Initiate repair and restore water service.
- Monitor progress of repairs and restoration.
- Communicate with health officials, the media, and water users on supply status.
- Coordinate with local, county and State in accordance with established emergency management guidelines.
- Document damage and repairs.

Evaluation of Catastrophic Loss of SWP Water Supplies

The District has conducted an analysis of the potential water supply impacts of the loss of SWP supplies due to a catastrophic failure of Delta levees. This evaluation focused on the District's SWP supplies because the SWP provides the greatest quantity of imported supplies to the District service area. The emergency supply scenario evaluated by the District was based on concerns surrounding the 2004 Jones Tract levee failure that threatened use of the Harvey O. Banks Pumping Plant to provide SWP supplies[2]. Under the scenario evaluated, it is assumed the South Bay Aqueduct is functional with its sole supply coming from Del Valle Reservoir (i.e. no supplies from the Delta are available). Thus, the analysis evaluated the District's ability to provide water to its customers considering no State Water Project or Semitropic/transfer water supply available and all applicable production and hydraulic constraints. The analysis assumed distribution system demands of 54,200 AF/yr (approximately equal to projected buildout demands currently forecast to occur in around year 2040) and no emergency conservation benefit.

The analysis assumed conditions from May 2004, specifically average groundwater levels, median

2 Results of this analysis and action plan were used during the 2014 Water Shortage Emergency as the limited duration 0% Table A allocation from the SWP was functionally equivalent to a Delta outage.

SFPUC allocation, and 6,000 AF of emergency storage from Del Valle with no additional District storage. The following rain year replenishment of local supplies assumed median hydrologic conditions for groundwater and available diversions as well as 3,000 AF of inflow to Del Valle with no additional emergency storage. Median RWS supply is assumed for the following year as well.

Findings from the analysis show that, under the assumptions described above, the District would have sufficient supplies to provide full water deliveries to its customers for over 12 months, including the projected annual increase in water demand, before supply and production constraints limit further deliveries. The District's estimates of its ability to withstand an extended outage of its SWP supplies is attributed to the projected availability of its local supplies (groundwater, desalination), emergency storage from Del Valle Reservoir in the Alameda Creek Watershed, and continued purchases of San Francisco Regional Water System supplies.

10.5 THREE YEAR DROUGHT ANALYSIS

An estimate of the minimum water supply available to the District over the next three years (2016-2018) was developed based on the driest three year sequence that is incorporated in the District's planning model, and is summarized in Table 10-1. The planning model utilizes the 81-year historical hydrologic conditions of 1922-2003 for projections of local and imported supply availability. A review of the projected local and imported supply availability over the 81-year planning period indicates that the minimum cumulative imported and local water supply available to the District over a three-year sequence occurs under the 1931-1933 hydrologic conditions. Modeling analysis indicates that this three year drought, if it occurred in the next three years would not result in significant shortages to the District. The District's ability to withstand a severe, three year drought without shortages is a result of: (1) the completion of the Newark Desalination Facility; (2) the investment in off-site groundwater banking at Semitropic; and (3) the use of local groundwater storage in the Niles Cone Groundwater Basin.

Table 10-5
Estimated Worst Case Three Year Drought Scenario

SUPPLY/DEMAND	Year		
	Year 1 (2016)	Year 2 (2017)	Year 3 (2018)
SUPPLY COMPONENT			
Imported Supplies			
- State Water Project	10,300	6,500	10,100
- San Francisco Regional	7,800	7,800	7,900
Total Imported Supplies	18,100	14,300	17,900
Local Supplies			
- Groundwater Recharge	12,400	13,700	20,000
- Groundwater Storage	1,300	2,500	0
- Del Valle	200	4,500	5,300
- Desalination	8,200	8,100	7,700
- Recycled Water	0	0	0
Total Local Supplies	22,000	29,000	33,000
Banking/Transfers			
- Semitropic Banking	15,100	13,300	11,200
TOTAL SUPPLY	55,300	56,600	62,200
DEMAND COMPONENT			
- Distribution System Demand	36,500	39,200	41,900
- Groundwater System Demands	16,800	15,800	15,200
TOTAL DEMAND	53,300	55,000	57,000
% SURPLUS (Supplies exceed Demand)	4%	3%	9%

Note:
Under critically dry conditions, the groundwater system demands may be reduced from Normal Year conditions, which would occur as a result of temporarily lowering groundwater levels in the Newark Aquifer (in the Forebay area) to slightly below sea level (minimum elevation of 5 feet below mean sea level). This temporary drawdown of the Newark Aquifer may subsequently reduce the quantity of saline groundwater outflows to San Francisco Bay, thereby reducing the overall groundwater system demands.

APPENDIX A
Water Supply Contracts

APPENDIX A-1
State Water Project Contract

APPENDIX A-2
San Francisco Regional Water Supply Contract

(note: Complete State Water Project Supply Contract is available on DWR website:
http://www.swpao.water.ca.gov/wsc/index.cfm)

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

WATER SUPPLY CONTRACT
BETWEEN

THE STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

AND

ALAMEDA COUNTY WATER DISTRICT

Disclaimer: This document integrates Alameda County Water District's State Water Project water supply contract with the many amendments to the contract entered into since 1961. It is intended only to provide a convenient reference source, and the Department of Water Resources is unable to provide assurances that this integrated version accurately represents the original documents. For legal purposes, or when precise accuracy is required, users should direct their attention to original source documents rather than this integrated version.

(as of May 28, 2003)

IN WITNESS WHEREOF, the parties hereto have executed this contract on the date first above written.

Approved as to legal form
and sufficiency:

Chief Counsel (Acting)
Department of Water Resources

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

By B. Abbott Goldberg
Acting Director

ALAMEDA COUNTY WATER DISTRICT

By Manuel J. Bernardo
Manuel J. Bernardo, President

Phyllis J. Kettering
Countersigned:
Phyllis J. Kettering, Secretary

APPROVED AS TO TERMS
AND CONDITIONS:

M. P. Whitfield, General
Manager and Chief Engineer
Alameda County Water District

APPROVED AS TO FORM:

Morris Hyman, Attorney
Alameda County Water District

APPENDIX A

TABLE A

AS SHOWN IN THE CONTRACT
BETWEEN
THE STATE OF CALIFORNIA
THE DEPARTMENT OF WATER RESOURCES AND
ALAMEDA COUNTY WATER DISTRICT
AND
AMENDMENT NO. 20

TABLE A
ANNUAL AMOUNTS OF WATER TO BE MADE AVAILABLE FOR DELIVERY TO ALAMEDA COUNTY WATER DISTRICT

<As shown in the original Contract>

Year	Total Annual Amount In Acre-feet
1	16,900
2	17,600
3	18,100
4	18,800
5	19,400
6	14,300
7	15,000
8	15,500
9	16,200
10	17,000
11	17,900
12	18,800
13	19,600
14	20,500
15	21,300
16	22,200
17	23,100
18	23,900
19	24,800
20	26,000
21	27,200
22	28,400
23	29,600
24	30,800
25	32,100
26	33,300
27	34,500
28	35,700
29	36,900
30	38,400
31	39,900
32	41,400
33	42,000
and each succeeding year thereafter, for the term of this contract:	42,000

TABLE A
ANNUAL AMOUNTS OF WATER TO BE
MADE AVAILABLE FOR DELIVERY TO
ALAMEDA COUNTY WATER DISTRICT DISTRICT

<As shown in Amendment No. 20>

Year	Total Annual Amount In Acre-feet
1962	16,900
1963	17,600
1964	18,100
1965	18,800
1966	19,400
1967	14,300
1968	15,000
1969	15,500
1970	16,200
1971	17,000
1972	17,900
1973	18,800
1974	19,600
1975	20,500
1976	21,300
1977	22,200
1978	23,100
1979	23,900
1980	24,800
1981	26,000
1982	27,200
1983	28,400
1984	29,600
1985	30,800
1986	32,100
1987	33,300
1988	34,500
1989	35,700
1990	36,900
1991	38,400
1992	39,900
1993	41,400
1994	42,000
and each succeeding year thereafter, for the term of this contract:	42,000

In any year, the amounts designated in this Table A shall not be interpreted to mean that the State is able to deliver those amounts in all years. Article 58 describes the State's process for providing current information for project delivery capability.

WATER SALES CONTRACT

This Contract dated as of July 1, 2009, is entered into by and between the City and County of San Francisco ("San Francisco") and Alameda County Water District ("Customer")

RECITALS

San Francisco and the Customer have entered into a Water Supply Agreement (WSA'), which sets forth the terms and conditions under which San Francisco will continue to furnish water for domestic and other municipal purposes to Customer and to other Wholesale Customers The WSA contemplates that San Francisco and each individual Wholesale Customer will enter into an individual contract describing the location or locations at which water will be delivered to each customer by the San Francisco Public Utilities Commission ("SFPUC"), the customer's service area within which water so delivered is to be sold, and other provisions unique to the individual purchaser This Water Sales Contract is the individual contract contemplated by the WSA

AGREEMENTS OF THE PARTIES

1 Incorporation of the WSA

The terms and conditions of the WSA are incorporated into this Contract as if set forth in full herein

2 Term

Unless explicitly provided to the contrary in Article 9 of the WSA, the term of this Contract shall be identical to that provided in Section 2 01 of the WSA

3 Service Area

Water delivered by San Francisco to the Customer may be used or sold within the service area shown on the map designated Exhibit A attached hereto Except as provided in Section 3 03 of the WSA, Customer shall not deliver or sell any water provided by San Francisco outside of this area without the prior written consent of the General Manager of the SFPUC

4 Location and Description of Service Connections

Sale and delivery of water to Customer will be made through a connection or connections to the SFPUC Regional Water System at the location or locations listed, with the applicable present account number, service location, service size, and meter size shown on Exhibit B attached hereto

5 Interties With Other Systems

Customer maintains interties with neighboring water systems at the location or locations and with the connection size(s) as shown on Exhibit C attached hereto

6 Billing and Payment

San Francisco shall compute the amounts of water delivered and bill Customer therefor on a monthly basis The bill shall show the separate components of the charge (e g , service, consumption demand) Customer shall pay the amount due within thirty (30) days after receipt of the bill

If Customer disputes the accuracy of any portion of the water bill it shall (a) notify the General Manager of the SFPUC in writing of the specific nature of the dispute and (b) pay the undisputed portion of the bill within thirty (30) days after receipt Customer shall meet with the General Manager of the SFPUC or a delegate to discuss the disputed portion of the bill

7 Minimum Water Delivery Levels

San Francisco will deliver and Customer will pay for a minimum annual supply of 7 648 MGD

IN WITNESS WHEREOF, the parties hereto have executed this Contract, to become effective upon the effectiveness of the WSA, by their duly authorized representatives.

CITY AND COUNTY OF SAN FRANCISCO
Acting by and through its Public Utilities Commission

By: _____
Edward Harrington
General Manager

Date: June 24, 2009

Approved by Commission Resolution No. 09-0069, adopted April 28, 2009

_____
Michael Housh
Secretary to Commission

Approved as to form:

DENNIS J. HERRERA
City Attorney

By: _____
Joshua D. Milstein
Deputy City Attorney

ALAMEDA COUNTY WATER DISTRICT

By: _____
Name: Paul Piraino
Title: General Manager

Date: June 11, 2009

Approved by Resolution No. 09-033, adopted June 11, 2009

ATTEST:

_____
Secretary

APPROVED AS TO FORM:

_____
Legal Counsel

APPENDIX B
Water Supply Uncertainty: Supplemental Information

FACTORS AFFECTING THE RELIABILITY OF THE SAN FRANCISCO REGIONAL WATER SYSTEM

APPENDIX B
FACTORS AFFECTING THE RELIABILITY OF THE REGIONAL WATER SYSTEM
(source: Bay Area Water Supply and Conservation Agency, 2016, unless otherwise noted)

Reliability of the Regional Water System

The SFPUC's WSIP provides goals and objectives to improve the delivery reliability of the RWS, including water supply reliability. The goals and objectives of the WSIP related to water supply are:

Program Goal	System Performance Objective
Water Supply – *meet customer water needs in non-drought and drought periods*	• Meet average annual water demand of 265 mgd from the SFPUC watersheds for retail and wholesale customers during non-drought years for system demands through 2018. • Meet dry-year delivery needs through 2018 while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts. • Diversify water supply options during non-drought and drought periods. • Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers.

The adopted WSIP had several water supply elements to address the WSIP water supply goals and objectives. The following provides the water supply elements for all year types and the dry-year projects of the adopted WSIP to augment all year type water supplies during drought.

Water Supply – All Year Types

The SFPUC historically has met demand in its service area in all year types from its watersheds, which consist of:

- Tuolumne River watershed
- Alameda Creek watershed
- San Mateo County watersheds

In general, 85 percent of the supply comes from the Tuolumne River through Hetch Hetchy Reservoir and the remaining 15 percent comes from the local watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos and San Andreas Reservoirs. The adopted WSIP retains this mix of water supply for all year types.

Water Supply – Dry-Year Types

The adopted WSIP includes the following water supply projects to meet dry-year demands with no greater than 20 percent system-wide rationing in any one year:

- Calaveras Dam Replacement Project
  Calaveras Dam is located near a seismically active fault zone and was determined to be seismically vulnerable. To address this vulnerability, the SFPUC is constructing a new dam of equal height downstream of the existing dam. The Environmental Impact Report was certified by the San Francisco City Planning Commission in 2011, and construction is now ongoing. Construction of the new dam is slated for completion in 2018; the entire project should be completed in 2019.

- Alameda Creek Recapture Project
  The Alameda Creek Recapture Project will recapture the water system yield lost due to instream flow releases at Calaveras Reservoir or bypassed around the Alameda Creek Diversion Dam and return this yield to the RWS through facilities in the Sunol Valley. Water that naturally infiltrates from Alameda Creek will be recaptured into an existing quarry pond known as SMP (Surface Mining Permit)-24 Pond F2. The project will be designed to allow the recaptured water to be pumped to the Sunol Valley Water Treatment Plant or to San Antonio Reservoir. The project's Draft Environmental Impact Report will be released in the spring of 2016, and construction will occur from spring 2017 to fall 2018.
- Lower Crystal Springs Dam Improvements
  The Lower Crystal Springs Dam Improvements were substantially completed in November 2011. While the project has been completed, permitting issues for reservoir operation have become significant. While the reservoir elevation was lowered due to Division of Safety of Dams restrictions, the habitat for the Fountain Thistle, an endangered plant, followed the lowered reservoir elevation. Raising the reservoir elevation now requires that new plant populations be restored incrementally before the reservoir elevation is raised. The result is that it may be several years before the original reservoir elevation can be restored.
- Regional Groundwater Storage and Recovery Project
  The Groundwater Storage and Recovery Project is a strategic partnership between SFPUC and three San Mateo County agencies: the California Water Service Company (serving South San Francisco and Colma), the City of Daly City, and the City of San Bruno. The project seeks to balance the management of groundwater and surface water resources in a way that safeguards supplies during times of drought. During years of normal or heavy rainfall, the project would provide additional surface water to the partner agencies in San Mateo County, allowing them to reduce the amount of groundwater that they pump from the South Westside Groundwater Basin. Over time, the reduced pumping would allow the aquifer to recharge and result in increased groundwater storage of up to 20 billion gallons.
  The project's Final Environmental Impact Report was certified in August 2014, and the project also received Commission approval that month. The well station construction contract Notice to Proceed was issued in April 2015, and construction is expected to be completed in spring 2018.
- 2 mgd Dry-year Water Transfer
  In 2012, the dry-year transfer was proposed between the Modesto Irrigation District and the SFPUC. Negotiations were terminated because an agreement could not be reached. Subsequently, the SFPUC is having ongoing discussions with the Oakdale Irrigation District for a one-year transfer agreement with the SFPUC for 2 mgd (2,240 acre-feet).

In order to achieve its target of meeting at least 80 percent of its customer demand during droughts at 265 mgd, the SFPUC must successfully implement the dry-year water supply projects included in the WSIP.

Furthermore, the permitting obligations for the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements include a combined commitment of 12.8 mgd for instream flows on average. When this is reduced for an assumed Alameda Creek Recapture Project recovery of 9.3 mgd, the net loss of water supply is 3.5 mgd. The SFPUC's participation in regional water supply reliability efforts, such as the Bay Area Regional Desalination Project (BARDP), additional water transfers, and other projects may help to make up for this shortfall.

District Note: For the purposes of this UWMP, the District further reduced assumed SFPUC deliveries due to the uncertainty of some of these water supply projects. The District does not fully include the expected supplies of dry-year transfers that are still under negotiation and of the water supply projects that are still under environmental review.

Projected SFPUC Regional Water System Supply Reliability

The SFPUC has provided the attached table presenting the projected RWS supply reliability. This table assumes that the wholesale customers purchase 184 mgd from the RWS through 2040 and the implementation of the dry-year water supply projects included in the WSIP. The numbers represent the wholesale share of available supply during historical year types per the Tier One Water Shortage Allocation Plan. This table does not reflect any potential impact to RWS yield from the additional fishery flows required as part of Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements Project.

Impact of Recent SFPUC Actions on Dry-Year Reliability

As noted earlier, in adopting the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements Project, the SFPUC committed to providing fishery flows below Calaveras Dam and Lower Crystal Springs Dam, as well as bypass flows below Alameda Creek Diversion Dam. The fishery flow schedules for Alameda Creek and San Mateo Creek represent a potential decrease in available water supply of an average annual 9.3 mgd and 3.5 mgd, respectively with a total of 12.8 mgd average annually. The Alameda Creek Recapture Project, described above, will replace the 9.3 mgd of supply lost to Alameda Creek fishery flows. Therefore, the remaining 3.5 mgd of fishery flows for San Mateo Creek will potentially create a shortfall in meeting the SFPUC demands of 265 mgd and slightly increase the SFPUC's dry-year water supply needs.

The adopted WSIP water supply objectives include (1) meeting a target delivery of 265 mgd through 2018 and (2) rationing at no greater than 20 percent system-wide in any one year of a drought. As a result of the fishery flows, the SFPUC may not be able to meet these objectives between 2015 and 2018. Participation in the BARDP and additional water transfers, as described earlier, may help manage the water supply loss associated with the fishery flows.

As a result of the Individual Supply Guarantees described above, the SFPUC has a responsibility to provide 184 mgd to its wholesale customers in perpetuity, regardless of demand. Therefore, the current projections for purchase requests through 2018 remain at 265 mgd, which includes wholesale and retail demand. However, in the last decade including the current drought, SFPUC deliveries have been below this level, as illustrated in the table below.

Water Deliveries in San Francisco Regional Water System Service Area[1]

Fiscal Year	Total Deliveries (mgd)
2005-06	247.5
2006-07	257.0
2007-08	254.1
2008-09	243.4
2009-10	225.2
2010-11	219.9
2011-12	220.5
2012-13	223.9
2013-14	222.3
2014-15	196.0

Under the current drought to date, the SFPUC has called for, but has not mandated, a 10 percent system-wide reduction since January 2014. The SFPUC has not yet been compelled to declare a water shortage emergency and impose mandatory system-wide rationing because its customers have exceeded the 10 percent voluntary system-wide reduction in conjunction with the state-wide mandatory reductions assigned by the State Water Resources Control Board. If current drought conditions worsen between

[1] Reference: SFPUC FY 9-10 and FY 2014-15 J-Tables Line 9 "Total System Usage" plus 0.7 mgd for Lawrence Livermore National Laboratory use and 0.4 mgd for Groveland. No groundwater use is included in this number. Non-revenue water is included.

2015 and 2018, and the SFPUC determines that system-wide rationing would need to be imposed, then the SFPUC would issue a declaration of a water shortage emergency in accordance with Water Code Section 350 and implement rationing in accordance with the WSA and WSAP as described above.

2018 SFPUC Decisions

In the WSA, there are three decisions the SFPUC committed to making before 2018 that will affect water supply development:

- Whether or not to make the cities of San Jose and Santa Clara permanent customers,
- Whether or not to supply the additional unmet supply needs of the wholesale customers beyond 2018, and
- Whether or not to increase the wholesale customer Supply Assurance above 184 mgd.

Additionally, there have been recent changes to instream flow requirements and customer demand projections that will affect water supply planning beyond 2018. As a result, the SFPUC has developed a Water Management Action Plan (Water MAP) to provide necessary information to address the 2018 decisions and to begin developing a water supply program for the 2019 to 2035 planning horizon. The water supply program will enable the SFPUC to continue to meet its commitments and responsibilities to wholesale and retail customers, consistent with the priorities of the SFPUC.

The discussion resulting from the questions described in the Water MAP will help guide the water supply planning objectives through 2035. While the Water MAP is not a water supply program, it presents pertinent information that will help develop the SFPUC's future water supply planning program. At this time, and for purposes of long-term planning, it is assumed that deliveries from the RWS to San Francisco's wholesale customers will not be in excess of 184 mgd.

Current Drought (2012 to present)

Under the current drought to date, the SFPUC has called for, but has not mandated, a 10 percent system-wide reduction since January 2014. SFPUC has not yet been compelled to impose mandatory system-wide rationing because its customers have exceeded the 10 percent voluntary system-wide reduction in conjunction with the state-wide mandatory reductions assigned by the State Water Resources Control Board.

Drought Public Education and Outreach

In response to prolonged drought conditions, on January 31, 2014 the SFPUC asked its retail and wholesale customers to voluntarily reduce system-wide water consumption by 10 percent. That summer, BAWSCA, in partnership with the SFPUC, launched a regional drought education campaign to heighten awareness and encourage water conservation. The regional campaign drew upon the SFPUC's "Water Conservation is Smart and Sexy" citywide campaign. The regional campaign appeared in the form of billboards, BART station ads, movie theater ads, and online video advertisements.

Following Governor Brown's Drought Executive Order on April 1, 2015 and conservation regulations mandating a statewide 25 percent reduction in potable urban water use, the SFPUC continued its call for a system-wide 10 percent reduction in water use. The SFPUC and BAWSCA partnered again to launch a new drought campaign for the summer of 2015 to remind customers to keep up their water conservation efforts, focusing in particular on outdoor water savings. Regional messaging was included in the form of billboards, BART station ads, television ads, newspaper ads, and a video campaign.

Description of BAWSCA

BAWSCA provides regional water reliability planning and conservation programming for the benefit of its 26 member agencies that purchase wholesale water supplies from the San Francisco Public Utilities Commission. Collectively, the BAWSCA member agencies deliver water to over 1.74 million residents and nearly 40,000 commercial, industrial and institutional accounts in Alameda, San Mateo and Santa Clara Counties.

BAWSCA also represents the collective interests of these wholesale water customers on all significant technical, financial and policy matters related to the operation and improvement of the SFPUC's Regional Water System (RWS).

BAWSCA's role in the development of the 2015 UWMP updates is to work with its member agencies and the SFPUC to seek consistency among the multiple documents being developed.

Regional Water Demand and Conservation Projections

In September 2014, BAWSCA completed the Regional Water Demand and Conservation Projections Report (Demand Study). The goal of the Demand Study was to develop transparent, defensible, and uniform demand and conservation savings projections for each wholesale customer using a common methodology to support both regional and individual agency planning efforts. The Demand Study projections were incorporated into BAWSCA's Long-Term Reliable Water Supply Strategy (Strategy) discussed below.

Through the Demand Study process, BAWSCA and the wholesale customers (1) quantified the total average-year water demand for each BAWSCA member agency through 2030, (2) quantified passive and active conservation water savings potential for each individual wholesale customer through 2040, and (3) identified conservation programs for further consideration for regional implementation by BAWSCA. The Demand Study projected that by 2040 the collective active conservation efforts of the wholesale customer's would yield an additional 16 MGD in savings beyond what has already been achieved for the BAWSCA service area. Based on the revised water demand projections, the identified water conservation savings, and other actions, the collective purchases of the BAWSCA member agencies from the SFPUC are projected to stay below 184 MGD through 2018.

As part of the Demand Study, each wholesale customer was provided with a demand model that can be used to support ongoing demand and conservation planning efforts, including UWMP preparation.

Long Term Reliable Water Supply Strategy

BAWSCA's Strategy was developed to quantify the water supply reliability needs of the BAWSCA member agencies through 2040, identify the water supply management projects and/or programs (projects) that could be developed to meet those needs, and prepare an implementation plan for the Strategy's recommendations. Successful implementation of the Strategy is critical to ensuring that there will be sufficient and reliable water supplies for the BAWSCA member agencies and their customers in the future.

Phase II of the Strategy was completed in February 2015 with release of the Strategy Phase II Final Report. The water demand analysis done during Phase II of the Strategy resulted in the following key findings:

- There is no longer a regional normal year supply shortfall.
- There is a regional drought year supply shortfall of up to 43 mgd.

In addition, the project evaluation analysis done during Phase II of the Strategy resulted in the following key findings:

- Water transfers score consistently high across the various performance measures and within various portfolio constructs and thus represent a high priority element of the Strategy.
- Desalination also potentially provides substantial yield, but its high effective costs and intensive permitting requirements make it a less attractive drought year supply alternative. However, given the limited options for generating significant yield for the region, desalination warrants further investment in information as a hedge against the loss of local or other imported supplies.
- The other potential regional projects provide tangible, though limited, benefit in reducing dry year shortfalls given the small average yields in drought years[2].

BAWSCA is now implementing the Strategy recommendations in coordination with BAWSCA member agencies. Strategy implementation will be adaptively managed to account for changing conditions and to ensure that the goals of the Strategy are met efficiently and cost-effectively.

Due to the size of the supply and reliability need, and the uncertainty around yield of some Strategy projects, BAWSCA will need to pursue multiple actions and projects in order to provide some level of increased water supply reliability for its member agencies. On an annual basis, BAWSCA will reevaluate Strategy recommendations and results in conjunction with development of the work plan for the following year. In this way, actions can be modified to accommodate changing conditions and new developments.

[2] While specific projects were not developed or evaluated for the Strategy, regional discussions on indirect/direct potable reuse have accelerated dramatically in the last year, making this a water supply management project BAWSCA is tracking closely.

San Francisco
Water Power Sewer
Operator of the Hetch Hetchy Regional Water System

525 Golden Gate Avenue, 10th Floor
San Francisco, CA 94102
T 415.554.3271
F 415.934.5770
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January 5, 2016

Andree Johnson
Water Resources Specialist
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 650
San Mateo, CA 94402

Dear Ms. Johnson,

Attached please find the information you requested on the Regional Water System's supply reliability for use in the Wholesale Customer's 2015 Urban Water Management Plan (UWMP) updates. The SFPUC has assessed the water supply reliability under the following planning scenarios:

- Projected single dry year supply for base year 2015[1],
- Projected multiple dry year supply beginning with base year 2015, and
- Projected supply reliability for base year 2015 through 2040.

Table 1 summarizes deliveries to the Wholesale Customers for projected single dry year supply for base year 2015 and projected multiple dry year supply beginning base year 2015.

With regards to future demands, the SFPUC proposes to expand their water supply portfolio by increasing the types of water supply resources. Table 2 summarizes the water supply resources assumed to be available by 2040, as well as other assumptions affecting supply. These assumptions differ from those used in the reliability analysis for the previous 2010 UWMP update, and lead to slightly different reliability projections explained further below.

Concerning allocation of supply during dry years, the Water Shortage Allocation Plan (WSAP) was utilized to allocate shortages between the SFPUC and the Wholesale Customers collectively. The WSAP implements a method for allocating water between the SFPUC retail customers and wholesale customers collectively which has been adopted by the Wholesale Customers

[1] Fiscal Year 2015 is used as the base year to run the water supply reliability analysis in the Hetch Hetchy Local Simulation Model (HHLSM). This base year reflects a wholesale Supply Assurance of 184 million gallons per day, as well as Regional Water System reservoir and pipeline capacities and instream flow requirements as they exist in 2015 (pre-Water System Improvement Program [WSIP] completion).

per the July 2009 Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County. The wholesale customers have adopted the Tier Two Plan, the second component of the WSAP, which allocates the collective wholesale customer share among each of the 26 wholesale customers.

Finally, the SFPUC estimated the frequency and severity of anticipated shortages for the period 2015 (base year) through 2040. For this analysis, we assumed that the historical hydrologic period is indicative of future events and evaluated the supply reliability assuming a repeat of the actual historic hydrologic period 1921 through 2011. The results of this analysis are summarized in Table 3.

Compared to the reliability projections that were provided previously for the 2010 UWMP update, Table 1 indicates slightly higher shortages and lower Wholesale allocations for dry years 2 and 3. Also, Table 3 shows slightly higher estimates of required rationing in multi-year droughts as compared to those provided previously. These differences are due to the inclusion of a temporary constraint on Crystal Springs Reservoir storage and an in-stream flow requirement below Crystal Springs Reservoir, which are shown in Table 2, but were not included in the previous reliability analysis.

It is our understanding that you will pass this information on to the Wholesale Customers. If you have any questions or need additional information, please do not hesitate to contact me at (415) 554-0792.

Sincerely,

Paula Kehoe

Paula Kehoe
Director of Water Resources

Table 1: Projected Deliveries for Three Multiple Dry Years

	Base Year 2015 (Non-Dry)	One Critical Dry Year	Deliveries During Multiple Dry Years		
			Year 1	Year 2	Year 3
System-Wide Shortage	0%	10%	10%	22%	22%
Wholesale Allocation (MGD)	184.0	152.6	152.6	129.2	129.2
MGD = million gallons per day					

Table 2: Water Supply Modeling Assumptions for Fiscal Years 2015 through 2040

	2015	2020	2025	2030	2035	2040
Water Supply Resource						
Westside Basin Groundwater (AF/yr)		8,100	8,100	8,100	8,100	8,100
Districts Transfer (AF/yr)		2,240	2,240	2,240	2,240	2,240
Crystal Springs Reservoir Capacity (20.3 BG) [1]			x	x	x	x
Calaveras Reservoir at Full Capacity		x	x	x	x	x
Alameda Creek Recapture (9.3 MGD)		x	x	x	x	x
Reservoir Operation Affecting Supply						
Crystal Springs Reservoir Release for In-Stream Flow to San Mateo Creek (3.5 MGD) [2]	x	x	x	x	x	x
Calaveras Reservoir Release and Alameda Creek Diversion Dam Bypass for In-Stream Flow to Alameda Creek (9.3 MGD)		x	x	x	x	x

AF/yr = acre-feet per year, BG = billion gallons, MGD = million gallons per day, x = in operation

Notes:

1. Schedule for restoration of Crystal Springs Reservoir storage is tied to permitting requirements for endangered plants.
2. Release from Crystal Springs Reservoir to meet minimum in-stream flow requirement in San Mateo Creek began in January 2015.

Table 3: Projected System Supply Reliability Based on Hydrologic Period

	Wholesale Demand (MGD)					
	184.0	184.0	184.0	184.0	184.0	184.0
	Projected Wholesale Allocation (MGD)					
Fiscal Year	2015	2020	2025	2030	2035	2040
1920-21	184.0	184.0	184.0	184.0	184.0	184.0
1921-22	184.0	184.0	184.0	184.0	184.0	184.0
1922-23	184.0	184.0	184.0	184.0	184.0	184.0
1923-24	184.0	184.0	184.0	184.0	184.0	184.0
1924-25	152.6	184.0	184.0	184.0	184.0	184.0
1925-26	184.0	184.0	184.0	184.0	184.0	184.0
1926-27	184.0	184.0	184.0	184.0	184.0	184.0
1927-28	184.0	184.0	184.0	184.0	184.0	184.0
1928-29	184.0	184.0	184.0	184.0	184.0	184.0
1929-30	184.0	184.0	184.0	184.0	184.0	184.0
1930-31	184.0	184.0	184.0	184.0	184.0	184.0
1931-32	129.2	152.6	152.6	152.6	152.6	152.6
1932-33	184.0	184.0	184.0	184.0	184.0	184.0
1933-34	184.0	184.0	184.0	184.0	184.0	184.0
1934-35	152.9	184.0	184.0	184.0	184.0	184.0
1935-36	184.0	184.0	184.0	184.0	184.0	184.0
1936-37	184.0	184.0	184.0	184.0	184.0	184.0
1937-38	184.0	184.0	184.0	184.0	184.0	184.0
1938-39	184.0	184.0	184.0	184.0	184.0	184.0
1939-40	184.0	184.0	184.0	184.0	184.0	184.0
1940-41	184.0	184.0	184.0	184.0	184.0	184.0
1941-42	184.0	184.0	184.0	184.0	184.0	184.0
1942-43	184.0	184.0	184.0	184.0	184.0	184.0
1943-44	184.0	184.0	184.0	184.0	184.0	184.0
1944-45	184.0	184.0	184.0	184.0	184.0	184.0
1945-46	184.0	184.0	184.0	184.0	184.0	184.0
1946-47	184.0	184.0	184.0	184.0	184.0	184.0
1947-48	184.0	184.0	184.0	184.0	184.0	184.0
1948-49	184.0	184.0	184.0	184.0	184.0	184.0
1949-50	184.0	184.0	184.0	184.0	184.0	184.0
1950-51	184.0	184.0	184.0	184.0	184.0	184.0
1951-52	184.0	184.0	184.0	184.0	184.0	184.0
1952-53	184.0	184.0	184.0	184.0	184.0	184.0
1953-54	184.0	184.0	184.0	184.0	184.0	184.0
1954-55	184.0	184.0	184.0	184.0	184.0	184.0
1955-56	184.0	184.0	184.0	184.0	184.0	184.0
1956-57	184.0	184.0	184.0	184.0	184.0	184.0
1957-58	184.0	184.0	184.0	184.0	184.0	184.0
1958-59	184.0	184.0	184.0	184.0	184.0	184.0
1959-60	184.0	184.0	184.0	184.0	184.0	184.0
1960-61	152.6	184.0	184.0	184.0	184.0	184.0

	Wholesale Demand (MGD)					
	184.0	184.0	184.0	184.0	184.0	184.0
	Projected Wholesale Allocation (MGD)					
Fiscal Year	2015	2020	2025	2030	2035	2040
1961-62	129.2	152.6	152.6	152.6	152.6	152.6
1962-63	184.0	184.0	184.0	184.0	184.0	184.0
1963-64	184.0	184.0	184.0	184.0	184.0	184.0
1964-65	184.0	184.0	184.0	184.0	184.0	184.0
1965-66	184.0	184.0	184.0	184.0	184.0	184.0
1966-67	184.0	184.0	184.0	184.0	184.0	184.0
1967-68	184.0	184.0	184.0	184.0	184.0	184.0
1968-69	184.0	184.0	184.0	184.0	184.0	184.0
1969-70	184.0	184.0	184.0	184.0	184.0	184.0
1970-71	184.0	184.0	184.0	184.0	184.0	184.0
1971-72	184.0	184.0	184.0	184.0	184.0	184.0
1972-73	184.0	184.0	184.0	184.0	184.0	184.0
1973-74	184.0	184.0	184.0	184.0	184.0	184.0
1974-75	184.0	184.0	184.0	184.0	184.0	184.0
1975-76	184.0	184.0	184.0	184.0	184.0	184.0
1976-77	152.6	184.0	184.0	184.0	184.0	184.0
1977-78	129.2	152.6	152.6	152.6	152.6	152.6
1978-79	184.0	184.0	184.0	184.0	184.0	184.0
1979-80	184.0	184.0	184.0	184.0	184.0	184.0
1980-81	184.0	184.0	184.0	184.0	184.0	184.0
1981-82	184.0	184.0	184.0	184.0	184.0	184.0
1982-83	184.0	184.0	184.0	184.0	184.0	184.0
1983-84	184.0	184.0	184.0	184.0	184.0	184.0
1984-85	184.0	184.0	184.0	184.0	184.0	184.0
1985-86	184.0	184.0	184.0	184.0	184.0	184.0
1986-87	184.0	184.0	184.0	184.0	184.0	184.0
1987-88	152.6	184.0	184.0	184.0	184.0	184.0
1988-89	129.2	152.6	152.6	152.6	152.6	152.6
1989-90	129.2	152.6	152.6	152.6	152.6	152.6
1990-91	129.2	132.5	132.5	132.5	132.5	132.5
1991-92	129.2	132.5	132.5	132.5	132.5	132.5
1992-93	129.2	132.5	132.5	132.5	132.5	132.5
1993-94	184.0	184.0	184.0	184.0	184.0	184.0
1994-95	184.0	184.0	184.0	184.0	184.0	184.0
1995-96	184.0	184.0	184.0	184.0	184.0	184.0
1996-97	184.0	184.0	184.0	184.0	184.0	184.0
1997-98	184.0	184.0	184.0	184.0	184.0	184.0
1998-99	184.0	184.0	184.0	184.0	184.0	184.0
1999-00	184.0	184.0	184.0	184.0	184.0	184.0
2000-01	184.0	184.0	184.0	184.0	184.0	184.0
2001-02	184.0	184.0	184.0	184.0	184.0	184.0
2002-03	184.0	184.0	184.0	184.0	184.0	184.0
2003-04	184.0	184.0	184.0	184.0	184.0	184.0

	Wholesale Demand (MGD)					
	184.0	184.0	184.0	184.0	184.0	184.0
	Projected Wholesale Allocation (MGD)					
Fiscal Year	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
2004-05	184.0	184.0	184.0	184.0	184.0	184.0
2005-06	184.0	184.0	184.0	184.0	184.0	184.0
2006-07	184.0	184.0	184.0	184.0	184.0	184.0
2007-08	184.0	184.0	184.0	184.0	184.0	184.0
2008-09	184.0	184.0	184.0	184.0	184.0	184.0
2009-10	184.0	184.0	184.0	184.0	184.0	184.0
2010-11	184.0	184.0	184.0	184.0	184.0	184.0

MGD = million gallons per day

APPENDIX C
District Groundwater Management Policy

ALAMEDA COUNTY WATER DISTRICT

GROUNDWATER MANAGEMENT POLICY

(Adopted January 26, 1989)
(Amended March 22, 2001)

TABLE OF CONTENTS

GROUNDWATER MANAGEMENT POLICY
ADOPTED JANUARY 26, 1989
Amended March 22, 2001

BACKGROUND

The Alameda County Water District (ACWD) was created by a vote of area residents in December 1913, thereby becoming the first water district in California to be formed under the County Water District Act enacted earlier that year. It is governed by a five-member board of directors, elected at large.

In the years preceding the vote, local farmers and residents had become concerned about water companies and agencies exporting water from both Alameda Creek and local groundwater to nearby communities such as Oakland and San Francisco. The result of these exports was that the groundwater table was falling at a rapid rate. The voters hoped, in establishing ACWD, to regain control over local water supplies, to protect the underground water in the Niles Cone Groundwater Basin, and to conserve the waters of Alameda Creek.

ACWD now has several sources of supply, including water purchased from the State Water Project (via the South Bay Aqueduct) and the San Francisco Public Utilities Commission (via the Hetch Hetchy aqueduct system). But groundwater remains an important component of its supply, currently furnishing 35% of the water ACWD distributes. In dry years, groundwater has contributed over 60% of the supply. Thus, conservation and preservation of the groundwater basin continues to be a vitally important program for ACWD.

AUTHORIZATION

This Groundwater Management Policy is based on the statutory authority granted to ACWD under the County Water District Law (commencing with Section 30000 of the Water Code); the Replenishment Assessment Act of the Alameda County Water District (Section 4, Chapter 1942

of the Statutes of 1961, as amended in 1970 and 1973), which grants additional powers to ACWD to prevent pollution, contamination, or diminution in quality of the groundwater supply; local well ordinances (Fremont No. 950, as amended; Newark No. 136; and Union City No. 109-73); agreements with other agencies; and local hazardous materials ordinances.

POLICY STATEMENT

It is the policy of the Alameda County Water District to efficiently protect and manage the Niles Cone Groundwater Basin to ensure a reliable supply of high quality water that satisfies present and future municipal, industrial, recreational, and agricultural water needs in the ACWD service area. ACWD will develop and implement appropriate programs within the ACWD service area to protect and manage the groundwater basin as a long-term source of water supply for ACWD. ACWD will also actively protect the groundwater basin from activities outside the ACWD service area that may negatively impact the water quality and/or water supply of the basin.

OBJECTIVES

The purpose of this policy is to protect and improve ACWD's groundwater resources for the benefit of both ACWD's customers and private well owners by taking actions designed to meet the following objectives:

- Increase groundwater replenishment capability.
- Increase the usable storage capacity of the groundwater basin.
- Operate the basin to provide: (1) a reliable water supply to meet baseload and peak distribution system demands, (2) an emergency source of supply, and (3) reserve storage to augment dry year supplies.
- Protect groundwater quality from degradation from any and all sources including: saline

water intrusion, wastewater discharges, recycled water use, urban and agricultural runoff, or chemical contamination.

- Improve groundwater quality by (1) removing salts and other contaminants from affected areas of the basin, and (2) improving the water quality of source water used for groundwater recharge.

The specific groundwater management programs that have been developed and implemented by ACWD to achieve these policy objectives are listed in Table 1and are described in greater detail in Attachment 1 to this Policy.

This Policy is intended to serve as a guide to ACWD management in the continued development and implementation of programs to manage and protect ACWD water resources and as a nontechnical document to explain ACWD groundwater programs to members of the public. This Policy is not intended to create legal rights in any person or organization, or to impose legal obligations on ACWD. It may be amended or repealed by the Board of Directors at any time.

TABLE 1 - SUMMARY OF ACWD GROUNDWATER MANAGEMENT PROGRAMS

Groundwater Program	Description
Water Supply Management	Planning, managing, and optimizing ACWD's sources of supply: watershed runoff, SWP water for recharge, SWP water for treatment, SFPUC water for blending, and water banking.
Groundwater Replenishment	Operation of ACWD groundwater recharge facilities to optimize 1) capture of local runoff, 2) replacement of water extracted from production and ARP wells, and 3) maintenance of groundwater levels to prevent salt water intrusion.
Watershed Protection and Monitoring	Assisting in the protection and monitoring of the watershed to optimize the quality of runoff water available for ACWD water supply.
Basin Monitoring	Sampling and measuring wells to assess and evaluate 1) groundwater quality, 2) water pressures within the basin, and 3) the direction of groundwater flow.
Wellhead Protection Program	Identify sensitive recharge and groundwater areas, maintain an inventory of potential threats within these areas, assess the vulnerability of source water, and develop management strategies to minimize the potential for groundwater quality impacts.
Aquifer Reclamation Program	Pump brackish water from degraded aquifers in order to 1) increase useable basin storage, 2) improve overall water quality, 3) prevent movement of brackish water toward ACWD production wells, and 4) provide (future) supply augmentation through treatment to potable water standards.
Groundwater Protection Program	Maintain an active role in 1) assisting with the identification of potential groundwater contamination, 2) implementing monitoring systems at hazardous materials storage sites, and 3) providing technical oversight for investigations and cleanups at hazardous materials spill sites.
Well Ordinance Administration	As enforcing agency for municipal ordinances governing construction, repair, or destruction of wells, ACWD provides inspection services, collects fees, and performs field searches for abandoned wells which could act as a conduit for contamination of groundwater.

ATTACHMENT 1

ACWD GROUNDWATER MANAGEMENT PROGRAMS

(March 22, 2001)

Eight major groundwater management programs have been developed and implemented by ACWD to achieve the objectives identified in ACWD's Groundwater Management Policy:

- Water Supply Management
- Groundwater Replenishment
- Watershed Protection and Monitoring
- Basin Monitoring
- Wellhead Protection Program
- Aquifer Reclamation Program
- Groundwater Protection Program
- Well Ordinance Administration

Water Supply Management

ACWD has three primary sources of water: (1) runoff from the Alameda Creek Watershed, (2) treated surface water purchased from the San Francisco Public Utilities Commission (SFPUC) and delivered through the Hetch Hetchy aqueduct system, and (3) untreated surface water purchased from the State Water Project (SWP) and delivered through the South Bay Aqueduct. Alameda Creek watershed runoff and imported water from the State Water Project are used for replenishment of the Niles Cone Groundwater Basin.

The groundwater basin is used conjunctively with surface water supplies. Generally, surface water production facilities are operated throughout the year to meet distribution system demands. Groundwater production facilities are operated to meet a portion of the base load demand and to meet peak and emergency demands. A desalination facility is planned to be operational in 2002 to treat some of the brackish groundwater currently being discharged to the San Francisco Bay from the Aquifer Reclamation Program wells (see Aquifer Reclamation Program section) and produce a new source of high quality water.

ACWD conducts an annual survey of groundwater conditions to determine the amount of imported water needed to maintain groundwater levels within an acceptable range and to determine a replenishment assessment rate. Groundwater levels are also used to trigger dry year water management response programs, including additional water conservation and utilization of off-site water banking and/or exchange programs.

Owners of wells who pump water from the groundwater basin are required to pay a replenishment assessment to reimburse ACWD for a portion of the cost of imported water used to recharge the depleted groundwater basin and to help offset ACWD's groundwater basin operations and management costs. Currently, the owners or operators of 234 wells receive annual registration forms as part of the replenishment assessment program.

Reclaimed wastewater is a potential alternative source of supply for ACWD. ACWD will cooperate with the Union Sanitary District to explore appropriate and beneficial uses of reclaimed wastewater within ACWD's service area in locations where there is very little risk of percolation into the aquifers used for potable water production.

Groundwater Replenishment

ACWD utilizes sections of the Alameda Creek Flood Control Channel behind three inflatable rubber dams and recharge ponds (abandoned quarry pits) to store and percolate

water into the aquifers of the Niles Cone Groundwater Basin. The groundwater replenishment program serves two major roles:

(1) Replenishment of groundwater extracted to meet local demands and to replace brackish water extracted as part of the Aquifer Reclamation Program.

(2) Maintenance of groundwater flow toward San Francisco Bay, in order to prevent future saline water intrusion from the bay and to displace brackish water remaining from historic saline water intrusion.

Through ACWD's long range Capital Improvement Program, a major portion of the recharge ponds below (i.e., west of) the Hayward Fault were rehabilitated in 1997 and 1998 and resulted in greater storage capacity within the ponds and increased the rate at which water is recharged to replace water pumped from the groundwater basin.

Recharge facilities are operated to maximize the capture of local runoff. The operating criteria for the recharge facilities and the groundwater basin are continuously evaluated to optimize the use of these resources.

Watershed Protection and Monitoring

ACWD plays a major role in coordinating and communicating with other state and local agencies to influence policy decisions related to activities within the watershed of Alameda Creek which could have a negative effect on ACWD water supplies and the groundwater basin. This includes review of environmental impact reports, technical evaluation of National Pollutant Discharge Elimination System (NPDES) permits, emergency response to surface spills, participation in watershed planning and technical committees, and participation in planning studies for expansion of wastewater export facilities in the Livermore-Amador Valley.

As part of ACWD's watershed protection program, ACWD will require (to the extent

ACWD has legal authority to do so) and in all cases will request that lead agencies for future development projects within the Upper Alameda Creek Watershed that may affect water quality in Alameda Creek determine the extent and significance of those impacts, and will request such lead agencies to require adequate mitigation of any significant impacts to Alameda Creek and ACWD. Specific mitigation measures will depend on the particular features of individual projects including their location, size, volume of water applied and/or discharged, and the physical/chemical/biological composition of such water. Mitigation may include either or both implementation of on-site source control measures or contributions to off-site mitigation projects, such as reimbursement of a portion of ACWD's cost of constructing and operating a demineralization facility. The goal of whatever mitigation measures are employed is to prevent individual project or cumulative effects of development (or other projects within the Alameda Creek Watershed) from adversely changing the quality of groundwater in the Niles Cone Groundwater Basin.

ACWD is working in coordination with other agencies to implement a watershed monitoring program consisting of sampling surface water, measuring water quality parameters, and estimating water flow rates at key locations in the watershed. ACWD also patrols Alameda Creek performing visual inspections and collecting samples for water quality analysis. ACWD has constructed and maintains an automated monitoring station located adjacent to Alameda Creek at the west end of Niles Canyon which provides continuous information and signals an alarm to ACWD when there are significant changes in water flow or quality that may affect the operation of ACWD's recharge facilities.

Basin Monitoring

The District performs weekly water level measurements of representative wells in each major aquifer to monitor changes in groundwater levels. A more comprehensive

monitoring program consisting of sampling and measuring water levels is performed in the spring and fall of each year to assess the groundwater quality, water pressures within the basin, and direction of groundwater flow. Production wells are monitored regularly for a wide variety of water quality parameters specified by state and federal regulations. The groundwater recharge area is monitored daily for water level fluctuations to track percolation rates and to schedule water imports.

Because of development, many privately owned water wells that ACWD has utilized in the past for monitoring basin water levels and saline water intrusion have been destroyed. Since these wells are critical to the management of ACWD's groundwater basin, replacement monitoring wells have been included in the Capital Improvement Program. From 1997 through 1999, 32 monitoring wells have been installed as part of the Monitoring Well Construction Project. A total of approximately 60 wells are expected to be installed by 2007 to provide additional geologic information, to replace destroyed wells, and to improve water sample and water level data acquisition through efficiently located and appropriately designed wells.

Wellhead Protection Program

The 1986 Amendments to the Safe Drinking Water Act require each state to establish a Wellhead Protection Program which "protects the wellhead areas of all public water systems from contaminants that may have adverse human health effects." California is relying on local agencies to plan and implement this program. ACWD has initiated the identification of surface and recharge areas vulnerable to contamination for the protection of ACWD's groundwater facilities. The program also includes the identification of potential contaminant sources, development of management practices to reduce the contamination risk, identification of areas to be monitored, and preparation of a contingency/emergency

response plan in the event of a contamination incident. As an example of a management practice, ACWD has worked with the City of Fremont to require a "Do Not Pollute" decal at each storm drain inlet within a development adjacent to the recharge facilities and has mailed a stormwater runoff public education brochure to all houses on streets with storm drains that discharge directly into a recharge pond.

The groundwater portion of the Source Water Assessment Program (SWAP) that is now being required by the California Department of Health Services (DHS) has a similar focus to that of the Wellhead Protection Program. SWAP requires the identification of sensitive surface water and groundwater areas, an inventory of potential threats within those areas, and an assessment of source vulnerability. The primary difference between the programs is that the Wellhead Protection Program additionally identifies management strategies to minimize the potential for groundwater quality impacts. Because of the overlap between these programs, development of the programs will be closely coordinated. Since DHS is requiring a SWAP for all new sources of water, a "pilot" SWAP is currently being prepared for Aquifer Reclamation Program wells that will serve as supply wells for ACWD's future desalination facility. This pilot SWAP will serve as a model for developing a SWAP for all ACWD facilities in the future.

Both of these programs are expected to benefit from the results of the American Water Works Association Research Foundation project being jointly conducted by ACWD and the Lawrence Livermore National Laboratory. The project, titled "Predicting Water Quality Changes from Artificial Recharge Sources to Nearby Wellfields," began in the spring of 1997 and is expected to be completed in 2001. The scope of work includes the characterization and evaluation of groundwater flowing between the percolation ponds and ACWD's production wells using isotopic tracers, age-dating techniques, and production and monitoring well sampling. A major objective of the study is determining groundwater and

chemical travel times within the fastest flow paths between the recharge facilities and the production wells.

ACWD's efforts in developing a Wellhead Protection Program and maintaining a strong public education program have been recognized as a Groundwater Guardian Affiliate by the Groundwater Foundation, a private non-profit educational organization that is dedicated to educating the public about the conservation and protection of groundwater. The Groundwater Guardian Affiliate designation is awarded to entities at the regional level that work to promote shared responsibility for groundwater protection.

Aquifer Reclamation Program

The goal of this program is to remove entrapped saline water from degraded portions of aquifers in the Niles Cone Groundwater Basin in order to increase usable basin storage, to improve overall water quality, and to prevent the movement of this saline water toward production wells. Pumped water from a combination of nine Aquifer Reclamation Program (ARP) wells is discharged to flood control channels in accordance with a NPDES permit issued by the Regional Water Quality Control Board. Operation of this program depends on the annual availability of water supplies to replace the water that is pumped out of the aquifers. In the future, some of the wells used in this program will be converted to supply water to the brackish groundwater desalination facility planned for Newark to supplement ACWD's drinking water supply.

Five other wells are being evaluated as possible additions to the Aquifer Reclamation Program. These wells are former Salinity Barrier Project wells. The Salinity Barrier Project (SBP) was initiated in the late 1970's by ACWD in cooperation with the Department of Water Resources. The plan was to install 14 extraction wells strategically located to create an alignment just inland of the salt evaporator ponds, running parallel

along the entire stretch of ACWD's shoreline. Simultaneous pumping of the wells would create a trough along the alignment to prevent inland migration of saline water originating from the bay and evaporator ponds during drought periods. In addition to preventing new sea water intrusion, SBP operation was planned as a potential augmentation of the Aquifer Reclamation Program during non-drought periods for mitigating historic sea water intrusion in the interior part of the basin. By the late 1980's, five of the fourteen wells were constructed. However, the project was postponed pending further evaluation.

In the course of comprehensive water supply and facilities planning in the 1990's, ACWD determined that operation of the basin below sea level during drought periods is no longer a necessary or desirable strategy relative to other water supply options that have since become available to ACWD. Because the basin is not likely to be operated significantly below sea level during drought periods, SBP is not needed to prevent new sea water intrusion. Although ACWD's groundwater basin strategy no longer includes a salt water barrier, groundwater modeling indicates that pumping these wells may help to improve water quality in the inland portions of the groundwater basin (which is the goal of the Aquifer Reclamation Program), especially if they are pumped during wet periods with high piezometric head. More groundwater modeling work is needed to determine whether their contribution to water quality improvement would justify their activation.

Groundwater Protection Program

ACWD takes an active role in (1) assisting regulatory agencies and industry in identifying sources of potential groundwater contamination, (2) implementing monitoring systems at hazardous materials storage sites, and (3) providing technical oversight for the investigation and cleanup operations at Leaking Underground Fuel Tank (LUFT) and Spills, Leaks, Investigation, and Cleanup (SLIC) sites to assure the protection of the groundwater

basin. Coordination with federal, state, county, and city agencies similarly involved is a key to the success of this program. This program's objectives are to protect the basin from future water quality degradation by ensuring that existing tanks have not leaked and that future chemical releases are quickly identified and controlled.

Since 1988, ACWD informally provided assistance to the California Regional Water Quality Control Board - San Francisco Bay Region (Regional Board) in overseeing the investigation and remediation at LUFT and SLIC sites. In order to memorialize the terms of this participation and to further strengthen the coordination between the Regional Board and ACWD, the agencies entered into a Cooperative Agreement on June 27, 1996. ACWD entered into similar Cooperative Agreements with the Cities of Fremont, Newark, and Union City on March 25, 1997, June 26, 1997, and August 12, 1997 to further strengthen the interagency coordination and cost-effective implementation of groundwater protection within the cities. ACWD also entered into an agreement with the City of Hayward on July 27, 2000 to work cooperatively on sites which threaten or affect water quality in the portion of the City of Hayward that is within ACWD's service area (Hayward Detachment areas).

Well Ordinance Administration

Ordinances to regulate the construction, repair, reconstruction, destruction or abandonment of wells with the boundaries of the Cities of Fremont, Newark, and Union City were adopted by each city (City of Fremont Ordinance No. 950 on June 26, 1973, as amended by Ordinance No. 963 on October 16, 1973; City of Newark Ordinance No. 136 on July 12, 1973; and City of Union City Ordinance No. 109-73 on June 18, 1973). The purpose of the ordinances is:

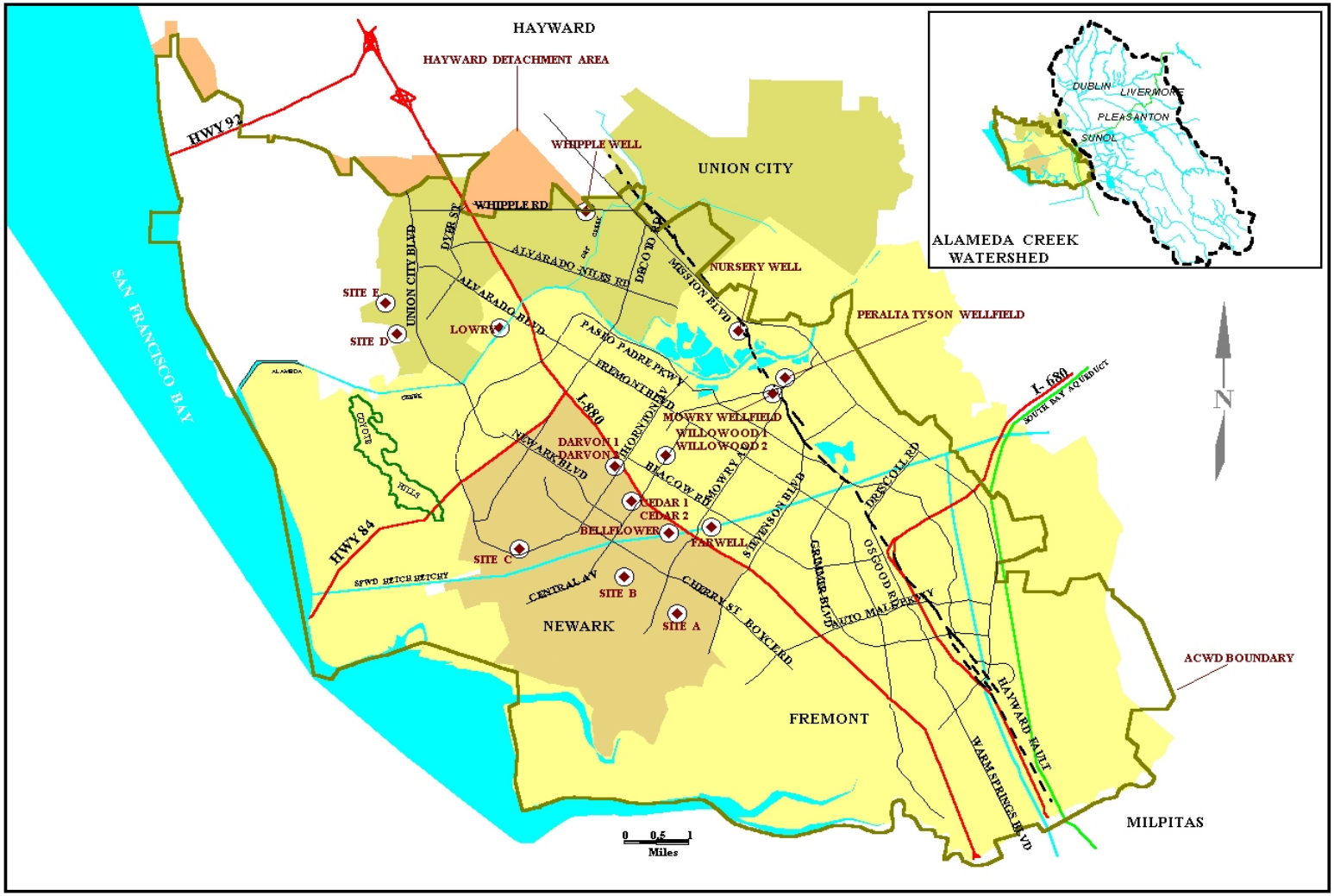
> "to provide for the construction, repair, reconstruction, and destruction of wells, including cathodic protection wells and exploratory holes, to the end

> that the groundwater found wholly or partially within the area of the [cities] will not be polluted or contaminated and that water obtained from water wells will be suitable for the beneficial uses intended and will not jeopardize the health, safety or welfare of the people of the said city, and for the destruction of abandoned wells or wells found to be public nuisances, including cathodic protection wells and exploratory holes, to the end that such wells will not cause pollution or contamination of groundwater or otherwise jeopardize the health, safety or welfare of the people of the said city."

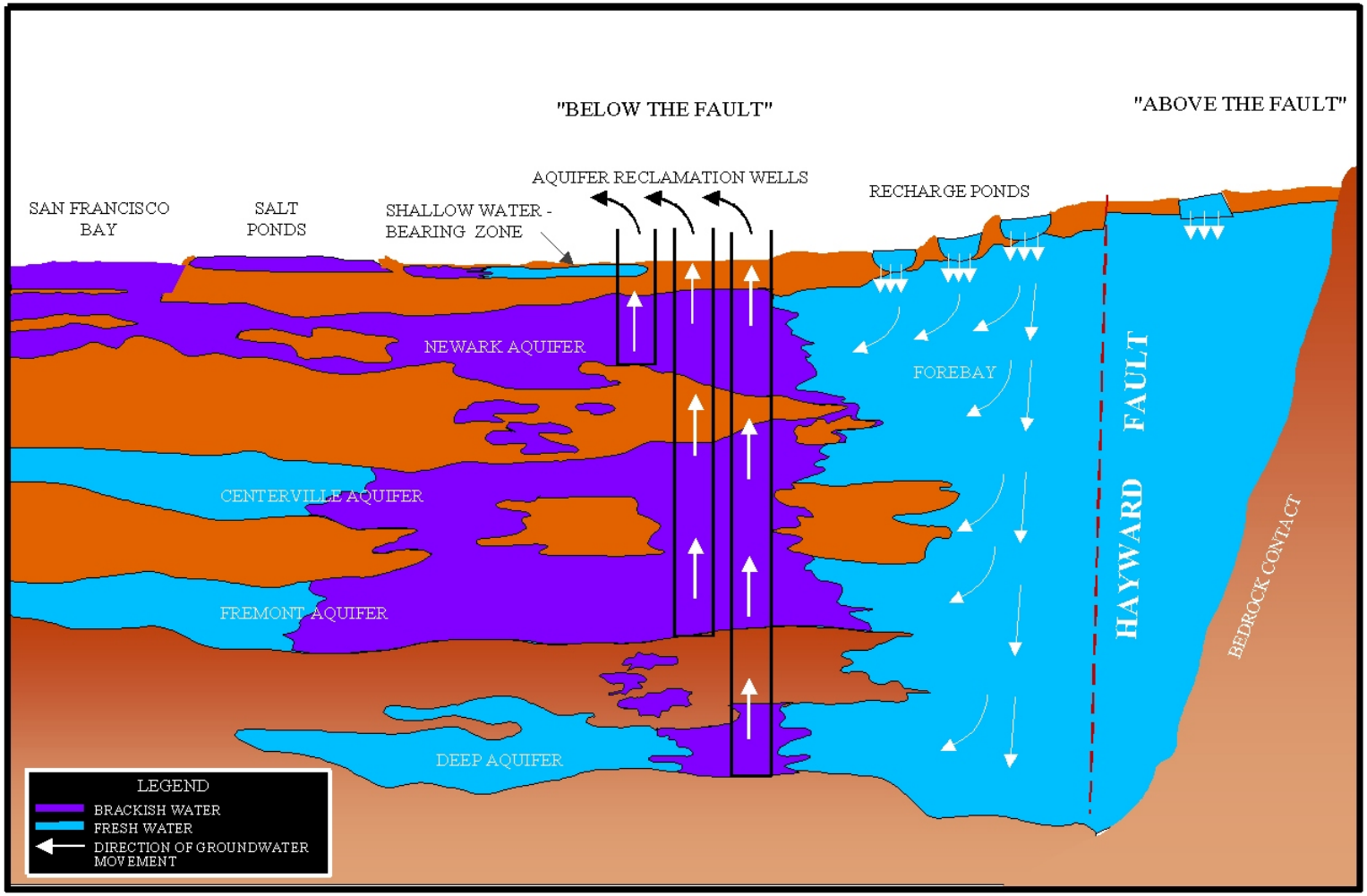
Each of the ordinances designates ACWD as the enforcing agency as defined by the Department of Water Resources and requires that a written permit be obtained from ACWD prior to conducting any of the work described above in each of the cities. By separate resolutions on January 10, 1974, ACWD agreed to implement the city ordinances and authorized the collection of fees to defray the expenses of enforcing them (Resolution No. 74-002 to implement Ordinance No. 950 as amended by Ordinance No. 963 of the City of Fremont; Resolution No. 74-003 to implement Ordinance No. 136 of the City of Newark; Resolution No. 74-004 to implement Ordinance No. 109-73 of the City of Newark). ACWD has also worked with the City of Hayward to amend the City Well Ordinance to require ACWD's approval prior to the construction, operation, or destruction of wells in Hayward Detachment areas.

ACWD has developed a well destruction program in cooperation with the cities. When land use changes are proposed, the cities require the property owners or developers to obtain a letter from ACWD indicating whether wells are located within the boundaries of the development. This process gives ACWD the opportunity to conduct a record and field search for wells before development occurs. If wells are located within the development,

the city and appropriate parties are notified. The destruction of abandoned wells then become a condition for approval of the proposed development or land use change by the city building or planning departments. ACWD also maintains a process to insure that abandoned wells are properly destroyed before water service improvements are accepted.



ATTACHMENT 2 - ALAMEDA COUNTY WATER DISTRICT GROUNDWATER FACILITIES



ATTACHMENT 3 - NILES CONE GROUNDWATER BASIN SCHEMATIC

APPENDIX D
CUWCC Best Management Practices Annual Reporting

CUWCC BMP Retail Coverage Report 2013

Foundational Best Managemant Practices for Urban Water Efficiency

BMP 1.1 Operation Practices

ON TRACK

7 Alameda County Water District

1. Conservation Coordinator provided with necessary resources to implement BMPs?

Name:	Stephanie Nevins
Title:	Water Conservation Supervisor
Email:	stephanie.nevins@acwd.com

2. Water Waste Prevention Documents

WW Document Name	WWP File Name	WW Prevention URL	WW Prevention Ordinance Terms Description
Option A Describe the ordinances or terms of service adopted by your agency to meet the water waste prevention requirements of this BMP.	Alameda County WD_Alameda County WD_7_2013 and 2014_BMP1-1_Ordinance Prohibiting Wasteful Use of Water.pdf		
Option B Describe any water waste prevention ordinances or requirements adopted by your local jurisdiction or regulatory agencies within your service area.			All the cities in ACWD's service area have adopted the CA WELO. Newark and Fremont adopted the State version, Union City adopted the Bay-Friendly version. ACWD supports the cities in their efforts to implement the WELO requirements.
Option C Describe any documentation of support for legislation or regulations that prohibit water waste.			
Option D Describe your agency efforts to cooperate with other entities in the adoption or enforcement of local requirements consistent with this BMP.			
Option E Describe your agency support positions with respect to adoption of legislation or regulations that are consistent with this BMP.			
Option F Describe your agency efforts to support local ordinances that establish permits requirements for water efficient design in new development.	Alameda County WD_Alameda County WD_7_2013 and 2014_BMP1-1_New Development Recs Chart_version 4-17-2013.pdf		ACWD has established water use efficiency standards for new developments. When a water use assessment is triggered by a development, ACWD requires that its water use efficiency recommendations be included in the development plans (see attached).

At Least As effective As No

CUWCC BMP Retail Coverage Report 2013

Foundational Best Managemant Practices for Urban Water Efficiency

BMP 1.1 Operation Practices **ON TRACK**

Exemption	No	

Comments:

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control **ON TRACK**

7 Alameda County Water District

Completed Standard Water Audit Using AWWA Software?	Yes
AWWA File provided to CUWCC?	Yes
Final ACWD FY12-13 AWWA Wttr Loss Control Comm. Wtr Audit Software v4.2.xls	
AWWA Water Audit Validity Score?	72
Complete Training in AWWA Audit Method	Yes
Complete Training in Component Analysis Process?	Yes
Component Analysis?	Yes
Repaired all leaks and breaks to the extent cost effective?	Yes
Locate and Repar unreported leaks to the extent cost effective?	Yes
Maintain a record keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.	Yes

Provided 7 Types of Water Loss Control Info

Leaks Repairs	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost Of Interventions	Water Saved (AF)
264	664371	1946691	0			

At Least As effective As No

Exemption No

Comments:

Component analysis for 2013 was conducted on 12/01/2014. Next one will be done in 2017. * Please note: This section was completed using provisional data.

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.3 Metering With Commodity

ON TRACK

7 Alameda County Water District

Numbered Unmetered Accounts	No
Metered Accounts billed by volume of use	Yes
Number of CII Accounts with Mixed Use Meters	4216
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	Yes
Feasibility Study provided to CUWCC?	Yes

Date: 6/1/2006

Uploaded file name: Alameda County WD_Alameda County WD_7_2013-2014_Metering with Commodity_BMP1-3_Meter Retrofit Summary.pdf

Completed a written plan, policy or program to test, repair and replace meters	Yes
At Least As effective As	No
Exemption	No

Comments:

Number of CII accounts with mixed use meters is assumed to be the number of CII accounts due to the difficulty in identifying mixed use accounts among all CII accounts. The actual number is likely to be substantially less.

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.4 Retail Conservation Pricing

On Track

7 Alameda County Water District

Implementation (Water Rate Structure)

Customer Class	Water Rate Type	Conserving Rate?	(V) Total Revenue Comodity Charges	(M) Total Revenue Fixed Carges
Single-Family	Uniform	Yes	31882219	8872192
Multi-Family	Uniform	Yes	11269641	971144
Commercial	Uniform	Yes	6949046	783433
Industrial	Uniform	Yes	3404133	399824
Institutional	Uniform	Yes	2688933	314184
Dedicated Irrigation	Uniform	Yes	8225348	438728
Fire Lines	Uniform	Yes	0	0
			64419320	**11779505**

Calculate: V / (V + M) **85 %**

Implementation Option: Use Annual Revenue As Reported

☐ Use 3 years average instead of most recent year

Canadian Water and Wastewater Association

Upload file:

Agency Provide Sewer Service: No

At Least As effective As No

Exemption No

Comments:

Union Sanitary District provides waste water service for ACWD's entire service area. Please note: This worksheet is showing not on track even though ACWD is meeting the 70% requirement due to a known database error.

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

7 **Alameda County Water District** **Retail**

Does your agency perform Public Outreach programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

N/A

The name of agency, contact name and email address if not CUWCC Group 1 members

Did at least one contact take place during each quater of the reporting year? Yes

Public Outreach Program List	Number
Newsletter articles on conservation	13
Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets	518
Website	6
Landscape water conservation media campaigns	
General water conservation information	509
Email Messages	2000
Total	**3046**

Did at least one contact take place during each quater of the reporting year? Yes

Number Media Contacts	Number
Articles or stories resulting from outreach	13
Editorial board visits	
News releases	5
Newspaper contacts	13
Radio contacts	
Television contacts	
Written editorials	13
Online Advertisings	
Total	**44**

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

Did at least one website update take place during each quater of the reporting year? Yes

Public Information Program Annual Budget

Annual Budget Category	Annual Budget Amount
General Public Information	544961
Total Amount:	**544961**

Public Outreah Additional Programs
Direct Mail (seasonal irrigation notices, high water use notices)
Booths at fairs/events, presentations to community organizations, demonstration gardens, sponsor landscape workshops
Leak detection and notification program

Description of all other Public Outreach programs

work with local appliance retailers on HEW rebate program.

Comments:

At Least As effective As	No	
Exemption	No	0

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.2 School Education Programs

ON TRACK

7 Alameda County Water District **Retail**

Does your agency implement School Education programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

N/A

Materials meet state education framework requirements? Yes

provide resource materials to teachers about water supply and water conservation including: workbooks, lesson plans, curriculum guides, brochures, videos, posters, maps

Materials distributed to K-6? Yes

ACWD provides workbooks, lesson plans, curriculum guides, brochures, videos, posters, maps, and stickers

Materials distributed to 7-12 students? Yes (Info Only)

ACWD provides lesson plans, curriculum guides, brochures, videos, posters, maps. Number of students reached: 4,300.

Annual budget for school education program: 117054.00

Description of all other water supplier education programs

Program includes classroom instruction, a water conservation school assembly program, distribution of educational resource materials, tours, a mini-grant program.

Comments:

At Least As effective As No

Exemption No 0

CUWCC BMP Retail Coverage Report 2014

Foundational Best Managemant Practices for Urban Water Efficiency

BMP 1.1 Operation Practices

ON TRACK

7 Alameda County Water District

1. Conservation Coordinator provided with necessary resources to implement BMPs?

Name:	Stephanie Nevins
Title:	Water Conservation Supervisor
Email:	stephanie.nevins@acwd.com

2. Water Waste Prevention Documents

WW Document Name	WWP File Name	WW Prevention URL	WW Prevention Ordinance Terms Description
Option A Describe the ordinances or terms of service adopted by your agency to meet the water waste prevention requirements of this BMP.	Copy of Alameda County WD_Alameda County WD_7_2013 and 2014_BMP1-1_Ordinance Prohibiting Wasteful Use of Water.pdf		
Option B Describe any water waste prevention ordinances or requirements adopted by your local jurisdiction or regulatory agencies within your service area.			All the cities in ACWD's service area have adopted the CA WELO. Newark and Fremont adopted the State version, Union City adopted the Bay-Friendly version. ACWD supports the cities in their efforts to implement the WELO requirements.
Option C Describe any documentation of support for legislation or regulations that prohibit water waste.			
Option D Describe your agency efforts to cooperate with other entities in the adoption or enforcement of local requirements consistent with this BMP.			
Option E Describe your agency support positions with respect to adoption of legislation or regulations that are consistent with this BMP.			
Option F Describe your agency efforts to support local ordinances that establish permits requirements for water efficient design in new development.	Copy of Alameda County WD_Alameda County WD_7_2013 and 2014_BMP1-1_New Development Recs Chart_version 4-17-2013.pdf		ACWD has established water use efficiency standards for new developments. When a water use assessment is triggered by a development, ACWD requires that its water use efficiency recommendations be included in the development plans (see attached).

At Least As effective As No

CUWCC BMP Retail Coverage Report 2014

Foundational Best Managemant Practices for Urban Water Efficiency

BMP 1.1 Operation Practices **ON TRACK**

Exemption	No	

Comments:

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control **ON TRACK**

7 Alameda County Water District

Completed Standard Water Audit Using AWWA Software?	Yes
AWWA File provided to CUWCC?	Yes
Revised Final ACWD FY13-14 AWWA Wttr Loss Control Comm. Wtr Audit Software v4.2.xls	
AWWA Water Audit Validity Score?	72
Complete Training in AWWA Audit Method	Yes
Complete Training in Component Analysis Process?	Yes
Component Analysis?	Yes
Repaired all leaks and breaks to the extent cost effective?	Yes
Locate and Repar unreported leaks to the extent cost effective?	Yes
Maintain a record keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.	Yes

Provided 7 Types of Water Loss Control Info

Leaks Repairs	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost Of Interventions	Water Saved (AF)
334	19140	1790531	39			

At Least As effective As No

Exemption No

Comments:

Component analysis for 2013 was conducted on 12/01/2014. Next one will be done in 2017. * Please note: This section was completed using provisional data.

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.3 Metering With Commodity

ON TRACK

7 Alameda County Water District

Numbered Unmetered Accounts	No
Metered Accounts billed by volume of use	Yes
Number of CII Accounts with Mixed Use Meters	4215
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	Yes
Feasibility Study provided to CUWCC?	Yes

Date: 6/1/2006

Uploaded file name: Copy of Alameda County WD_Alameda County WD_7_2013-2014_Metering with Commodity_BMP1-3_Meter Retrofit Summary.pdf

Completed a written plan, policy or program to test, repair and replace meters	Yes

At Least As effective As No

Exemption No

Comments:

Number of CII accounts with mixed use meters is assumed to be the number of CII accounts due to the difficulty in identifying mixed use accounts among all CII accounts. The actual number is likely to be substantially less.

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.4 Retail Conservation Pricing

On Track

7 Alameda County Water District

Implementation (Water Rate Structure)

Customer Class	Water Rate Type	Conserving Rate?	(V) Total Revenue Comodity Charges	(M) Total Revenue Fixed Carges
Single-Family	Uniform	Yes	30281088	13221977
Multi-Family	Uniform	Yes	11384711	1499087
Commercial	Uniform	Yes	7069736	1152874
Industrial	Uniform	Yes	3252668	568175
Dedicated Irrigation	Uniform	Yes	7252839	628791
Institutional	Uniform	Yes	2482628	468058
Fire Lines	Uniform	Yes	0	0
			61723670	**17538962**

Calculate: V / (V + M) **78 %**

Implementation Option: Use Annual Revenue As Reported

☐ Use 3 years average instead of most recent year

Canadian Water and Wastewater Association

Upload file:

Agency Provide Sewer Service: No

At Least As effective As No

Exemption No

Comments:

Union Sanitary District provides waste water service for ACWD's entire service area. Please note: This worksheet is showing not on track even though ACWD is meeting the 70% requirement due to a known database error.

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

7 **Alameda County Water District** **Retail**

Does your agency perform Public Outreach programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

N/A

The name of agency, contact name and email address if not CUWCC Group 1 members

Did at least one contact take place during each quater of the reporting year? Yes

Public Outreach Program List	Number
Newsletter articles on conservation	12
Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets	2035
Website	6
Landscape water conservation media campaigns	
Email Messages	2000
General water conservation information	509
Total	**4562**

Did at least one contact take place during each quater of the reporting year? Yes

Number Media Contacts	Number
Online Advertisings	
Written editorials	26
Television contacts	17
Radio contacts	5
News releases	11
Articles or stories resulting from outreach	26
Editorial board visits	
Newspaper contacts	26
Total	**111**

Did at least one website update take place during each quater of the reporting year? Yes

Public Information Program Annual Budget

Annual Budget Category	Annual Budget Amount
Public Information	584214
Total Amount:	**584214**

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

Public Outreah Additional Programs
Direct Mail (seasonal irrigation notices, high water use notices)
Booths at fairs/events, presentations to community organizations, demonstration gradens, sponsor landscape workshops
leak detection and notification program

Description of all other Public Outreach programs

work with local appliance retailers on HEW rebate program.

Comments:

At Least As effective As No

Exemption No 0

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.2 School Education Programs

ON TRACK

7 Alameda County Water District **Retail**

Does your agency implement School Education programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

N/A

Materials meet state education framework requirements? Yes

provide resource materials to teachers about water supply and water conservation including: workbooks, lesson plans, curriculum guides, brochures, videos, posters, maps

Materials distributed to K-6? Yes

ACWD provides workbooks, lesson plans, curriculum guides, brochures, videos, posters, maps, and stickers

Materials distributed to 7-12 students? Yes (Info Only)

ACWD provides lesson plans, curriculum guides, brochures, videos, posters, maps. Number of students reached: 3,939.

Annual budget for school education program: 118823.00

Description of all other water supplier education programs

Program includes classroom instruction, a water conservation school assembly program, distribution of educational resource materials, tours, a mini-grant program.

Comments:

At Least As effective As No

Exemption No 0

CUWCC BMP Coverage Report 2014

7 Alameda County Water District

Baseline GPCD (1997-2006): 165.56

GPCD in 2014: 111.28

GPCD Target for 2018: 135.80

Biennial GPCD Compliance Table

ON TRACK

		Target		Highest Acceptable Bound	
Year	Report	% Base	GPCD	% Base	GPCD
2010	1	96.4%	**159.60**	100%	**165.60**
2012	2	92.8%	**153.60**	96.4%	**159.60**
2014	3	89.2%	**147.70**	92.8%	**153.60**
2016	4	85.6%	**141.70**	89.2%	**147.70**
2018	5	82.0%	**135.80**	82.0%	**135.80**

APPENDIX E
District Water Shortage Ordinance

ORDINANCE NO. 2014-01

AN ORDINANCE OF ALAMEDA COUNTY WATER DISTRICT DECLARING A WATER SHORTAGE EMERGENCY AND ADOPTING WATER USE REGULATIONS, RESTRICTIONS AND GUIDELINES FOR THE WATER SHORTAGE EMERGENCY.

BE IT ORDAINED by the Board of Directors of ALAMEDA COUNTY WATER DISTRICT as follows:

SECTION 1. DECLARATION OF A WATER SHORTAGE EMERGENCY.

The Board of Directors finds and declares as follows:

(a) The District's primary sources of supplies include: imported water from the State Water Project (40%); imported water from the San Francisco Public Utilities Commission (SFPUC) Regional Water System (20%); and local supplies originating from rainfall and runoff from the Alameda Creek Watershed (40%).

(b) On January 17, 2014, Edmund G. Brown, Governor of California, proclaimed a State of Emergency to exist in the State of California due to severe drought conditions.

(c) On January 31, 2014, the California Department of Water Resources (DWR) announced that the 2014 State Water Project (SWP) allocation for all SWP Contractors is zero percent (0%) of the Contractors' contractual maximum SWP allocations due to the exceptionally dry conditions.

(d) Locally, Calendar Year 2013 was the driest year on record with only 23% of the long-term average precipitation, impacting local surface water and groundwater supplies.

(e) Additional findings supporting the actions in this Ordinance are set forth in the staff report for this Ordinance and the March 13, 2014 staff presentation to the Alameda County Water District Board of Directors which are incorporated into this Ordinance by this reference.

(f) On February 13, 2014, at a properly noticed regular Board meeting, the Board considered whether to declare that a water shortage emergency condition exists within the water service area of the District, and decided to hold a public hearing in March 2014 on this issue and to provide District customers an opportunity to be heard to protest against the declaration and to present their needs to the Board of Directors.

(g) Notice of the public hearing was published pursuant to law one time at least seven days prior to the date of the public hearing in The Argus, a newspaper of general circulation, printed and published within the water service area of the District.

(h) The full text of this Ordinance was published in The Argus at least five days prior to the date of the public hearing.

(i) The full text of this Ordinance was posted in the office of the District and posted on the District's website at least five days prior to the public hearing.

(j) At the public hearing all persons present were given an opportunity to be heard and all persons desiring to be heard were heard.

(k) The public hearing was called, noticed and held in all respects as required by law.

(l) This Board heard and has considered each protest against the water shortage emergency declaration and all comments presented at the public hearing.

(m) The Board of Directors declares that a water shortage emergency condition exists and prevails within the water service area of this District. The water shortage exists by reason of the fact that the ordinary demands and requirements of the water consumers in the Alameda County Water District service area cannot be met and satisfied by the water supplies now available to the District without depleting the water supply or diminishing its quality to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.

SECTION 2. PURPOSE AND AUTHORITY.

The purpose of this Ordinance is to conserve the water supply of the District for the greatest public benefit with particular regard to public health, fire protection and domestic use; to conserve water by reducing and restricting nonessential water use that if continued would constitute waste; and to the extent necessary by reason of drought and the existing water shortage emergency condition, to reduce water use fairly and equitably. This Ordinance is adopted pursuant to the District's authority under Sections 350 et seq. and 31026 et seq. of the California Water Code.

The water supply of the District includes water from the District's distribution system, as well as groundwater from the Niles Cone Groundwater Basin, which the District manages and regulates pursuant to its authority under the Replenishment Assessment Act of the Alameda County Water District, Chapter 1942 of the Statutes of 1961. The Niles Cone Groundwater Basin is an essential component of the District's water supply and must be conserved during this water shortage emergency. This Ordinance applies to all water from the District's water distribution system and to all wells, public and private, within the District's service boundary that produce water from the Niles Cone Groundwater Basin.

SECTION 3. EFFECT OF ORDINANCE.

This Ordinance shall take effect immediately, shall supersede and control over any other ordinance or regulation of the District in conflict herewith, and shall remain in effect until the Board of Directors declares that the water shortage emergency has ended.

SECTION 4. WATER USE LIMITATIONS.

(a) Mandatory Restrictions on Water Use.
During the water shortage emergency condition, and to preserve the water supply for the greatest public benefit with particular regard to domestic use, sanitation, and fire protection, the following uses of water are prohibited:

(1) Use of water in violation of ACWD Ordinance No. 2008-01 Prohibiting Wasteful Use of Water;

(2) Use of water for the irrigation of lawns or other landscaped areas on consecutive days. With the exception of Item (3) below, landscape irrigation cannot be more frequent than:

- One day per week for the period of April 1 through May 31;
- Two days per week for the period of June 1 through September 30;
- One day per week for the period of October 1 through November 30.
- One day per week for the period of December 1 through March 31. Landscape irrigation during this period should be avoided except during an extended dry period. During this period landscape irrigation while it is raining is prohibited.

This section does not apply to the following categories of use:

- Watering or irrigating by use of a hand-held bucket or similar container.
- Watering for very short periods of time for the express purpose of adjusting or repairing an irrigation system.
- Maintenance of existing landscape necessary for fire protection.
- Maintenance of existing landscape for soil erosion control.
- Maintenance of plant materials identified to be rare or essential to the well-being of protected species.
- Maintenance of turf at sports fields, playing fields, and other active recreation use areas within public parks, school grounds, golf course greens, and day care centers, provided that such irrigation does not exceed 3 days per week for the period of June 1through September 30 and 2 days per week for the period of October 1 through May 31. Landscape irrigation during the period of December 1 through March 31 should be avoided except during an extended dry period.
- Actively irrigated environmental mitigation projects.
- Maintenance of vegetation, including fruit trees and shrubs, intended for consumption.

Increasing the frequency and/or duration of irrigation run times to offset the above restrictions on days of allowable irrigation is contrary to the purpose of this Ordinance, and is therefore prohibited.

(3) Use of water for the irrigation of new landscape installed after January 1, 2014 cannot be more frequent than three times per week throughout the year, provided that all of the following conditions are met:

a. The newly installed landscape replaces turf grass that was regularly maintained and irrigated.
b. The new landscape consists solely of drought tolerant plants and is consistent with the requirements for drought tolerant landscaping established in the District's Turf Replacement Program.
c. The new landscape is irrigated solely by drip irrigation, or another low-volume irrigation type such as micro-spray, micro-jet or micro-bubbler where no emitter produces more than 2 gallons of water per hour, or by hose equipped with a quick-acting positive shutoff nozzle.
d. Mulch is used around the new landscaping to minimize evaporative losses.

(4) Use of water for lawn or garden watering, or any other landscape irrigation, in a manner which results in excessive ponding, flooding and/or excessive runoff in gutters or other waterways, patios, driveways, walks or streets;

(5) Use of water for washing sidewalks, walkways, driveways, patios, parking lots, tennis courts or other hard-surfaced areas;

(6) Use of hoses for any purpose, including washing cars, boats, trailers or other vehicles and machinery, without a quick-acting positive shutoff nozzle;

(7) The use of water for cleaning building or mobile home exteriors, including windows, except for the preparation of such exterior surfaces for the purpose of repair or repainting (only allowed with the use of a pressurized washing device equipped with a quick-acting positive shutoff nozzle);

(8) The draining and refilling of all existing swimming pools, except for protection of public health and safety;

(9) Use of single pass cooling systems in new (non-residential) connections ;

(10) Use of non-recirculating systems in new conveyer car wash and commercial laundry systems;

(11) Use of non-recycling decorative water fountains.

Depending on the continued severity of the drought and water shortage emergency, the District may update this Ordinance to impose additional water use restrictions as conditions warrant. Any updates to this Ordinance will be adopted pursuant to the District's authority under Sections 350 et seq. and 31026 et seq. of the California Water Code.

(b) Enforcement of Restrictions.

(1) Written Warning: If the District determines that a customer is using water in violation of this Ordinance, the District will send a written warning to the customer that lists the name and address of the person on the account, identifies the wasteful use of water that violates the mandatory restrictions on water use, requests that the customer

stop such wasteful use, informs the customer about the process for applying for an exception from the requirements of this Ordinance, and informs the customer that failure to comply with this Ordinance may result in the termination of service.

(2) On-site Notification: The District may, after issuing a written warning, and if the customer does not request an exception, conduct a follow-up visit in order to ascertain whether wasteful use of water is still occurring. In the event that continued waste of water that violates the mandatory restrictions on water use is observed, and no exception has been granted, the District will make reasonable efforts to notify an adult residing at the property if a residential account or an adult working on the property if a non-residential account, and will issue a second written warning by on-site notification of wasteful water use and the customer will be charged the field service visit charge established in the District's Rate and Fee Schedule, Section 3A. This second written warning will include all the information included in the first written warning and will be hand delivered to the adult on the premises or posted on the premises.

(3) Termination of Water Service: In the event that District personnel observe continued waste of water that violates the mandatory restrictions on water use occurring at a customer's premises more than 48 hours after the on-site notification, it shall be deemed to be a willful violation of the mandatory restrictions on water use, and the General Manager may authorize termination of water service.

(4) Restoring Water Service: The reconnection charge established in the District's Rate and Fee Schedule, Section 3E must be paid before the District will restore service. In addition, the customer must have stopped the wasteful use of water and have paid all charges owed to the District under this Ordinance, and all other rates and fees owed, before the District will restore water service.

(c) Violation is a Misdemeanor.

Pursuant to California Water Code Section 31029, use of water in violation of the restrictions on water use set forth in Section 4 of this Ordinance is a misdemeanor.

SECTION 5. WATER USE GUIDELINES.

During the water shortage emergency condition, customers are urged to adhere to the following guidelines to conserve the limited water supply available:

(1) Use water for beneficial purposes in a manner which minimizes the use of water, and repair leaks as soon as possible.

(2) Replace non-conserving plumbing fixtures (e.g. toilets, showerheads, faucets, clothes washers) with newer, water efficient models.

(3) Reduce indoor water use by taking the following actions:

a. Turn off the tap while brushing teeth, shaving, and washing hands
b. Run dishwashers and washing machines with full loads only
c. Take shorter showers

(4) Landscape Guidelines:

Irrigate early in the morning (before 10:00 a.m.), to minimize evaporation.

Installation of new landscaping should utilize best known irrigation and horticultural practices for efficient water use.

Existing systems should be evaluated and repaired to minimize evaporation.

Use drought tolerant plant species wherever possible for replacement and at all new landscape installations. Installation of non-drought tolerant landscaping, including turf, should be avoided.

Use non-potable water from rain water capture and/or graywater for landscape irrigation. Graywater should not be used in vegetable gardens where food is a root crop or touches the ground surface. Regulations for the design and construction of graywater systems can be found in Chapter 16A of the California Plumbing Code. Most graywater systems also require permits from the local cities.

(5) Use non-potable water for construction purposes unless it is not appropriate and/or not available. If reclaimed water is used, the proposed conditions of use must meet the requirements of the San Francisco Bay Regional Water Quality Control Board.

(6) Non-residential customers should utilize systems which recycle water when possible.

(7) Restaurants should serve water to customers only when requested.

SECTION 6. APPLICATION PROCEDURE FOR EXCEPTIONS.

Consideration of written applications for exceptions regarding the mandatory restrictions on water use set forth in Section 4 shall be as follows:

(a) A customer may submit a written application for an exception to the mandatory restrictions on water use to the District's Drought Management Coordinator or designee. The application must be on the District's form and must include the customer name, account number(s), a description of the proposed water use and estimated duration and quantity of water use (e.g., gallons per day), and a description of the reason an exception is requested.

(b) The Drought Management Coordinator or designee will consider each application for an exception to the mandatory restrictions on water use based on the criteria established for residential and nor-residential customers. If the criteria is satisfied, the Drought Management Coordinator or designee may grant exceptions for reasons that include

benefits and/or needs of water to be used, potential adverse economic impacts, implementation complexities/issues, and mitigation measures/offsets.

(c) A customer may appeal a denial of an application by submitting a written appeal to the General Manager on the District's form and include the reasons why the customer disagrees with the denial.

SECTION 7. EXEMPTION FROM CEQA.

The District Board of Directors finds that the actions taken in this Ordinance are exempt from provisions of the California Environmental Quality Act of 1970 because they are immediate actions necessary to prevent or mitigate an emergency, as described in section 15269(c), and to assume the maintenance, restoration, or enhancement of a natural resource, as described in section 15307, of the Guidelines promulgated under said Act.

SECTION 8. SEVERABILITY.

If any provision of this Ordinance is held to be invalid or unenforceable, that holding will not affect the remainder of the Ordinance, which shall remain in full force and effect.

SECTION 9. PUBLICATION AND POSTING OF ORDINANCE.

The Board of Directors direct that the full text of this Ordinance be published in The Argus and that a certified copy of the full text of this Ordinance be posted in the Office of the District and on the District's website within ten days from the date this Ordinance is adopted and identifying how each Director voted on this Ordinance.

PASSED AND ADOPTED this 13th day of March, 2014, by the following vote:

AYES: Directors Koller, Gunther, Huang, and Sethy

NOES: Director Weed

ABSENT: None

/s/ PAUL S. SETHY
Paul S. Sethy, President
Board of Directors
Alameda County Water District

ATTEST:

/s/ ANDREW WARREN
Andrew Warren, Assistant District Secretary
Alameda County Water District

APPROVED AS TO FORM:

/s/ PATRICK T. MIYAKI
Patrick T. Miyaki, Attorney
Alameda County Water District

APPENDIX F
District Board of Directors Resolution No. 16-039
Adopted on June 9, 2016

RESOLUTION NO. 16-039

OF BOARD OF DIRECTORS OF ALAMEDA COUNTY WATER DISTRICT ADOPTING THE 2015-2020 URBAN WATER MANAGEMENT PLAN AND THE SBX7-7 COMPLIANCE METHOD

WHEREAS, pursuant to the Urban Water Management Planning Act, California Water Code Sections 10610 *et seq.* (Act), the Alameda County Water District (District) must prepare and adopt an Urban Water Management Plan (UWMP);

WHEREAS, on June 9, 2011, with the adoption of the 2010-2015 UWMP, the District adopted, a method for determining its urban water use target for compliance with the Water Conservation Bill of 2009, California Water Code Sections 10608 et seq. (SBX7-7);

WHEREAS, with the 2015-2020 UWMP, the District may update its urban water use target for compliance with the Water Conservation Bill of 2009;

WHEREAS, the analysis and selection of the District's SBX7-7 compliance method is set forth in its UWMP;

WHEREAS, the District met the procedural requirements of both the Act and SBX7-7 by doing all of the following: (1) coordinated the preparation of the UWMP with other appropriate agencies in the area; (2) notified the County of Alameda and cities of Fremont, Union City, and Newark that the District will be reviewing the UWMP at least 60 days prior to the public hearing; (3) distributed notice of the availability of the draft UWMP to numerous local and regional agencies and other parties; (4) made the draft UWMP available at the District headquarters; (5) posted the draft UWMP on the District's website; (6) encouraged active involvement of different elements of the population and the community; (7) reviewed the draft UWMP assumptions at the regular, publicly noticed, April 12 Board meeting; (8) published a

notice of the June 9 public hearing in the local newspaper once a week for two successive weeks beginning at least fourteen days prior to the public hearing and posted that notice on the District's website; (9) held a public hearing inviting public input regarding the draft UWMP and the SBX7-7 compliance method, including the District's SBX7-7 implementation plan, the economic impacts of that implementation plan, and the method selected for determining the District's urban water use target; and (10) considered all comments received during the public hearing; and

WHEREAS, the SBX7-7 compliance method recommended by staff is method four, the method developed by the California Department of Water Resources that considers local and regional factors (Method Four) and using the default indoor residential savings assumptions developed by DWR, based on an analysis of each of the four alternative methodologies as described in the UWMP.

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

1. The Board readopts Method Four for determining its urban water use target for compliance with SBX7-7.
2. The Board adopts the 2015-2020 Urban Water Management Plan as presented by staff, and authorizes staff to incorporate the public hearing comments as approved by the Board after the close of the public hearing.
3. The Board authorizes and directs the General Manager to submit copies of the final UWMP to the Department of Water Resources, the California State Library, the County of Alameda, and the cities of Fremont, Newark, and Union City by July 9, 2016.

PASSED AND ADOPTED this 9th day of June, 2016, by the following vote:

AYES: Directors Weed, Gunther, Koller, Sethy, and Huang

NOES: None

ABSENT: None

Judy C. Huang, President
Board of Directors
Alameda County Water District

ATTEST:

Andrew Warren, Assistant District Secretary
Alameda County Water District
(Seal)

APPROVED AS TO FORM:

Patrick T. Miyaki, Attorney
Alameda County Water District

CERTIFICATE

I, the undersigned District Secretary of ALAMEDA COUNTY WATER DISTRICT, do hereby certify that the foregoing is a full, true and correct copy of a Resolution of the Board of Directors of ALAMEDA COUNTY WATER DISTRICT, a political subdivision, which said Resolution was duly adopted at a meeting of said Board regularly held on June 9, 2016, that a copy of said Resolution was forthwith duly entered in the minutes of said meeting of said Board, and that the same is in full force and effect.

Dated: June 13, 2016

Gina Markou, District Secretary
Alameda County Water District

APPENDIX G
DWR Standard Tables and SBX7-7 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
CA0110001	Alameda County Water District	83,232	38,579
	TOTAL	83232	38,579
NOTES: Number of connections as of December 2015. Volumes given in Acre-Feet. Volume for CY2015 includes both total District production plus private well pumping.			

Table 2-2: Plan Identification (Select One)		
☑	Individual UWMP	
☐	Regional UWMP (RUWMP) *(checking this triggers the next line to appear)*	
	Select One:	
	☐	RUWMP includes a Regional Alliance
	☐	RUWMP does not include a Regional Alliance
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 Day that the Fiscal Year Begins (dd/mm)	
dd/mm	
Units of Measure Used in UWMP (select from Drop down)	
Unit	AF
NOTES: Ref. Section 1.5, District Background	

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)*
California Department of Water Resources (DWR)
San Francisco Public Utilities Commission (SFPUC)
NOTES: Ref. Sect. 3.2, Sources of Supply and Supply Availability.

Table 3-1 Retail: Population - Current and Projected						
Population Served	2015	2020	2025	2030	2035	2040*(opt)*
	344,278	353,300	367,600	382,500	398,700	415,600
NOTES: Ref. Table 1-3.						

Table 4-1 Retail: Demands for Potable and Raw Water - Actual			
Use Type *(Add additional rows as needed)*	2015 Actual		
Use 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	14,848
Multi-Family		Drinking Water	6,896
Commercial		Drinking Water	4,495
Industrial		Drinking Water	2,185
Institutional/Governmental		Drinking Water	1,119
Landscape		Drinking Water	3,012
Other	Other Distribution System Demands	Drinking Water	162
Losses	Gross Non-Revenue Water (difference between metered production and billed consumption)	Drinking Water	3,805
Other	Private Groundwater Pumping	Raw Water	2,057
Saline water intrusion barrier	Aquifer Recovery Program (ARP) Pumping	Raw Water	11,000
Saline water intrusion barrier	Saline and Other Groundwater Outflows to SF Bay Aquifer	Raw Water	7,700
		TOTAL	57,279
NOTES: CY2015 consumption totals. "Drinking Water" deliveries plus Private Groundwater Pumping are billed CY2015 totals. Saline water intrusion: ARP Pumping reflects metered totals; "Saline and Other Groundwater Outflows" estimated by MODFLOW modeling analysis.			

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*				
Use 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		19,700	20,600	20,500	20,300	20,100
Multi-Family		9,800	10,900	11,300	11,500	11,700
Commercial		6,600	7,200	7,700	8,100	8,400
Industrial		4,100	4,700	5,000	5,100	5,200
Institutional/Governmental		3,900	4,700	5,300	5,300	5,300
Other		300	300	300	300	300
Losses		2,800	3,100	3,200	3,200	3,200
Other	Groundwater System	16,200	16,200	16,200	16,200	16,200
TOTAL		63,400	67,700	69,500	70,000	70,400
NOTES: Ref. Table 2-5; includes estimated Additional Conservation Program Savings as well as Drought Demand Factor within each use type						

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*	57,279	63,400	67,700	69,500	70,000	70,400
Recycled Water Demand *From Table 6-4*	3,065	3,000	3,000	3,000	3,000	3,000
TOTAL WATER DEMAND	60,344	66,400	70,700	72,500	73,000	73,400
NOTES: Ref. Tables 2-1 and 2-5.						

Table 4-4 Retail: 12 Month Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss
01/2015	2613
NOTES: Ref. Appendix H.	

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)*	Yes
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.	Section 2.4, pp. 2-6 to 2-6
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes
NOTES: Ref. Section 2.4.	

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	*1995*	*2004*	*170*	*154*	*137*
5 Year	*2003*	*2007*	*160*		
*All values are in Gallons per Capita per Day (GPCD)					
NOTES: Ref. Section 8.1.					

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" for adjustments not used *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		
100	154	0	0	0	0	100	100	Yes
**All values are in Gallons per Capita per Day (GPCD)*								
NOTES: Ref. (District UWMP) Table 8-1 and Table 8-6, and SB X7-7 Table 9.								

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	Niles Cone Groundwater Basin	25,400	25,100	21,800	21,700	19,100
	TOTAL	25,400	25,100	21,800	21,700	19,100
NOTES: Ref. Table 4-2 [FY].						

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 in 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						
Union Sanitary District	Metered	24,226	Union Sanitary District	Alvarado Wastewater Treatment Plant	Yes	No
Total Wastewater Collected from Service Area in 2015:		24,226				
NOTES: Ref. Section 6.3.						

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										
Alvarado Wastewater Treatment Plant	East Bay Dischargers Authority	San Francisco Bay	n/a	Bay or estuary outfall	No	Secondary, Undisinfected	24,226	21,161	3,065	0
						Total	24,226	21,161	3,065	0
NOTES: Data supplied by USD. Ref. Section 6.3. Level of treatment does not fit DWR categories, which may be better characterized as "Secondary, Disinfected." Union Sanitary District is not required to meet a total coliform limit of 23 MPN/100 mL , rather the limit is 500 MPN/100 mL for fecal coliform as a geometric mean. Recycled Water is beneficial wetland habitat freshwater supply and does not offset demand for potable water. See DWR Table 6-4.										

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:		Union Sanitary District							
Name of Agency Operating the Recycled Water Distribution System:		Union Sanitary District							
Supplemental Water Added in 2015									
Source of 2015 Supplemental Water									
Beneficial Use Type *These are the only Use Types that will be recognized by the DWR online submittal tool*	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)								
Golf course irrigation								
Commercial use								
Industrial use								
Geothermal and other energy production								
Seawater intrusion barrier								
Recreational impoundment								
Wetlands or wildlife habitat	Freshwater Source for Marsh Ecosystem	Secondary, Disinfected - 23	3,065	3,000	3,000	3,000	3,000	3,000
Groundwater recharge (IPR)								
Surface water augmentation (IPR)								
Direct potable reuse								
Other: Type of Use								
		Total:	3,065	3,000	3,000	3,000	3,000	3,000
IPR - Indirect Potable Reuse								
NOTES: Level of treatment to Marsh: Secondary, Disinfected. Union Sanitary District is not required to meet a total coliform limit of 23 MPN/100 mL on the marsh discharge. The limit is 500 MPN/100 mL for fecal coliform as a geometric mean. Projected wetland beneficial use numbers based on 2015 levels; assumption made by ACWD and not provided by USD and may not reflect any potential future plans USD or East Bay Park District may have to change discharge levels.									

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 *These are the only Use Types that will be recognized by the WUEdata online submittal tool*		2010 Projection for 2015	2015 actual use
Agricultural irrigation			
Landscape irrigation (excludes golf courses)			
Golf course irrigation			
Commercial use			
Industrial use			
Geothermal and other energy production			
Seawater intrusion barrier			
Recreational impoundment			
Wetlands or wildlife habitat		3,900	3,065
Groundwater recharge (IPR)			
Surface water augmentation (IPR)			
Direct potable reuse			
Other	Required for this use		
Total		3,900	3,065
NOTES: Average annual use as stated in ACWD 2010 UWMP.			

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.		
Sect. 6.5, p. 6-3	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			
		Total	0
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 User may select more than one.*	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						
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				
Purchased or Imported Water	SWP Supplies (including previously banked SWP supplies from Semitropic) Used at District Facilities	14,798	Raw Water	
Supply from Storage	From Lake Del Valle	1,763	Raw Water	
Purchased or Imported Water	SFPUC	6,567	Drinking Water	
Desalinated Water	Newark Desal Facility	8,228	Drinking Water	
Groundwater	Net Local GW Recharge	18,400	Raw Water	
	Total	49,756		0

NOTES: These supplies are CY2015. Net Groundwater Recharge numbers depend on metered diversions plus incidental recharge estimated by MODFLOW analysis.

Table 6-9 Retail: Water Supplies — Projected											
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	Additional Detail on Water Supply	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											
Purchased or Imported Water	SWP Supplies Used at District Facilities	27,500		27,500		27,500		27,500		27,500	
Purchased or Imported Wate	SFPUC	15,400		15,400		15,400		15,400		15,400	
Groundwater	Groundwater Recharge	24,200		23,900		23,600		23,300		23,000	
Groundwater	Groundwater Storage	0		0		0		0		0	
Surface water	Lake Del Valle	5,000		5,000		5,000		5,000		5,000	
Desalinated Water	Newark Desal Facility	5,100		5,100		5,100		5,100		5,100	
	Total	77,200	0	76,900	0	76,600	0	76,300	0	76,000	0
NOTES: From Table 9-2 "Normal Year"											

Table 7-1 Retail: Basis of Water Year Data			
Year Type	Base Year	Available Supplies if Year Type Repeats	
		Agency may provide volume only, percent only, or both	
		Volume Available	% of Average Supply
Average Year	1971	77,900	100%
Single-Dry Year	1977	54,300	
Multiple-Dry Years 1st Year	1987	58,900	
Multiple-Dry Years 2nd Year	1988	54,500	
Multiple-Dry Years 3rd Year	1989	78,900	
Multiple-Dry Years 4th Year *Optional*	1990	56,700	
Multiple-Dry Years 5th Year *Optional*	1991	57,600	
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.			
NOTES: Ref. Tables 9-2, 9-3 and 9-4.			

Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 *(Opt)*
Supply totals *(autofill from Table 6-9)*	77,200	76,900	76,600	76,300	76,000
Demand totals *(autofill from Table 4-3)*	63,400	67,800	69,500	69,900	70,400
Difference	13,800	9,100	7,100	6,400	5,600
NOTES: Values autofilled using data from other DWR tables.					

Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals	55,300	55,700	56,100	56,500	56,800
Demand totals	59,500	63,900	65,800	66,400	67,000
Difference	(4,200)	(8,200)	(9,700)	(9,900)	(10,200)
NOTES: Ref. Table 9-3.					

Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	58,900	65,600	65,700	65,800	66,000
	Demand totals	51,900	64,900	66,800	68,400	68,800
	Difference	7,000	700	(1,100)	(2,600)	(2,800)
Second year	Supply totals	54,500	59,000	59,800	60,500	61,200
	Demand totals	52,800	61,900	63,700	64,900	65,200
	Difference	1,700	(2,900)	(3,900)	(4,400)	(4,000)
Third year	Supply totals	78,900	77,800	77,700	77,500	77,300
	Demand totals	54,200	61,700	63,400	64,600	65,200
	Difference	24,700	16,100	14,300	12,900	12,100
Fourth year *(optional)*	Supply totals	56,700	59,600	61,500	63,400	65,300
	Demand totals	56,200	62,300	64,000	65,100	65,700
	Difference	500	(2,700)	(2,500)	(1,700)	(400)
Fifth year *(optional)*	Supply totals	57,600	57,900	58,100	58,200	58,400
	Demand totals	57,600	61,600	63,000	63,200	63,300
	Difference	0	(3,700)	(4,900)	(5,000)	(4,900)
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
NOTES: Ref. Tables 9-4, 9-5, 9-6, 9-7, and 9-8.						

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		
Stage 1	0-10%	Minimal shortage (moderate impact to one source of supply or minimal impact to more than one source), only voluntary actions required to meet demands and prepare for subsequent dry years.
Stage 2	10-20%	Moderate Shortage (severe impacts to one source or moderate impacts to more than one source), mandatory actions required to meet demands and prepare for subsequent dry years.
Stage 3	20-30%	Severe Shortage (major impacts to more than one source of supply)
Stage 4	30-50%	Critical Shortage (major impacts to all sources of supply)
[1] *One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.*		
NOTES: Ref. Tables 10-3a through 10-3d.		

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			
All Stages	Landscape - Restrict or prohibit runoff from landscape irrigation		Yes
Stage 2-4	Landscape - Limit landscape irrigation to specific times		Yes
Stage 2-4	Landscape - Limit landscape irrigation to specific days		Yes
Stage 3-4	Landscape - Prohibit certain types of landscape irrigation	Drip only, or other low flow irrigation emitters.	Yes
Stage 4	Landscape - Prohibit all landscape irrigation		Yes
Stage 2-4	Landscape - Other landscape restriction or prohibition	Limit the number of days per week customers can water landscapes.	Yes
Stage 3-4	CII - Lodging establishment must offer opt out of linen service		Yes
Stage 3-4	CII - Restaurants may only serve water upon request		Yes
Stage 2-4	CII - Other CII restriction or prohibition	Use of drought water budgets (based on ET for landscape use); audits to identify non-efficient use or equipment	Yes
Stage 2-4	Water Features - Restrict water use for decorative water features, such as fountains		Yes
Stage 3-4	Pools and Spas - Require covers for pools and spas		Yes
Stage 2-4	Other water feature or swimming pool restriction	No draining or refilling unless health and safety issue exists (Stage 2-4)	Yes
All Stages	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner		Yes
All Stages	Other - Require automatic shut of hoses		Yes
Stage 2-4	Other - Prohibit use of potable water for washing hard surfaces		Yes
Stage 4	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Can use reclaimed/captured water when washing at home.	Yes
NOTES: Ref. Tables 10-3a through 10-3d.			

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 Stages	Expand Public Information Campaign	
All Stages	Improve Customer Billing	Bills have a customer's historical use, average gallons per day use by billing period, and comparisons to average annual use for customers in the same lot-sized grouping
All Stages*	Increase Frequency of Meter Reading	*Consideration of AMI for some customers - ongoing feasibility study.
All Stages	Offer Water Use Surveys	
All Stages	Provide Rebates on Plumbing Fixtures and Devices	
All Stages	Provide Rebates for Landscape Irrigation Efficiency	Weather-based irrigation controller rebates
All Stages	Provide Rebates for Turf Replacement	
Stage 2-4	Decrease Line Flushing	
Stage 2-4	Reduce System Water Loss	
Stage 2-4	Increase Water Waste Patrols	Cross-training of District staff to identify Ordinance violations and waste.
Stage 3-4	Moratorium or Net Zero Demand Increase on New Connections	Temporary restrictions on supply to new developments and/or requirements to implement extreme water use efficiency measures, and net zero increase for new developments (stage 4).
Stage 2-4	Implement or Modify Drought Rate Structure or Surcharge	
All Stages	Other	Coordination with all stakeholders (cities, schools, campuses, hospitals, community groups, etc.) on community outreach and drought action programs.
NOTES: Ref. Tables 10-3a through 10-3d.		

Table 8-4 Retail: Minimum Supply Next Three Years			
	2016	2017	2018
Available Water Supply	55,300	56,600	62,200
NOTES: Ref. Table 10-5			

Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Fremont	☑	☑
Newark	☑	☑
Union City	☑	☑
Hayward	☑	☑
San Jose	☐	☑
Milpitas	☑	☑
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Alameda County	☑	☑
Santa Clara County	☑	☑
	☐	☐
NOTES: Ref. Ch. 1.		

SB X7-7 Table 0: Units of Measure Used in UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent with Table 2-3*
NOTES:

SB X7-7 Table-1: Baseline Period Ranges

Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	56,383	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	1995	
	Year ending baseline period range[3]	2004	
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:

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:	

SB X7-7 Table 3: Service Area Population		
Year		Population
10 to 15 Year Baseline Population		
Year 1	1995	278,182
Year 2	1996	280,812
Year 3	1997	286,734
Year 4	1998	295,661
Year 5	1999	304,006
Year 6	2000	**312,753**
Year 7	2001	316,401
Year 8	2002	319,589
Year 9	2003	319,048
Year 10	2004	317,523
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2003	319,048
Year 2	2004	317,523
Year 3	2005	316,780
Year 4	2006	316,304
Year 5	2007	317,739
2015 Compliance Year Population		
2015		344,278
NOTES: 2015 estimate based on CaDOF report E-5_2015 (rev May 2015)		

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	1995	52,784	-	-	-	-	-	52,784
Year 2	1996	56,619	-	-	-	-	-	56,619
Year 3	1997	60,381	-	-	-	-	-	60,381
Year 4	1998	54,711	-	-	-	-	-	54,711
Year 5	1999	57,381	-	-	-	-	-	57,381
Year 6	2000	59,632	-	-	-	-	-	59,632
Year 7	2001	58,738	-	-	-	-	-	58,738
Year 8	2002	59,118	-	-	-	-	-	59,118
Year 9	2003	57,660	-	-	-	-	-	57,660
Year 10	2004	58,932	-	-	-	-	-	58,932
Year 11	0	-			-		-	-
Year 12	0	-			-		-	-
Year 13	0	-			-		-	-
Year 14	0	-			-		-	-
Year 15	0	-			-		-	-
10 - 15 year baseline average gross water use								**57,596**
5 Year Baseline - Gross Water Use								
Year 1	2003	57,660			-		-	57,660
Year 2	2004	58,932			-		-	58,932
Year 3	2005	56,108			-		-	56,108
Year 4	2006	55,392			-		-	55,392
Year 5	2007	57,065			-		-	57,065
5 year baseline average gross water use								**57,031**
2015 Compliance Year - Gross Water Use								
2015		38,579	-		-		-	**38,579**

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

NOTES:

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)

Complete one table for each source.

Name of Source	Treated State Water Project
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	1995	17,590		17,590
Year 2	1996	11,873		11,873
Year 3	1997	10,911		10,911
Year 4	1998	11,340		11,340
Year 5	1999	14,327		14,327
Year 6	2000	17,656		17,656
Year 7	2001	17,647		17,647
Year 8	2002	19,764		19,764
Year 9	2003	12,548		12,548
Year 10	2004	14,081		14,081
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	12,548		12,548
Year 2	2004	14,081		14,081
Year 3	2005	10,044		10,044
Year 4	2006	12,552		12,552
Year 5	2007	15,407		15,407
2015 Compliance Year - Water into Distribution System				
2015		14,798		14,798

** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: SWP Supply Treated at Surface Water Treatment Plants

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	San Francisco Regional			
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	1,995	11,632		11,632
Year 2	1,996	12,973		12,973
Year 3	1,997	13,993		13,993
Year 4	1,998	11,981		11,981
Year 5	1,999	14,245		14,245
Year 6	2,000	12,777		12,777
Year 7	2,001	13,320		13,320
Year 8	2,002	13,812		13,812
Year 9	2,003	13,325		13,325
Year 10	2,004	12,744		12,744
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	13,325		13,325
Year 2	2,004	12,744		12,744
Year 3	2,005	11,835		11,835
Year 4	2,006	11,837		11,837
Year 5	2,007	14,740		14,740
2015 Compliance Year - Water into Distribution System				
2015		6,567		6,567
** 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	Treated Lake Del Valle Supply			
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	1,995	4,056		4,056
Year 2	1,996	10,099		10,099
Year 3	1,997	10,931		10,931
Year 4	1,998	11,135		11,135
Year 5	1,999	5,342		5,342
Year 6	2,000	5,281		5,281
Year 7	2,001	5,466		5,466
Year 8	2,002	1,871		1,871
Year 9	2,003	7,863		7,863
Year 10	2,004	5,158		5,158
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	7,863		7,863
Year 2	2,004	5,158		5,158
Year 3	2,005	11,009		11,009
Year 4	2,006	7,002		7,002
Year 5	2,007	4,962		4,962
2015 Compliance Year - Water into Distribution System				
2015		1,763		1,763
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES: LDV Supply Treated at Surface Water Treatment Plants				

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	Groundwater			
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	1,995	14,682		14,682
Year 2	1,996	17,173		17,173
Year 3	1,997	19,966		19,966
Year 4	1,998	17,097		17,097
Year 5	1,999	20,621		20,621
Year 6	2,000	20,017		20,017
Year 7	2,001	19,322		19,322
Year 8	2,002	20,131		20,131
Year 9	2,003	19,945		19,945
Year 10	2,004	18,409		18,409
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	19,945		19,945
Year 2	2,004	18,409		18,409
Year 3	2,005	16,375		16,375
Year 4	2,006	17,947		17,947
Year 5	2,007	16,288		16,288
2015 Compliance Year - Water into Distribution System				
2015		5,166		5,166
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES: Mowry and PT wellfield Production				

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	Desalination			
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	1,995	-		0
Year 2	1,996	-		0
Year 3	1,997	-		0
Year 4	1,998	-		0
Year 5	1,999	-		0
Year 6	2,000	-		0
Year 7	2,001	-		0
Year 8	2,002	-		0
Year 9	2,003	512		512
Year 10	2,004	4,693		4,693
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	512		512
Year 2	2,004	4,693		4,693
Year 3	2,005	3,557		3,557
Year 4	2,006	3,190		3,190
Year 5	2,007	3,091		3,091
2015 Compliance Year - Water into Distribution System				
2015		8,228		8,228
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES: Newark Desalination Facility Product Water				

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	Groundwater (Private pumping)			
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	1,995	4,823		4,823
Year 2	1,996	4,501		4,501
Year 3	1,997	4,580		4,580
Year 4	1,998	3,158		3,158
Year 5	1,999	2,845		2,845
Year 6	2,000	3,901		3,901
Year 7	2,001	2,984		2,984
Year 8	2,002	3,540		3,540
Year 9	2,003	3,466		3,466
Year 10	2,004	3,846		3,846
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	3,466		3,466
Year 2	2,004	3,846		3,846
Year 3	2,005	3,290		3,290
Year 4	2,006	2,864		2,864
Year 5	2,007	2,577		2,577
2015 Compliance Year - Water into Distribution System				
2015		2057		2,057
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES: Niles Cone Groundwater Managed by ACWD and Pumped by Private Well Owners Subject to a Replenishment				

SB X7-7 Table 4-B: Indirect Recycled Water Use Deduction *(For use only by agencies that are deducting indirect recycled water)*

Baseline Year *Fm SB X7-7 Table 3*		Surface Reservoir Augmentation					Groundwater Recharge			**Total Deductible Volume of Indirect Recycled Water Entering the Distribution System**
		Volume Discharged from Reservoir for Distribution System Delivery	Percent Recycled Water	Recycled Water Delivered to Treatment Plant	Transmission/ Treatment Loss	Recycled Volume Entering Distribution System from Surface Reservoir Augmentation	Recycled Water Pumped by Utility*	Transmission/ Treatment Losses	Recycled Volume Entering Distribution System from Groundwater Recharge	
10-15 Year Baseline - Indirect Recycled Water Use										
Year 1	1995			-		-			-	-
Year 2	1996			-		-			-	-
Year 3	1997			-		-			-	-
Year 4	1998			-		-			-	-
Year 5	1999			-		-			-	-
Year 6	2000			-		-			-	-
Year 7	2001			-		-			-	-
Year 8	2002			-		-			-	-
Year 9	2003			-		-			-	-
Year 10	2004			-		-			-	-
Year 11	0			-		-			-	-
Year 12	0			-		-			-	-
Year 13	0			-		-			-	-
Year 14	0			-		-			-	-
Year 15	0			-		-			-	-
5 Year Baseline - Indirect Recycled Water Use										
Year 1	2003			-		-			-	-
Year 2	2004			-		-			-	-
Year 3	2005			-		-			-	-
Year 4	2006			-		-			-	-
Year 5	2007			-		-			-	-
2015 Compliance - Indirect Recycled Water Use										
2015				-		-			-	-

**Suppliers will provide supplemental sheets to document the calculation for their input into "Recycled Water Pumped by Utility". The volume reported in this cell must be less than total groundwater pumped - See Methodology 1, Step 8, section 2.c.*

NOTES: Not Applicable for ACWD

SB X7-7 Table 4-C: Process Water Deduction Eligibility *(For use only by agencies that are deducting process water) Choose Only One*	
☐	**Criteria 1**- Industrial water use is equal to or greater than 12% of gross water use. Complete SB X7-7 Table 4-C.1
☐	**Criteria 2** - Industrial water use is equal to or greater than 15 GPCD. Complete SB X7-7 Table 4-C.2
☐	**Criteria 3** - Non-industrial use is equal to or less than 120 GPCD. Complete SB X7-7 Table 4-C.3
☐	**Criteria 4** - Disadvantaged Community. Complete SB x7-7 Table 4-C.4
NOTES: ACWD does not elect to use deductions	

SB X7-7 Table 4-C.1: Process Water Deduction Eligibility					
Criteria 1 Industrial water use is equal to or greater than 12% of gross water use					
Baseline Year *Fm SB X7-7 Table 3*		Gross Water Use Without Process Water Deduction	Industrial Water Use	Percent Industrial Water	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility					
Year 1	1995	52,784		0%	NO
Year 2	1996	56,619		0%	NO
Year 3	1997	60,381		0%	NO
Year 4	1998	54,711		0%	NO
Year 5	1999	57,381		0%	NO
Year 6	2000	59,632		0%	NO
Year 7	2001	58,738		0%	NO
Year 8	2002	59,118		0%	NO
Year 9	2003	57,660		0%	NO
Year 10	2004	58,932		0%	NO
Year 11	0	-			NO
Year 12	0	-			NO
Year 13	0	-			NO
Year 14	0	-			NO
Year 15	0	-			NO
5 Year Baseline - Process Water Deduction Eligibility					
Year 1	2003	57,660		0%	NO
Year 2	2004	58,932		0%	NO
Year 3	2005	56,108		0%	NO
Year 4	2006	55,392		0%	NO
Year 5	2007	57,065		0%	NO
2015 Compliance Year - Process Water Deduction Eligiblity					
2015		38,579		0%	NO
NOTES:					

SB X7-7 Table 4-C.2: Process Water Deduction Eligibility					
Criteria 2 Industrial water use is equal to or greater than 15 GPCD					
Baseline Year *Fm SB X7-7 Table 3*		Industrial Water Use	Population	Industrial GPCD	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility					
Year 1	1995		278,182	-	NO
Year 2	1996		280,812	-	NO
Year 3	1997		286,734	-	NO
Year 4	1998		295,661	-	NO
Year 5	1999		304,006	-	NO
Year 6	2000		312,753	-	NO
Year 7	2001		316,401	-	NO
Year 8	2002		319,589	-	NO
Year 9	2003		319,048	-	NO
Year 10	2004		317,523	-	NO
Year 11	0		-		NO
Year 12	0		-		NO
Year 13	0		-		NO
Year 14	0		-		NO
Year 15	0		-		NO
5 Year Baseline - Process Water Deduction Eligibility					
Year 1	2003		319,048	-	NO
Year 2	2004		317,523	-	NO
Year 3	2005		316,780	-	NO
Year 4	2006		316,304	-	NO
Year 5	2007		317,739	-	NO
2015 Compliance Year - Process Water Deduction Eligibility					
2015			344,278	-	NO
NOTES:					

SB X7-7 Table 4-C.3: Process Water Deduction Eligibility							
Criteria 3 Non-industrial use is equal to or less than 120 GPCD							
Baseline Year *Fm SB X7-7 Table 3*		Gross Water Use Without Process Water Deduction *Fm SB X7-7 Table 4*	Industrial Water Use	Non-industrial Water Use	Population *Fm SB X7-7 Table 3*	Non-Industrial GPCD	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility							
Year 1	1995	52,784		52,784	278,182	169	NO
Year 2	1996	56,619		56,619	280,812	180	NO
Year 3	1997	60,381		60,381	286,734	188	NO
Year 4	1998	54,711		54,711	295,661	165	NO
Year 5	1999	57,381		57,381	304,006	169	NO
Year 6	2000	59,632		59,632	312,753	170	NO
Year 7	2001	58,738		58,738	316,401	166	NO
Year 8	2002	59,118		59,118	319,589	165	NO
Year 9	2003	57,660		57,660	319,048	161	NO
Year 10	2004	58,932		58,932	317,523	166	NO
Year 11	0	-		-	-		NO
Year 12	0	-		-	-		NO
Year 13	0	-		-	-		NO
Year 14	0	-		-	-		NO
Year 15	0	-		-	-		NO
5 Year Baseline - Process Water Deduction Eligibility							
Year 1	2003	57,660		57,660	319,048	161	NO
Year 2	2004	58,932		58,932	317,523	166	NO
Year 3	2005	56,108		56,108	316,780	158	NO
Year 4	2006	55,392		55,392	316,304	156	NO
Year 5	2007	57,065		57,065	317,739	160	NO
2015 Compliance Year - Process Water Deduction Eligiblity							
2015		38,579		38,579	344,278	100	YES
NOTES:							

SB X7-7 Table 4-C.4: Process Water Deduction Eligibility				
Criteria 4 Disadvantaged Community *Use IRWM DAC Mapping tool* http://www.water.ca.gov/irwm/grants/resources_dac.cfm				
California Median Household Income		Service Area Median Household Income	Percentage of Statewide Average	**Eligible for Exclusion? Y/N**
2015 Compliance Year - Process Water Deduction Eligibility				
2010	$53,046		0%	YES
A "Disadvantaged Community" is a community with a median household income less than 80 percent of the statewide average.				
NOTES:				

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	1995	278,182	52,784	169
Year 2	1996	280,812	56,619	180
Year 3	1997	286,734	60,381	188
Year 4	1998	295,661	54,711	165
Year 5	1999	304,006	57,381	169
Year 6	2000	312,753	59,632	170
Year 7	2001	316,401	58,738	166
Year 8	2002	319,589	59,118	165
Year 9	2003	319,048	57,660	161
Year 10	2004	317,523	58,932	166
Year 11	0	-	-	
Year 12	0	-	-	
Year 13	0	-	-	
Year 14	0	-	-	
Year 15	0	-	-	
10-15 Year Average Baseline GPCD				**170**
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	319,048	57,660	161
Year 2	2004	317,523	58,932	166
Year 3	2005	316,780	56,108	158
Year 4	2006	316,304	55,392	156
Year 5	2007	317,739	57,065	160
5 Year Average Baseline GPCD				**160**
2015 Compliance Year GPCD				
2015		344,278	38,579	**100**
NOTES:				

SB X7-7 Table 6: Gallons per Capita per Day *Summary From Table SB X7-7 Table 5*	
10-15 Year Baseline GPCD	170
5 Year Baseline GPCD	160
2015 Compliance Year GPCD	100
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**
170	**136**
NOTES:	

SB X7-7 Table 7-E: Target Method 3				
Agency May Select More Than One as Applicable	Percentage of Service Area in This Hydrological Region	Hydrologic Region	"2020 Plan" Regional Targets	Method 3 Regional Targets (95%)
☐		North Coast	137	130
☐		North Lahontan	173	164
☐		Sacramento River	176	167
☑	100%	San Francisco Bay	131	124
☐		San Joaquin River	174	165
☐		Central Coast	123	117
☐		Tulare Lake	188	179
☐		South Lahontan	170	162
☐		South Coast	149	142
☐		Colorado River	211	200
Target *(If more than one region is selected, this value is calculated.)*				**124**

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**
160	152	137	**137**

[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**
137	170	**153**
NOTES:		

SB X7-7 Table 9: 2015 Compliance								
Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments *(in GPCD)* Enter "0" if Adjustment Not Used			TOTAL Adjustments	Adjusted 2015 GPCD	2015 GPCD *(Adjusted if applicable)*	**Did Supplier Achieve Targeted Reduction for 2015?**
		Extraordinary Events	Weather Normalization	Economic Adjustment				
100	153	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	-	100	100	**YES**
NOTES:								

User Input -- Provisional Method 4 Target

Target Calculation Option (select one): * Calculate Targets Using Default Indoor Residential Savings

* = Required Data

Water Supplier Name: * Alameda County Water District

10-15 Year Baseline Water Use Information

Baseline Period: * 1995-2004

Midpoint of Baseline Period: 1999

Baseline Water Use GPCD: * 170.0

Population in Midpoint Year: * 304,006

5 Year Baseline Water Use Information

Baseline Period: * 2003-2007

Baseline Water Use GPCD: * 160.0

95% of 5-Year Baseline GPCD: 152.0

Unmetered Connections

Number of Unmetered Connections in 1999: * 0

Water Use By Unmetered Connections In 1999: * 0 Acre-Feet

Baseline CII Water Use[1]

CII Water Use in 1999: * 12,097 Acre-Feet

Per Capita Use: 35.5 GPCD

[1]CII = Commercial, Industrial, Institutional.

If you have chosen to calculate targets using the Default Indoor Residential Savings, you do not need to complete the remaining tables.
Go to the "Calculated Targets" worksheet.

Optional Data Needed to Calculate Targets Using the Indoor Residential Savings Calculators

NOTE: You only need to complete the tables below if you have chosen to calculate targets using the indoor residential savings calculators.
The data you enter here is used to calculate the 2020 water saving values for residential toilets, washers, and showerheads.
If you are using the Default Indoor Residential Savings you do not need to enter this data.

Persons and Plumbing Fixtures Per Household

Units Per Household:	Single Family	Multi Family
Persons	3.40	2.40
Toilets	2.11	1.41
Showers	2.23	1.37

The table below shows average shower and toilet counts per household for major metropolitan areas. The table is based on 2003 data published by the American Housing Survey.

		Single Family		Multi Family	
SMSA Code	SMSA name	Showers	Toilets	Showers	Toilets
360	Anaheim-Santa Ana	1.92	2.33	1.25	1.44
680	Bakersfield	1.64	1.96	1.38	1.48
2840	Fresno	1.62	1.91	1.19	1.29
4480	Los Angeles-Long Beach	1.58	1.93	1.19	1.34
5170	Modesto	1.79	1.99	1.23	1.58
5775	Oakland	1.77	2.07	1.17	1.36
6000	Oxnard-Ventura	1.87	2.22	1.16	1.37
6780	Riverside-San Bernardino	1.81	2.05	1.37	1.51
6920	Sacramento	1.69	1.99	1.14	1.21
7120	Salinas-Seaside-Monterey	1.72	2.09	1.00	1.15
7320	San Diego	1.92	2.21	1.25	1.39
7360	San Francisco	1.79	2.20	1.15	1.25
7400	San Jose	1.98	2.33	1.24	1.39
7480	Santa Barbara-Santa Maria-Lompoc	1.60	1.80	1.00	1.10
7500	Santa Rosa-Petaluma	2.26	2.43	1.00	1.20
8120	Stockton	1.58	1.87	1.11	1.11
8720	Vallejo-Fairfield-Napa	1.91	2.31	1.11	1.26
	CA urban average	1.75	2.08	1.20	1.35

Residential Housing Units

Year		Single Family	Multi Family
1991		63,100	26,700
1992		61,000	29,900
1993		61,800	30,300
1994		62,500	30,800
1995		63,000	31,500
1996		63,600	32,100
1997		64,300	32,600
1998		65,400	32,700
1999		66,600	32,700
2000	Row Not Used -->		
2001	Row Not Used -->		
2002	Row Not Used -->		
2003	Row Not Used -->		
2004	Row Not Used -->		
2005	Row Not Used -->		

Imputed Service Area Population 1999

NOTE: If imputed service area population differs by more than 5% from the service area population entered above, you should revise your persons per household or dwelling unit estimates.

Enter Group Quarters Population in 1999:		*(estimate using census data)*
Imputed Single Family Population in 1999:	226,440	*(persons per household x dwelling units)*
Imputed Multi Family Population in 1999:	78,480	*(persons per household x dwelling units)*
Imputed Service Area Population in 1999:	304,920	

Service Area Population Entered Above: 304,006

Imputed service area population is within 0.3% of the service area population you entered above.

Toilet Saturation In 1999

NOTE: You can enter toilet saturation levels in 1999 or let the model calculate them. Select which method the calculator should use.

Toilet Saturation Estimation Option (select one): 1. Enter my own saturation estimates

OPTION 1: Complete the following table if you selected Option 1 -- Enter my own saturation estimate.

	Estimated % of Toilets in 1999 by Flush Volume				
	5 gpf	3.5 gpf	1.6 gpf	1.28 gpf	Total
Single Family	0.0%	78.00%	22.0%		100.0%
Multi Family	0.0%	78.00%	22.0%		100.0%

How was saturation estimated?

Saturation study conducted by CTSI Corporation in 2000 of ACWD single & multi-family customers; 95% statistical confidence level, with a maximum +/- 10% error rate, per CUWCC MOU BMP 2 implementation requirements.

OPTION 2: Complete the following table if you selected Option 2 -- Have calculator estimate saturation.

	Conservation Program Toilet Replacements				
	Single Family			Multi Family	
Year	ULFT	HET		ULFT	HET
1991					
1992					
1993					
1994					
1995					
1996					
1997					
1998					
1999					
2000					
2001					
2002					
2003					
2004					
2005					

Showerhead Saturation In 1999

NOTE: You can enter showerhead saturation levels in 1999 or let the model calculate them. Select which method the calculator should use.

Showerhead Saturation Estimation Option (select one): 2. Have calculator estimate saturation

OPTION 1: Complete the following table if you selected Option 1 -- Enter my own saturation estimate.

	LF	Non LF	Total
Estimated % of Low Flow Showerheads in Residential Homes in 1999:		100.0%	100.0%

How was saturation estimated?

OPTION 2: Complete the following table if you selected Option 2 -- Have calculator estimate saturation.

Year	*Number of Residential Showerheads Distributed/Installed*	
1991		
1992		
1993		
1994		100
1995		300
1996		1,000
1997		1,000
1998		19,700
1999		5,070
2000	Row Not Used -->	
2001	Row Not Used -->	
2002	Row Not Used -->	
2003	Row Not Used -->	
2004	Row Not Used -->	
2005	Row Not Used -->	

Clothes Washer Average Water Factor (WF) In 1999

NOTE: You can enter average WF for residential clothes washers in 1999 or let the model calculate it. Select which method the calculator should use.

Clothes Washer WF Estimation Option (select one): 2. Have calculator estimate the average WF

OPTION 1: Complete the following table if you selected Option 1 -- Enter my own WF estimate.

	Single Family	Multi Family
Average clothes washer WF in 1999:		

How was average WF estimated?

OPTION 2: Complete the following table if you selected Option 2 -- Have calculator estimate the average WF.

Number of Clothes Washer Incentives by WF

Year		8.5-9.5 WF	6.0-8.5 WF	< 6.0 WF
1999		22,100	10,000	
2000	Row Not Used -->			
2001	Row Not Used -->			
2002	Row Not Used -->			
2003	Row Not Used -->			
2004	Row Not Used -->			
2005	Row Not Used -->			

Target Calculation -- Provisional Method 4 Target

Step 1. Calculation of Landscape Water Use and System Water Loss

Urban Supplier	1995-2004 Baseline GPCD	–	Assumed Indoor Residential per Capita Water Use GPCD	–	CII per Capita Water Use GPCD	=	Estimated Landscape Water Use and System Water Loss GPCD
Alameda County Water District	170.0		70.0		35.5		64.5

Step 2. Calculation of Savings Using BMP Calculators

(Alternate) STEP 2 BEING USED TO CALCULATE TARGET

Urban Supplier	Indoor Residential Savings Calculators					+	Metering Savings BMP 1.3	+	CII Savings BMP 4	+	Land-scape + Water Loss Savings 21.6%	=	Total Savings GPCD
	Single Family Toilets	Multi Family Toilets	Resi-dential Washers	Resi-dential Showers	Total IR Savings								
Alameda County Water District	XXXX	XXXX	XXXX	XXXX	XXXX		XXXX		XXXX		XXXX		XXXX

(Alternate) Step 2. Calculation of Savings Using Default Indoor Residential Savings

Urban Supplier	Default Resi-dential Indoor Savings	+	Metering Savings BMP 1.3	+	CII Savings BMP 4	+	Land-scape + Water Loss Savings 21.6%	=	(alt) Total Savings GPCD
Alameda County Water District	15.0		0.0		3.6		13.9		32.5

Step 3. Calculation of Urban Water Use Targets

Urban Supplier	1995-2004 Baseline GPCD	–	Total Savings GPCD	=	Computed 2020 Target GPCD	→	Less Than 95% of 5-Year Baseline	→	Final 2020 Target	→	Final 2015 Target
Alameda County Water District	170.0		32.5		137.5		TRUE		137.5		153.8

BMP 4 CII Savings Calculator

Water Supplier: Alameda County Water District

Color Key

User Input
Model Assumption
Model Calculation

Midpoint of Base Period:	1999	
Service Area Pop. In 1999:	304,006	
Baseline CII Use (AF)	12,097	
CII Savings (%):	10%	*<< MOU Exhibit 1*
Total Savings (MGD):	1.08	
GPCD Savings:	3.55	

Single Family Toilet Savings Calculator

Water Supplier: Alameda County Water District

Color Key

User Input
Model Assumption
Model Calculation

Midpoint of Base Period:	1999	
Service Area Pop. In 1999:	304,006	
SF Dwelling Units in 1999:	66,600	
Persons Per Household:	3.40	
Toilets Per Household:	2.11	
Per Capita Flush Rate (Flushes/Person/Day):	5.05	*<<REUWS*
Natural Replacement (%/Yr):	4%	*<<BMP database default assumption*
ULFT Free Rider Rate (% Distributed):	25%	*<<BMP database default assumption*

Distribution of Toilet Stock

		% by Flush Volume (Gal)					Avg
	Year	5.00	3.50	1.60	1.28	Total	Flush Vol.
User Estimates	1999	0.0%	78.0%	22.0%	0.0%	100.0%	3.08
Calculator Estimates	1999	32.8%	32.8%	34.4%	0.0%	100.0%	3.34
	2020	0.0%	11.7%	3.3%	85.0%	100.0%	1.55

Based on User Estimates >>

Savings Per Flush (Gal):	1.53
Total Savings (MGD):	1.752
GPCD Savings:	5.76

Multi Family Toilet Savings Calculator

Water Supplier: Alameda County Water District

Color Key

User Input
Model Assumption
Model Calculation

Midpoint of Base Period:	1999	
Service Area Pop. In 1999:	304,006	
MF Dwelling Units in 1999:	32,700	
Persons Per Household:	2.4	
Toilets Per Household:	1.41	
sh Rate (Flushes/Person/Day):	5.05	*<<REUWS*
Natural Replacement (%/Yr):	4%	*<<BMP database default assumption*
ree Rider Rate (% Distributed):	25%	*<<BMP database default assumption*

Distribution of Toilet Stock

	% by Flush Volume (Gal)					Avg
Year	5.00	3.50	1.60	1.28	Total	Flush Vol.
1999	0.0%	78.0%	22.0%	0.0%	100.0%	3.08
1999	28.3%	28.3%	43.5%	0.0%	100.0%	3.10
2020	0.0%	11.7%	3.3%	85.0%	100.0%	1.55

Based on User Estimates >>

Savings Per Flush (Gal):	1.53
Total Savings (MGD):	0.607
GPCD Savings:	2.00

Residential Washer Savings Calculator

Water Supplier: Alameda County Water District

Color Key

User Input
Model Assumption
Model Calculation

Midpoint of Base Period:	1999	
Service Area Pop. In 1999:	304,006	
SF Pop. In 1999:	226,440	*<<SF Accts x SF PPH*
MF Pop. In 1999:	78,480	*<<MF Accts x MF PPH*
SF, PPH:	3.40	
MF, PPH:	2.40	

SF Dwelling Units with Washers (%):	96%	*<<American Housing Survey, 2005 National Avg.*
Washer Natural Replacement (%/Yr):	7.1%	*<<BMP database default assumption*
1998-99 Avg Gal Per Cycle:	40.9	*<<REUWS*
Avg Washer Capacity:	3.5	*<<Industry average*
1998-99 Avg Water Factor:	11.7	
Washer Free Rider Rate (% Distributed):	10%	*<<BMP database default assumption*

Average Clothes Washer WF in 1999

	SF	MF	
User Estimates	0.0	0.0	
Calculator Estimates	10.2	10.2	*<<Default assumes same WF for washers used (on or off premise) by MF residents as for SF washers.*

	SF	MF	
1998-99 Washer Use GPCD:	13.7	15.1	*<<Estimated using REUWS data on GPCD and PPH*
1999 Washer Use GPCD:	13.7	15.1	<< Based on Calculator Estimates
6 WF Washer Use GPCD:	7.0	7.8	

Base Period Midpoi

Total Washer Water Use (MGD)

	SF	MF
Avg 1999 WF:	3.1	1.2
85% 6 WF, 15% Avg 1999 WF:	1.8	0.7
GPCD Savings:	4.2	1.6
Total Savings:		5.8

Residential Showerhead Savings Calculator

Water Supplier: Alameda County Water District

Color Key

User Input
Model Assumption
Model Calculation

Midpoint of Base Period:	1999	
Service Area Pop. In 1999:	304,006	
	SF	MF
Avg Showers Per Household:	2.23	1.37
Showerhead Natural Replacement (%/Yr):	10%	*<< CALFED Comp. Eval. Assumption*
Distributed Showerheads Installed (%):	55%	*<<CUWCC BMP Database Default Assumption*
Shower Use, Non-LF Homes (GPCD):	13.3	*<<REUWS, Table 5.21*
Shower Use, LF Homes (GPCD):	8.8	*<<REUWS, Table 5.21*

LF Showerhead Saturation in 1999

User Estimates	0.0%
Calculator Estimates	71.5%

Total Residential Shower Water Use (MGD)

1999 % LF:	3.1	<< Based on Calculator Estimates
95% LF, 5% Non-LF:	2.8	
GPCD Savings:	1.1	

APPENDIX H
AWWA Water Audit

AWWA Free Water Audit Software v5.0

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:	Leonard Ash
Email Address:	leonard.ash@acwd.com
Telephone (incl Ext.):	510-668-4209
Name of City / Utility:	Alameda County Water District
City/Town/Municipality:	Fremont
State / Province:	California (CA)
Country:	USA
Year:	2015 Calendar Year
Audit Preparation Date:	5/12/2016
Volume Reporting Units:	Million gallons (US)
PWSID / Other ID:	CA0110001

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

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

? Click to access definition
+ Click to add a comment

Water Audit Report for: Alameda County Water District (CA0110001)
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: MILLION GALLONS (US) 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.

WATER SUPPLIED

	<---------- Enter grading in column 'E' and 'J' ---------->			Master Meter and Supply Error Adjustments		
				Pcnt:	Value:	
Volume from own sources:	7	4,938.924	MG/Yr	2.00%		MG/Yr
Water imported:	7	6,961.807	MG/Yr	2.00%		MG/Yr
Water exported:	7	0.000	MG/Yr			MG/Yr

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

WATER SUPPLIED: 11,667.383 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

			Pcnt:	Value:	
Billed metered:	7	10,667.929	MG/Yr			
Billed unmetered:	7	0.000	MG/Yr			
Unbilled metered:	8	2.233	MG/Yr			
Unbilled unmetered:	5	145.842	MG/Yr	1.25%		MG/Yr

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

AUTHORIZED CONSUMPTION: 10,816.004 MG/Yr

Use buttons to select percentage of water supplied OR value

WATER LOSSES (Water Supplied - Authorized Consumption) 851.378 MG/Yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:		29.168	MG/Yr	0.25%		MG/Yr

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

Customer metering inaccuracies:	6	217.758	MG/Yr	2.00%	MG/Yr
Systematic data handling errors:	6	26.670	MG/Yr	0.25%	MG/Yr

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

Apparent Losses: 273.597 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 577.782 MG/Yr

WATER LOSSES: 851.378 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 999.454 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	8	898.5	miles
Number of active AND inactive service connections:	8	83,919	
Service connection density:		93	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:	4	70.0	psi

COST DATA

Total annual cost of operating water system:	9	$88,683,000	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$3.37	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	7	$1,710.00	$/Million gallons	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 71 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: Water imported
2: Volume from own sources
3: Billed metered

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

Water Audit Report for: **Alameda County Water District (CA0110001)**
Reporting Year: **2015** 1/2015 - 12/2015

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 71 out of 100 ***

System Attributes:

	Apparent Losses:	273.597	MG/Yr
+	Real Losses:	577.782	MG/Yr
=	**Water Losses:**	**851.378**	MG/Yr
?	Unavoidable Annual Real Losses (UARL):	445.82	MG/Yr
	Annual cost of Apparent Losses:	$1,233,660	
	Annual cost of Real Losses:	$988,007	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:	8.6%	
	Non-revenue water as percent by cost of operating system:	2.8%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	8.93	gallons/connection/day
	Real Losses per service connection per day:	18.86	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.27	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	577.78	million gallons/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.30	

* 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

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:	District source data from Operations Department, report managed by Water Resources Planning.
Vol. from own sources: Master meter error adjustment:	District source data District Operations Department
Water imported:	District source data from Operations Department, report managed by Water Resources Planning.
Water imported: master meter error adjustment:	District source data District Operations Department
Water exported:	Not applicable.
Water exported: master meter error adjustment:	Not applicable.
Billed metered:	District source data from Finance Department account database, report managed by Water Resources Planning.
Billed unmetered:	Not applicable.
Unbilled metered:	District source data from Finance Department account database, report managed by Finance Department.
Unbilled unmetered:	Default value used, however compared to District source data from Operations Department and Engineering & Information Technologies Department databases, report compiled by Operations Department.
Unauthorized consumption:	Default value selected.
Customer metering inaccuracies:	District source data District Operations Department

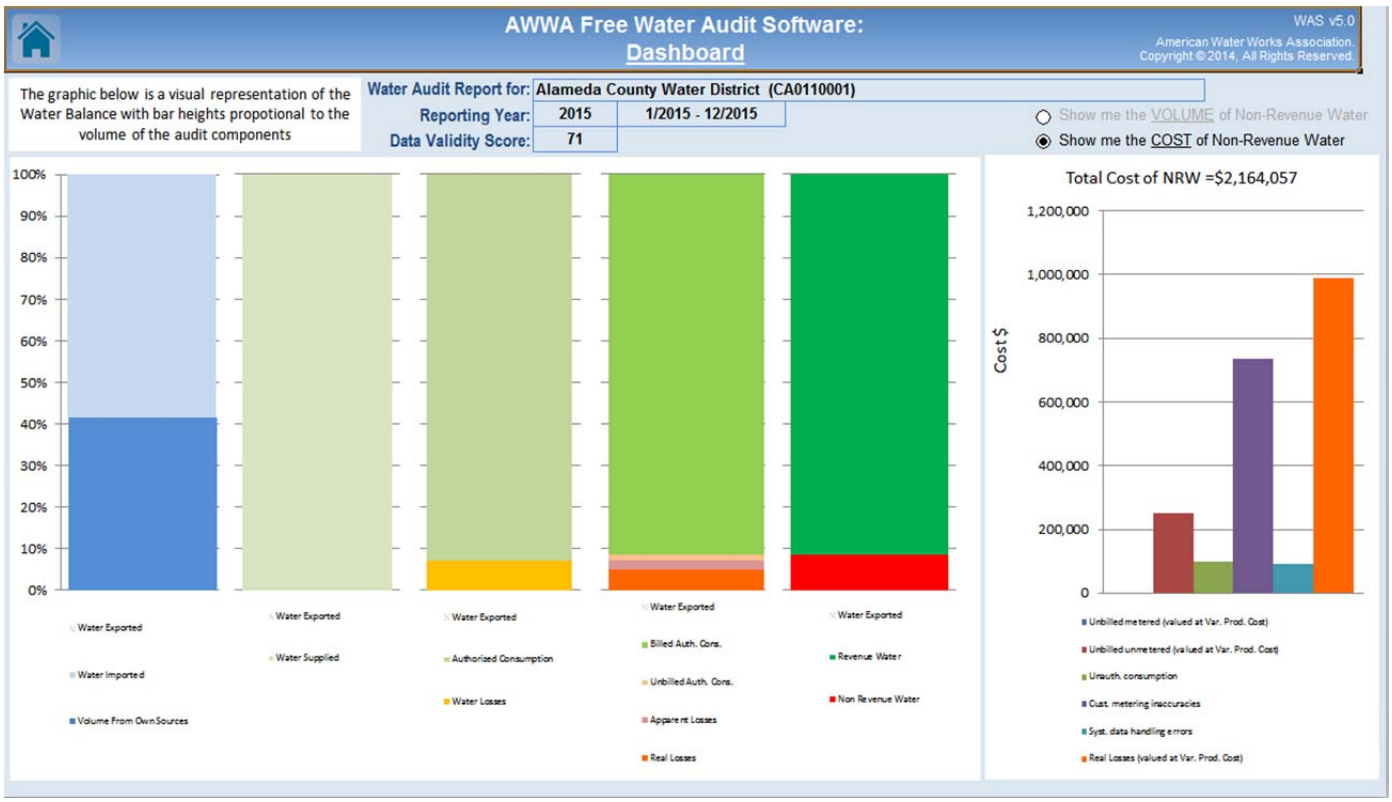
Systematic data handling errors:	Default value selected.
Length of mains:	District source data from Operations Department and Engineering & Information Technologies Department databases, report compiled by Operations Department.
Number of active AND inactive service connections:	District source data from Operations Department and Engineering & Information Technologies Department databases, report compiled by Operations Department.
Average length of customer service line:	District standard installation locations for all meters at the curb or property line.
Average operating pressure:	District source data from Operations Department modeling and database, report compiled by Operations Department.
Total annual cost of operating water system:	District source data from Finance Department.
Customer retail unit cost (applied to Apparent Losses):	District source data from Finance Department.
Variable production cost (applied to Real Losses):	District source data from Operations Department.

AWWA Free Water Audit Software: Water Balance

WAS v5.0

Water Audit Report for:	Alameda County Water District (CA0110001)	
Reporting Year:	2015	1/2015 - 12/2015
Data Validity Score:	71	

Own Sources (Adjusted for known errors) 4,842.082	Water Exported 0.000	Billed Water Exported	Billed Authorized Consumption 10,667.929	Billed Metered Consumption (water exported is removed) 10,667.929	Revenue Water 10,667.929
				Billed Unmetered Consumption 0.000	
		Authorized Consumption 10,816.004	Unbilled Authorized Consumption 148.075	Unbilled Metered Consumption 2.233	Non-Revenue Water (NRW) 999.454
				Unbilled Unmetered Consumption 145.842	
	Water Supplied 11,667.383	Water Losses 851.378	Apparent Losses 273.597	Unauthorized Consumption 29.168	
				Customer Metering Inaccuracies 217.758	
				Systematic Data Handling Errors 26.670	
Water Imported 6,825.301			Real Losses 577.782	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
WAS v5.0
American Water Works Association.
Copyright © 2014, All Rights Reserved.
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: Alameda County Water District (CA0110001)
Reporting Year: 2015 1/2015 - 12/2015
Data Validity Score: 71
Show me the VOLUME of Non-Revenue Water
Show me the COST of Non-Revenue Water
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Water Exported
Water Imported
Volume From Own Sources
Water Exported
Water Supplied
Water Exported
Authorized Consumption
Water Losses
Water Exported
Billed Auth. Cons.
Unbilled Auth. Cons.
Apparent Losses
Real Losses
Water Exported
Revenue Water
Non Revenue Water
Total Cost of NRW =$2,164,057
Cost $
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Unbilled metered (valued at Var. Prod. Cost)
Unbilled unmetered (valued at Var. Prod. Cost)
Unauth. consumption
Cust. metering inaccuracies
Syst. data handling errors
Real Losses (valued at Var. Prod. Cost)

APPENDIX I
District UWMP Public Outreach, Notices, and Submittal

Public Outreach and Notification of UWMP Updates

Code Requirement: CWC §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.

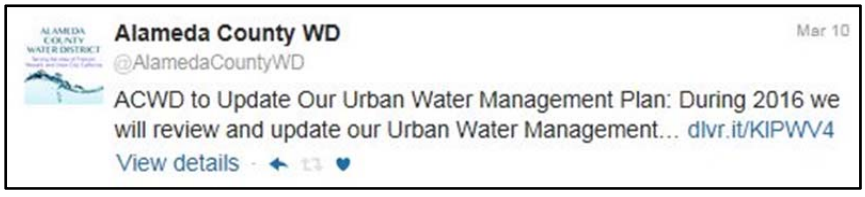
District Actions Taken: On March 10, 2016, the District sent notification letters via mail to cities and agencies. Reference the example letter and recipient list on the following pages.

Code Requirement: CWC §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.

District Actions Taken: On March 10, 2016, the District posted on its website (www.acwd.org) notice that the District will be reviewing the UWMP and considering amendments or changes to the plan. On the same date, the District also posted announcements on social media (Facebook and Twitter) linking to the website notice. The District also published these announcements in two local newspapers: *The Fremont Argus* on March 17, 2016, and *The Tri-City Voice* on March 22, 2016.

Announcement on Facebook

Announcement on Twitter



Announcement in *The Fremont Argus*

ALAMEDA COUNTY WATER DISTRICT

UPDATE OF URBAN WATER MANAGEMENT PLAN

Alameda County Water District will be reviewing and updating our Urban Water Management Plan during 2016. The Plan was last updated in 2011. We encourage all of our customers to participate in this review process. We will make any proposed revisions to the Plan available for public review and will hold a public hearing in 2016. In the meantime, if you would like to learn more about the current Plan, the schedule for considering changes to it, or how to participate in the process, please contact:

Alameda County Water District
Leonard Ash,
Water Resources Planning Engineer
43885 South Grimmer Boulevard,
Fremont CA 94538
Telephone: (510) 668-4209
Facsimile: (510) 651-1760
Email: leonard.ash@acwd.com
AR #5692995; March 17, 2016

Announcement in *The Tri-City Voice*

ALAMEDA COUNTY WATER DISTRICT

UPDATE OF URBAN WATER MANAGEMENT PLAN

Alameda County Water District will be reviewing and updating our Urban Water Management Plan during 2016. The Plan was last updated in 2011. We encourage all of our customers to participate in this review process. We will make any proposed revisions to the Plan available for public review and will hold a public hearing in 2016. In the meantime, if you would like to learn more about the current Plan, the schedule for considering changes to it, or how to participate in the process, please contact:

Alameda County Water District
Leonard Ash, Water Resources Planning Engineer
43885 South Grimmer Boulevard, Fremont CA 94538
Telephone: (510) 668-4209
Facsimile: (510) 651-1760
Email: leonard.ash@acwd.com

ALAMEDA COUNTY WATER DISTRICT

43885 SOUTH GRIMMER BOULEVARD • FREMONT, CALIFORNIA 94538
(510) 668-4200 • FAX (510) 770-1793 • www.acwd.org

March 10, 2016

Alex Ameri
City of Hayward
777 "B" Street
Hayward, CA 94541-5007

Dear Mr. Ameri:

Subject: Review of Alameda County Water District's Urban Water Management Plan

This letter is to notify you that Alameda County Water District (ACWD) will be reviewing its Urban Water Management Plan (Plan) and considering amendments and changes to the Plan. We invite your agency's participation in this process.

We will make any proposed revisions to our Plan available for public review at the ACWD headquarters office located at 43885 South Grimmer Boulevard, Fremont, and will hold a public hearing later this year. If you have any questions about ACWD's Plan, or the process for updating it, please contact Leonard Ash, Water Resources Planning Engineer, at (510) 668-4209 or by email at leonard.ash@acwd.com.

Sincerely,

Steven D. Inn

Steven Inn
Manager of Water Resources

la/mh

Recipients of Notification Letters dated March 10, 2016

Contact	Organization
Alex Ameri	City of Hayward
Corinne Ferreyra	City of Hayward
Steve Machida	City of Milpitas
Nina Hawk	City of Milpitas
Michael Hurley	Bay Area Water Supply and Conservation Agency
Kristie Wheeler	City of Fremont
Joan Malloy	City of Union City
Terrence Grindall	City of Newark
Chris Bazar	Alameda County
Daniel Woldesenbet	Alameda County
Terry Erlewine	State Water Contractors
Kirk Girard	Santa Clara County
Rollie Arbolante	Union Sanitary District

Public Hearing and Board Approval

Code Requirement: CWC §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.

District Actions Taken: From May 10, 2016 through the public hearing on June 9, 2016, a copy of the Draft Plan was posted on its website. On May 25, 2016, the District sent notification letters via mail to cities, counties, and agencies. Reference the example letter and recipient list on the following pages. On May 25, 2016, the District also included the notice of public hearing on its website. From May 10, 2016 through the public hearing on June 9, 2016, a copy of the Draft Plan was available for public inspection at the District headquarters, located at 43885 South Grimmer Boulevard, Fremont, during normal business hours. Two notices of the public hearing were also published in the local newspapers (*The Fremont Argus* and *The Tri-City Voice*) at least once a week for two successive weeks prior to the public hearing. The District held a public hearing on Thursday, June 9, 2016, at 6:00 p.m. at the District headquarters office located at 43885 South Grimmer Boulevard, Fremont.

Notices Published in *The Fremont Argus* on Friday, May 27, 2016, and Friday, June 3, 2016

Notice of Public Hearing
for Urban Water Management Plan Update
and SBX7-7 Compliance
and
Availability of Draft Plan for Public Review

The Urban Water Management Planning Act requires the Alameda County Water District (ACWD) to update its Urban Water Management Plan (Plan) by July 2016. The 2015 Plan includes a re-evaluation of methods to comply with the urban water use targets established in SBX7-7 ("20 by 2020" water conservation requirements).

Draft Plan Available for Public Review and Comment

ACWD released the Draft Plan on May 10, 2016. The Draft Plan is available for public review and comment through the end of the public hearing described below. The Draft Plan can be viewed at ACWD's website at: http://www.acwd.org

A copy of the Draft Plan is also available for viewing at the ACWD office.

Public Hearing

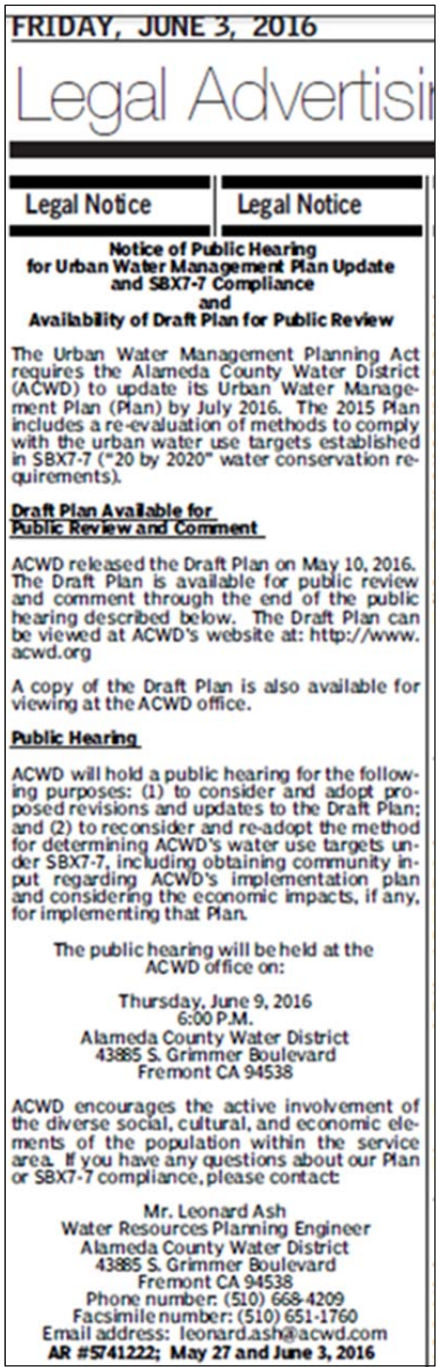
ACWD will hold a public hearing for the following purposes: (1) to consider and adopt proposed revisions and updates to the Draft Plan; and (2) to reconsider and re-adopt the method for determining ACWD's water use targets under SBX7-7, including obtaining community input regarding ACWD's implementation plan and considering the economic impacts, if any, for implementing that Plan.

The public hearing will be held at the ACWD office on:

Thursday, June 9, 2016
6:00 P.M.
Alameda County Water District
43885 S. Grimmer Boulevard
Fremont CA 94538

ACWD encourages the active involvement of the diverse social, cultural, and economic elements of the population within the service area. If you have any questions about our Plan or SBX7-7 compliance, please contact:

Mr. Leonard Ash
Water Resources Planning Engineer
Alameda County Water District
43885 S. Grimmer Boulevard
Fremont CA 94538
Phone number: (510) 668-4209
Facsimile number: (510) 651-1760
Email address: leonard.ash@acwd.com
AR #5741222; May 27 and June 3, 2016



FRIDAY, JUNE 3, 2016

Legal Advertisi

Legal Notice | Legal Notice

Notice of Public Hearing
for Urban Water Management Plan Update
and SBX7-7 Compliance
and
Availability of Draft Plan for Public Review

The Urban Water Management Planning Act requires the Alameda County Water District (ACWD) to update its Urban Water Management Plan (Plan) by July 2016. The 2015 Plan includes a re-evaluation of methods to comply with the urban water use targets established in SBX7-7 ("20 by 2020" water conservation requirements).

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Notices Published in the *Tri-City Voice* on Tuesday, May 24, 2016, and Tuesday, May 31, 2016

UPDATE AND SBX7-7 COMPLIANCE AND AVAILABILITY OF DRAFT PLAN FOR PUBLIC REVIEW

The Urban Water Management Planning Act requires the Alameda County Water District (ACWD) to update its Urban Water Management Plan (Plan) by July 2016. The 2015 Plan includes a re-evaluation of methods to comply with the urban water use targets established in SBX7-7 ("20 by 2020" water conservation requirements).

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A copy of the Draft Plan is also available for viewing at the ACWD office.

Public Hearing

ACWD will hold a public hearing for the following purposes: (1) to consider and adopt proposed revisions and updates to the Draft Plan; and (2) to reconsider and re-adopt the method for determining ACWD's water use targets under SBX7-7, including obtaining community input regarding ACWD's implementation plan and considering the economic impacts, if any, for implementing that Plan.

The public hearing will be held at the ACWD office on:

Thursday, June 9, 2016
6:00 P.M.
Alameda County Water District
43885 S. Grimmer Boulevard
Fremont CA 94538

ACWD encourages the active involvement of the diverse social, cultural, and economic elements of the population within the service area. If you have any questions about our Plan or SBX7-7 compliance, please contact:

Mr. Leonard Ash
Water Resources
Planning Engineer
Alameda County Water District
43885 S. Grimmer Boulevard
Fremont CA 94538
Phone number: (510) 668-4209
Facsimile number: (510) 651-1760
Email address: leonard.ash@acwd.com
5/24, 5/31/16

CNS-2884644#

NOTICE OF PUBLIC HEARING FOR URBAN WATER MANAGEMENT PLAN UPDATE AND SBX7-7 COMPLIANCE AND AVAILABILITY OF DRAFT PLAN FOR PUBLIC REVIEW

The Urban Water Management Planning Act requires the Alameda County Water District (ACWD) to update its Urban Water Management Plan (Plan) by July 2016. The 2015 Plan includes a re-evaluation of methods to comply with the urban water use targets established in SBX7-7 ("20 by 2020" water conservation requirements).

Draft Plan Available for Public Review and Comment

ACWD released the Draft Plan on May 10, 2016. The Draft Plan is available for public review and comment through the end of the public hearing described below. The Draft Plan can be viewed at ACWD's website at: http://www.acwd.org

A copy of the Draft Plan is also available for viewing at the ACWD office.

Public Hearing

ACWD will hold a public hearing for the following purposes: (1) to consider and adopt proposed revisions and updates to the Draft Plan; and (2) to reconsider and re-adopt the method for determining ACWD's water use targets under SBX7-7, including obtaining community input regarding ACWD's implementation plan and considering the economic impacts, if any, for implementing that Plan.

The public hearing will be held at the ACWD office on:

Thursday, June 9, 2016
6:00 P.M.
Alameda County Water District
43885 S. Grimmer Boulevard
Fremont CA 94538

ACWD encourages the active involvement of the diverse social, cultural, and economic elements of the population within the service area. If you have any questions about our Plan or SBX7-7 compliance, please contact:

Mr. Leonard Ash
Water Resources
Planning Engineer
Alameda County Water District
43885 S. Grimmer Boulevard
Fremont CA 94538
Phone number: (510) 668-4209
Facsimile number: (510) 651-1760
Email address: leonard.ash@acwd.com
5/24, 5/31/16

CNS-2884644#

Code Requirement: CWC §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.

District Actions Taken: On May 25, 2016, the District sent notification letters via mail to cities, counties, and agencies. Reference the example letter on the following page and recipient list below.

Code Requirement: CWC §10608.26(a) Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.

District Actions Taken: The District held a public hearing on Thursday, June 9, 2016, at 6:00 p.m. at the District headquarters office located at 43885 South Grimmer Boulevard, Fremont.

Recipients of Notification Letters dated May 25, 2016

Contact	Organization
Alex Ameri	City of Hayward
Corinne Ferreyra	City of Hayward
Steve Machida	City of Milpitas
Nina Hawk	City of Milpitas
Michael Hurley	Bay Area Water Supply and Conservation Agency
Kristie Wheeler	City of Fremont
Joan Malloy	City of Union City
Terrence Grindall	City of Newark
Chris Bazar	Alameda County
Daniel Woldesenbet	Alameda County
Terry Erlewine	State Water Contractors
Kirk Girard	Santa Clara County
Sami Ghossain	Union Sanitary District
Steve Ritchie	San Francisco Public Utilities Commission
Carl Torgersen	State Water Project, California Department of Water Resources
Jason Gianquinto	Semitropic Water Storage District
Jill Duerig	Zone 7 Water Agency
Jim Fiedler	Santa Clara Valley Water District
Robert E. Doyle	East Bay Regional Park District
Kerrie Romanow	Environmental Service Department, City of San Jose

ALAMEDA COUNTY WATER DISTRICT

43885 SOUTH GRIMMER BOULEVARD • FREMONT, CALIFORNIA 94538
(510) 668-4200 • FAX (510) 770-1793 • www.acwd.org

May 25, 2016

Alex Ameri
City of Hayward
777 "B" Street
Hayward, CA 94541-5007

Dear Mr. Ameri:

Subject: Notice of Public Hearing for the 2015-2020 Urban Water Management Plan and SBX7-7 Compliance

The Urban Water Management Planning Act requires the Alameda County Water District (ACWD) to update its Urban Water Management Plan (Plan) by July 2016. We are reviewing our current Plan, which was last updated in 2011, and will be considering revisions to it. As part of this process, ACWD will also be re-evaluating methods to comply with the urban water use targets established in SBX7-7 ("20 by 2020" water conservation requirements).

ACWD will hold a public hearing for the following two purposes: (1) to consider proposed revisions and updates to the Plan for 2015-2020 and (2) to consider the alternatives to comply with SBX7-7 water use targets. The hearing will be held on Thursday, June 9, 2016, at 6:00 p.m. at our headquarters office located at 43885 S. Grimmer Boulevard, Fremont, CA 94538.

We invite your agency's participation in this process. The Plan, which includes the alternative methodologies for complying with SBX7-7, is available for public review on the ACWD website and at the District office. If you have any questions about our Plan or SBX7-7 compliance, please contact Leonard Ash, Water Resources Planning Engineer, at (510) 668-4209 or by email at leonard.ash@acwd.com.

Sincerely,

Steven D. Inn

Steven D. Inn
Manager of Water Resources

la/jm

Plan Submission and Public Access to Approved Plan

Code Requirements: CWC §10621(d) Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.

CWC §10644(a)(2) The plan, or amendments to the plan, submitted to the department shall be submitted electronically. Reference the letter to DWR on the following page.

District Actions Taken: The District provided its updated 2015-2020 UWMP electronically to DWR on June 15, 2016, prior to July 1, 2016.

Code Requirement: CWC §10635(b) Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 60 days after the submission of the plan to DWR.

CWC §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

District Actions Taken: On June 22, 2016, the District provided the cities and counties a hard copy of its updated 2015-2020 UWMP, which includes the Water Shortage Contingency Plan. Reference the example letter on the following pages and recipient list below.

Code Requirement: CWC §10644(a) Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.

District Actions Taken: On June 22, 2016, the District provided the California State Library a copy of its updated 2015-2020 UWMP. Reference the letter on the following pages.

Code Requirement: CWC §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.

District Actions Taken: On June 15, 2016, the District has made a copy of its updated 2015-2020 UWMP available for public inspection on the District's website and at the District headquarters, located at 43885 South Grimmer Boulevard, Fremont, during normal business hours.

Recipients of Transmittal Letters, dated June 22, 2016, to Cities and Counties

Contact	Organization
Fran David	City of Hayward
Fred Diaz	City of Fremont
Antonio E. Acosta	City of Union City
John Becker	City of Newark
Susan Muranishi	Alameda County

ALAMEDA COUNTY WATER DISTRICT

43885 SOUTH GRIMMER BOULEVARD • FREMONT, CALIFORNIA 94538
(510) 668-4200 • FAX (510) 770-1793 • www.acwd.org

June 14, 2016

Department of Water Resources
Statewide Integrated Water Management
Water Use Efficiency Branch
P.O. Box 942836
Sacramento, CA 94236-0001

Attention: Coordinator, Urban Water Management Plans

Subject: 2015-2020 Urban Water Management Plan

Enclosed please find a copy of ACWD's 2015-2020 Urban Water Management Plan (UWMP) update and a copy, in Appendix F, of ACWD Board of Directors Resolution No. 16-039 adopting the UWMP and SBx7-7 Compliance Method on June 9, 2016. Copies of the UWMP will also be provided to the cities in the ACWD service area (Fremont, Hayward, Newark and Union City), Alameda County, and the California State Library. A copy of the adopted UWMP is available for public review on the ACWD website and at the ACWD headquarters during normal business hours.

If you have any questions or comments, please contact Leonard Ash at (510) 668-4209 or leonard.ash@acwd.com.

Sincerely,

Robert Shaver
General Manager

la/mh
Enclosures
By Electronic Submittal

ALAMEDA COUNTY WATER DISTRICT

DIRECTORS

JAMES G. GUNTHER
JUDY C. HUANG
MARTIN L. KOLLER
PAUL SETHY
JOHN H. WEED

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MANAGEMENT

ROBERT SHAVER
General Manager
SHELLEY BURGETT
Finance
STEVEN D. INN
Water Resources
STEVE PETERSON
Operations and Maintenance
ED STEVENSON
Engineering and Technology Services

June 22, 2016

Ms. Fran David
City Manager
City of Hayward
777 B Street, 4th Floor
Hayward, CA 94541

Dear Ms. David:

Subject: 2015-2020 Urban Water Management Plan

Enclosed please find a copy of ACWD's 2015-2020 Urban Water Management Plan (UWMP) update and a copy, in Appendix F, of ACWD Board of Directors Resolution No. 16-039 adopting the UWMP and SBx7-7 Compliance Method on June 9, 2016.

If you have any questions or comments, please contact Leonard Ash at (510) 668-4209 or leonard.ash@acwd.com.

Sincerely,

Robert Shaver
General Manager

la/mh
Enclosure

ALAMEDA COUNTY WATER DISTRICT

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(510) 668-4200 • FAX (510) 770-1793 • www.acwd.org

June 22, 2016

California State Library
Government Publication Section
P.O. Box 942837
Sacramento, CA 94237-0001

Attention: Coordinator, Urban Water Management Plans

Subject: Alameda County Water District's 2015-2020 Urban Water Management Plan

As required under the California Water Code, enclosed please find a copy of Alameda County Water District's (ACWD's) 2015 – 2020 Urban Water Management Plan (UWMP) update and a copy, in Appendix F, of ACWD Board of Directors Resolution No. 16-039 adopting the UWMP and SBx7-7 Compliance Method on June 9, 2016.

If you have any questions or comments, please contact Leonard Ash at (510) 668-4209 or leonard.ash@acwd.com.

Sincerely,

Robert Shaver
General Manager

la/mh
Enclosure

REFERENCES

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Alameda County Water District

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