City of Sunnyvale

2015 Urban Water Management Plan – DRAFT

Prepared by HydroScience Engineers, Inc.

June 2016

HydroScience
Strategic Water Solutions

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SECTION 1 – INTRODUCTION AND OVERVIEW

The City of Sunnyvale's (City) 2015 Urban Water Management Plan (UWMP) was prepared to provide a comprehensive update to the 2010 UWMP, which was adopted by City Council on June 28, 2011. The 1983 California Urban Water Management Act (Act), also referred to as Assembly Bill (AB) 797, requires all urban water suppliers who directly serve 3,000 or more customers or who provide 3,000 or more acre-feet of water per year, to prepare a UWMP every five years.

This plan will enable the State Department of Water Resources (DWR) to make projections on water usage and determine the status of water conservation efforts throughout the State. Although the efficient use of water supplies is a statewide concern, the planning and implementation of such use can best be accomplished at the local level.

The 2015 update to the City's 2010 UWMP builds upon previous updates, incorporates relevant water management issues and addresses supply and demand projections for the next 25 years within the City. It incorporates State legislative mandates that have been enacted, in particular Senate Bill (SB) X7-7, the Water Conservation Act of 2009, and AB 1420 Water Demand Management Measures. These legislative mandates target a 20% water use reduction per capita by 2020. Specific requirements include identifying the base daily per capita water use (baseline), urban water use target, interim water use target, and compliant daily per capita water use.

The 2015 UWMP must also include information on water deliveries and uses; water supply sources; efficient water uses; and demand management measures, including implementation strategy and schedule. DWR has the responsibility for the review and certification process of the UWMP pursuant to the Act. A current UWMP is required in order to be eligible for a water management grant or loan administered by the State including DWR, the State Water Resources Control Board, or the Delta Stewardship Council.

The goals of the 2015 UWMP update include:

- To provide a valuable resource tool to be used by policy makers at City, County, and local government levels to facilitate making sound and consistent decisions relating to water management and regional growth in the area.
- To meet all Federal and State regulatory requirements.
- To update the City's water conservation plan and projections for future conservation efforts.
- To identify communication links between key departments at both City and County levels, and to strengthen ties for cooperatively addressing water supply and land use planning issues.
- To continue and solidify relationships with other retailers and wholesalers to better address issues concerning water supply and demand.

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SECTION 2 – PLAN PREPARATION

The City retained HydroScience Engineers to prepare the 2015 UWMP update. The plan was prepared in accordance with the *Final Draft 2015 Urban Water Management Plans: Guidebook for Urban Water Suppliers* dated January 2016 (Guidebook). The consultant worked closely with the City's Environmental Services Department during the development of the UWMP to assure accurate and updated information was collected and incorporated. The plan organization and coordination efforts are detailed below.

2.1 Plan Organization

The 2015 UWMP is organized as recommended in the Guidebook to expedite review and approval by DWR. The sections contained in the 2015 UWMP are as follows:

- Section 1 – Introduction and Overview
- Section 2 – Plan Preparation
- Section 3 – System Description
- Section 4 – System Water Use
- Section 5 – Baselines and Targets
- Section 6 – System Supplies
- Section 7 – Water Supply Reliability
- Section 8 – Water Shortage Contingency Planning
- Section 9 – Demand Management Measures
- Section 10 – Plan Adoption, Submittal, and Implementation

2.2 Inclusion of All 2015 Data

The 2015 UWMP includes all data for water use and planning for the calendar year of 2015. Data is shown in calendar year with units in acre-feet (AF).

2.3 Coordination

The City participates in area and regional planning with the Bay Area Water Supply and Conservation Agency (BAWSCA), the San Francisco Public Utilities Commission (SFPUC) and the Santa Clara Valley Water District (SCVWD). Sunnyvale also participates in basin-wide groundwater and conservation planning with SCVWD. SCVWD provides management of local groundwater resources and contracts for imported water to Santa Clara County. Participation in these planning efforts helps ensure that the City will receive an adequate amount of water to provide for its residents and businesses. It also provides for drought-condition planning and coordination with the rest of the region so that no particular water provider is unduly impacted by lack of water.

The City contacted the SFPUC (through BAWSCA) and the SCVWD for assistance with its UWMP and at the same time provided those agencies with pertinent data for their own plans.

The City encouraged the involvement of social, cultural and economic community groups during the preparation of the 2015 UWMP. Specific efforts were made to send out a public notification mailer to all community groups, including public and private water suppliers. BAWSCA agencies were notified of the 2015 preparation process. The City directed these agencies to the location of the Draft UWMP and solicited comments and suggestions.

The City published its intention to update the 2010 UWMP, and invited public comments on the City's Web page. The City also published a notice of intention in the Sunnyvale Sun, part of the ~~San Jose Mercury News~~Bay Area News Group. Copies of notices for participation in the 2015 UWMP preparation can be found in **Appendix A**.

A Notice of Preparation of the UWMP was sent to the following agencies listed in **Table 2-1**~~**Table 2-1**~~.

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Table 2-1: List of Notified Agencies

AGENCY NAME	
ALAMEDA COUNTY WATER DISTRICT	SANTA CLARA VALLEY WATER DISTRICT
CITY OF HAYWARD	MID-PENINSULA WATER DISTRICT
CITY OF MILPITAS	NORTH COAST COUNTY WATER DISTRICT
CITY OF MOUNTAIN VIEW	CITY OF EAST PALO ALTO
CITY OF PALO ALTO	WESTBOROUGH WATER DISTRICT
CITY OF SANTA CLARA	CALIFORNIA WATER SERVICE COMPANY
STANFORD UNIVERSITY	GREAT OAKS WATER COMPANY
PURISSMA HILLS WATER DISTRICT	SAN JOSE WATER COMPANY
CITY OF BRISBANE	CITY OF SAN JOSE
CITY OF BURLINGAME	CITY OF GILROY
CITY OF DALY CITY	CITY OF MORGAN HILL
TOWN OF HILSBOROUGH	COUNTY OF SANTA CLARA
CITY OF MENLO PARK	SAN JOSE/SANTA CLARA WATER POLLUTION PLANT
CITY OF MILLBRAE	
CITY OF REDWOOD CITY	BAY AREA WATER SUPPLY & CONSERVATION AGENCY
CITY OF SAN BRUNO	
COASTSIDE COUNTY WATER DISTRICT	SAN FRANCISCO PUBLIC UTILITIES COMMISSION

SECTION 3 – SYSTEM DESCRIPTION

This section provides information about the City and service area including the organization structure and history, climate, demographics, and the water distribution system.

3.1 History

The City of Sunnyvale was incorporated in 1912 and became an official charter city in 1950. When the City was incorporated in 1912, its population was approximately 1,500 and the entire municipal water system relied exclusively on groundwater for its potable water supply source. The original water supply source was from a privately-owned well at the Joshua Hendy Iron Works Factory in Sunnyvale. By 1926, a total of three wells were operational, none of which are in use today. During World War II, the Federal government awarded several war contracts that led to the development of the Central Water Plant and groundwater well.

At the close of World War II, Sunnyvale began to grow very quickly. By the early 1950s, demand for water surpassed the supplies available from groundwater and led to overdraft of the aquifers. As a direct consequence of the overdraft of the groundwater, land subsidence in the northern region of the City was at 0.3 feet per year. By 1952, the population had grown to 10,000, and it was at that time that Sunnyvale entered into a contractual agreement with the City and County of San Francisco for delivery of imported SFPUC water. That same year, three connections were made to the SFPUC supply to serve as a primary water source, to be supplemented by the now seven City-owned and operated wells located throughout the City. In the 17 years that followed, the City population grew to 96,000. Sunnyvale realized the need for an additional water supply source, and contracted with the SCVWD for two connections to the SCVWD's West Pipeline. By 1970, the City had developed three of its four current water supply sources (SFPUC/Hetch Hetchy, SCVWD Central Valley Project water, and City-owned wells).

As the demand for water was steadily on the rise during the period of 1970 through the mid-1980s, the City expanded the number of Hetch Hetchy connections to its current total of six. Sunnyvale also added two well water producing facilities, which gave the City a total of 11 City-owned and operated wells at that time.

The City also expanded its interconnections with surrounding water utilities in the immediate area to ensure a sustainable water supply during times of emergencies, thus adding to the system's reliability. The City has, at the present time, connections to the cities of Mountain View, Cupertino and Santa Clara, as well as to the California Water Service Company.

The water demand reached an all-time-high in 1987 and demand was expected to increase, reaching approximately 36,000 acre-feet per year (AFY) at the projected system build-out. The six-year drought that started in the late 1980s and ended in the mid-1990s brought about many changes in water usage, which came largely from the industrial sector. Conservation measures and a recycled water program adopted by the City were some of the most important drought-induced changes. Changes in the economic dynamics of the area occurring after 2001 brought about new reductions to the water demand. Current projections for the water system build-out expect a slow increase to less than 30,000 AFY over the next 30 years.

3.2 Organization Structure

The City operates under a Council-manager form of government. Council, as the legislative body, represents the entire community and is empowered by the City Charter to formulate citywide policy. Seven Council members are elected at large by City voters for numbered seats and serve four-year terms. The City Charter limits Council members to serving two consecutive terms. The Mayor and Vice Mayor are selected from among the ranks of the Council and serve two year and one year terms respectively. The City Manager is appointed by Council and serves as the Chief Executive Officer, responsible for day-to-day administration of City affairs and implementation of Council policies. Boards and commissions, through public meetings, advise the City Council on policy issues. The City Council meetings are open to the public with few exceptions as allowed by law and take place between one and four Tuesdays per month.

The City's water utility is managed, operated, and maintained by the Environmental Services Department. This Division is responsible for the purchase and distribution of potable and non-potable water as well as construction of new and replacement infrastructure.

3.3 Climate

The City enjoys a generally mild, temperate climate with relatively low levels of precipitation. Daytime temperatures range from the mid 80's during the summer to typically not less than 50°F in the winter. Climate information for the area is illustrated in Table 3-1~~Table 3-1~~.

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Table 3-1: Local Climate Data

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Tot/ Avg
Monthly Average ET_o (inches) [1,2]	1.43	1.89	3.37	4.42	5.54	6.01	6.2	5.53	4.35	3.05	1.69	1.31	44.79
Average Total Rainfall (inches) [3]	2.88	2.69	2.31	1.2	0.44	0.1	0.02	0.07	0.19	0.76	1.5	2.41	14.57
Average Max Temperature (°F) [3]	58.1	61.9	65.4	69.5	74.2	79	81.8	81.3	80.4	74.3	65.2	58.5	70.8
Average Min Temperature (°F) [3]	40.9	43.5	45.2	46.9	50.5	53.8	56.1	56.2	55.2	51.3	45.3	41.5	48.87

Notes:
1. ET_o = Evapotranspiration is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues).
2. California Irrigation Management Information System (CIMIS) Station 171 – Union City
3. Western Regional Climate Center Station 047821 – San Jose

3.4 Service Area Population

The City provides water service to a population of approximately 148,028 people. City population is projected to increase approximately 23% in the next 25 years. Population estimates as shown in Table 3-2~~Table 3-2~~ were calculated using the DWR methodology 2, Category 1 since the City's service area overlaps the City boundaries by more than 95%. The

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population estimates are from the December 2014 population projections by County provided by the State Department of Finance (DOF).

Table 3-2: Population Projections for City of Sunnyvale

	2015	2020	2025	2030	2035	2040
City Population[1]	148,028	154,324	161,290	168,445	175,673	182,596

Notes:
1. Population extrapolated from Department of Finance projections for Santa Clara County.

3.5 Demographics

The City is a diverse community with a residential population of approximately 148,028, of which over 106,000 are estimated to be of working age (age 20+). Residents are generally well educated, with approximately 59% having a bachelor's degree or higher.

The City has one of the highest incomes per household in the nation, coupled with one of the lowest crime rates for a city of its size. It has a solid economic base, and poverty levels in the City have remained consistently lower than those of Santa Clara County or the State. With its Silicon Valley location, the City has a solid high-tech presence having transitioned from agricultural to defense to the current high tech economy. It has remained on the cutting edge of Silicon Valley's innovation. The top industries in the City include professional, scientific and management, and administrative and waste management services (25.6%); manufacturing (22%); education services, health care and social assistance (14.6%); retail trade (9.2%); and recreation/hospitality (5.6%). The City is home to growing clusters of emerging technology companies in the high-tech and biotechnology industries. The following are some other demographic factors:

- Total employment generated by City businesses is estimated to be 96,774.
- The average household income is approximately $100,043.
- As of 2013, there were nearly 57,000 housing units. Based ~~in~~ on Association of Bay Area Governments (ABAG) projections, Sunnyvale will need an additional 5,452 through the year 2023 to accommodate their share of growth in the Bay Area.
- Eight industrial areas were rezoned with an Industrial to Residential Combining District (ITR). The ITR district allows industrial, office, commercial, and residential uses to exist within the same district while gradually converting to residential use. The ITR Combining District now includes approximately 320 acres, accommodating up to 7,700 dwelling units.

3.5.1 Low-Income Housing

With over 1,300 units, Sunnyvale has actively supported affordable rental housing utilizing a variety of local, State and Federal funds, and works extensively with non-profit housing developers in the ownership and management of its projects. Rent-restricted housing in Sunnyvale includes both publicly subsidized affordable housing, generally assisted with any combination of Federal, State, local, and/or private subsidies, and deed-restricted rental units provided through the City's Below Market Rate (BMR) program. Sunnyvale's BMR program currently requires new developments of eight or more ownership units to offer 12.5 percent of

units in ownership developments at prices affordable to moderate-income purchasers. There are no longer any BMR requirements for new rental developments, due to the 2009 Palmer vs. Los Angeles court case, however a number of existing rental properties remain subject to BMR requirements imposed pre-Palmer based on recorded developer agreements with terms of 20-55 years. Additional detailed demographic data can be found in **Appendix B**.

3.6 Service Area Description

The City of Sunnyvale has an approximate area of 24 square miles and is located in Santa Clara County, just minutes from the City of San Jose and approximately 40 miles south of the City and County of San Francisco. The City retails potable drinking water and non-potable water within the City limits. As recycled water pipelines are built to serve communities beyond city limits, the City will become a wholesaler of recycled water. California Water Service Company (Cal Water), an investor-owned water utility, retails potable drinking water from Cal Water owned groundwater wells in pocket areas of the City (see **Figure 3-1**: City of Sunnyvale Service Area Map ~~**Figure 3-1**: City of Sunnyvale Service Area Map~~).

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3.6.1 Distribution System

The City owns, operates, and maintains a water supply and distribution system worth in excess of $200 million. The system is a closed network consisting of three different pressure zones. Sunnyvale's elevation varies from sea level at the northern end of town to approximately 300 feet above sea level at the southwest corner of town. Zone I extends roughly from El Camino Real northward to the San Francisco Bay and is supplied primarily by SFPUC water. Zone II consists of everything south of Zone I with the exception of the southwest corner of the City and is served by a supply mixture of SFPUC water, City groundwater wells, and SCVWD treated water. Zone III serves the southwest section of town with Hollenbeck Avenue on the east side and Fremont Avenue on the north side and is served by a combination of SCVWD treated water and City well water. The conveyance system extends over 300 miles in length, with pipe diameters ranging from 4 inches to 36 inches.

Water pressure within the distribution system is maintained within a range of 40 pounds per square inch (psi) to 105 psi throughout all three zones. A Supervisory Control and Data Acquisition (SCADA) system allows the City to maintain a balanced system, generally keeping water deliveries between those pressure readings. Zone I receives direct downstream pressure from the SFPUC pipeline system with an operating pressure of approximately 130 psi, though that pressure is reduced through the use of pressure regulating valves before it is delivered to customers.

Several pocketed areas within the City boundaries, located primarily along Fremont Avenue and Sunnyvale-Saratoga Road, receive water from Cal Water. These areas were at one time part of unincorporated Santa Clara County, but have since been annexed by the City. Cal Water produces its own water from wells the company owns exclusively. The City, through a cooperative effort, provides emergency connections to Cal Water's system to improve fire flows when needed.

There are eight potable water storage reservoirs at four different locations throughout the City with a total storage capacity of 26.5 million gallons. There is also one recycled water reservoir with a storage capacity of two million gallons. This volume of water can meet at least one day

of average water demand during the summer and up to two days of average water demand during the winter for the entire City.

Figure 3-1: City of Sunnyvale Service Area Map

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SECTION 4 – SYSTEM WATER USE

This section provides information on past, current, and projected water use within the City's service area. Note that water use is provided on a calendar year basis.

4.1 Water Demands and Demand Projections

The City of Sunnyvale categorizes its water accounts into five broad customer categories: single-family, multi-family, commercial (incorporating industrial and institutional or CII), irrigation, and fire services. The commercial sector includes all non-residential accounts that are not classified as irrigation.

Past, current, and projected water use in the City are summarized by sector, or customer classification, in **Table 4-1**~~**Table 4-1**~~, and by source in **Table 4-2**~~**Table 4-2**~~. Population is a primary factor affecting urban water demand; with increasing population, it is expected that overall water demand will also increase.

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Table 4-1: Past, Current, and Projected Water Use by Customer Type (AFY)

Customer Type	2010	2015	2020	2025	2030	2035
Single family residential	7,023	5,449	7,740	7,784	7,363	6,894
Multi-family residential	8,309	4,452	6,324	6,360	6,015	5,633
CII	4,261	3,806	6,186	7,685	9,118	10,941
Irrigation (potable)	970	1,374	1,952	1,963	1,857	1,738
Other (Firelines)	911	9	12	13	12	11
Total Potable	**21,474**	**15,090**	**22,214**	**23,805**	**24,365**	**25,218**

Table 4-2: Projected Potable Water Demand by Source (AFY)

Service Area	2015	2020	2025	2030	2035
SFPUC	8,883	11,124	12,266	12,266	12,266
SCVWD	6,497	10,642	11,202	11,762	12,614
Wells	134	448	336	336	336
Conservation	6,139	840	1,075	1,120	1,154
Total Demand	**21,653**	**23,054**	**24,879**	**25,484**	**26,370**

As can be seen from the data presented, water use in 2015 was significantly lower than 2010. The decrease in demand can be attributed to water conservation measures related to drought conditions. It is expected that water use will increase again by 2020, assuming normal water year conditions are achieved by that time. Under normal water year conditions, it is expected that a majority of water conserving measures will roll back, particularly irrigation of landscaping.

4.2 System Water Losses

Water loss within the City's distribution system can occur from various causes such as leaks, breaks, malfunctioning valves and the difference between the actual and measured quantities from water meter inaccuracies. Other losses come from legitimate uses such as water/sewer main and hydrant flushing, tests of fire suppression systems, and street cleaning.

The system losses experienced by Sunnyvale's water distribution system have historically been between 4% and 8% and are thus substantially lower than the 10% losses normally experienced by systems in urban areas (AWWA, Water Resource Planning; Manual of Water Supply Practices M50, 2001, p33), as shown on **Table 4-3**~~Table 4-3~~. Ninety-five percent of public water distribution systems experience losses between 7% and 15%. The system loss projections and total demand projections contained in this UWMP assume a future system loss percentage of approximately 6%, which represents a conservative estimate based on the actual system losses historically experienced by the City. In 2015, the water loss was estimated to be 1% calculated using the AWWA Water Loss Tool.

Table 4-3~~Table 4-3~~ provides all other water uses and losses that are not accounted for in the past, current, and projected demands associated with user demand. Saline water intrusion barriers, groundwater recharge, and conjunctive use are not shown below since these uses are managed by SCVWD and are reflected in SCVWD's UWMP for the entire County.

Table 4-3: Additional Water Uses and Losses (AFY)

Water Use	2015	2020	2025	2030	2035
Recycled Water	717	1,456	1,568	1,680	1,680
System Losses	930	1,332	1,428	1,461	1,213
Total	**1,647**	**2,788**	**2,996**	**3,141**	**2,895**

4.3 Low Income Housing Water Use Projection

Section 10631.1(a) of the California Water Code requires that the water use projections specifically identify the projected water use for lower income single-family and multi-family residential homes. The City projects that there will be 3,150 Affordable Housing rentals, 863 Below Market Rate (BMR) rentals, and 751 BMR ownership units in 2023 based on the current number of units and the various BMR and Affordable Housing restrictions and expirations, which apply to current and new developments (City of Sunnyvale, Housing Element of the General Plan January 31, 2015 – January 31, 2023, December 2014). Projections for additional units beyond 2023 are unknown at this time.

Projected water use is based on the number of units, the average household size within the City, and the projected water use factors. Projected water use factors are based on the forecasted populations and water demands through 2035. **Table 4-4**~~Table 4-4~~ provides the water use projection for lower income households within the City service area (these demands are already included in **Table 4-1**~~Table 4-1~~ and **Table 4-2**~~Table 4-2~~).

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Table 4-4: Lower Income Estimated Current and Projected Water Use (AFY)

Customer Type	2015	2020	2025	2030	2035
Single family residential (BMR Units)	116	160	164	161	159
Multi-family residential (Affordable Housing + BMR Units)	427	585	601	589	584
Total Water Use	**543**	**746**	**765**	**749**	**744**

Notes:
1. Average Household Size of 2.6, Community Economic Profile, June 2015, City of Sunnyvale

4.4 Water Demand Projections for Wholesale Water Agencies

No water was sold to other agencies. **Table 4-5~~Table 4-5~~** (below) depicts the projected demands given to each wholesale water agency from which the City receives water. A copy of the documentation provided to the wholesale agencies is provided in **Appendix C**.

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Table 4-5: Water Demand Projections for Wholesale Water Agencies (AFY)

Customer Type	Contracted Volume	2015	2020	2025	2030	2035
SFPUC	10,003	8,883	11,124	12,266	12,266	12,266
SCVWD	10,409	6,497	10,642	11,202	11,762	12,614

4.5 Water Use Reduction Plan

The City's General Plan, consolidated in 2011, contains short and long range goals for water conservation. In the Environmental Management Chapter (Chapter 7), the Plan states the following:

- **GOAL EM-2:** Water Conservation – Promote more efficient use of the City's water resources to reduce the demands placed on the City's water supplies.
- **Policy EM-2.1** – Lower overall water demand through the effective use of water conservation programs in the residential, commercial, industrial and landscaping arenas.

Current water use is at approximately 96 gpcd, which is less than the interim 2015 target of 166 gpcd. Assuming that the City can maintain or improve water use on a per capita basis, then the City is on target to meet the 2020 objective of 159 gpcd.

In an effort to decrease overall system demand, the City is currently working (in cooperation with SCVWD and other agencies) on water conservation education and outreach programs. Specifically, the City and/or its partnering agencies are implementing outreach and education to residential and commercial water users regarding water-wise and drought resistant landscaping and the increased use of recycled water. The details of each water use reduction program and the City's implementation plan are further discussed in **SECTION 9** (Demand Management Measures).

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SECTION 5 – BASELINES AND TARGETS

5.1 Historical Water Use

Water use varies throughout the years depending on several natural factors including the weather and the extension of seasons, but is also dependent on other factors such as business climate and the economy. Recognizing long-term general trends in water requirements is valuable in projecting future supply needs. Water use in Sunnyvale generally increased during the period of 1995 to 2001 and steadily decreased since 2002 in response to drought-related conservation measures, economic factors and based on contractual limitations previously negotiated. The City converted its traditional sewer treatment plant in the mid 1990's to allow for the production of recycled water and began using recycled water in 1999, supplementing the overall water supply. The City strategically plans its purchases of water from SCVWD and SFPUC based on cost, so the increase in deliveries from one source will generally be accompanied by a decrease from the other. Table 5-1~~Table 5-1~~ reflects the total annual water production in acre-feet per year (AFY) by the City since 1995.

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Table 5-1: Historical and Present Water Production (AFY)

Year	SFPUC Hetch Hetchy	SCVWD	Local Wells	Recycled Water	Total Water Production
1995	12,552	9,491	1,132	0	23,176
1996	12,216	12,915	616	0	25,747
1997	12,372	13,389	630	0	26,391
1998	11,916	12,378	667	0	24,962
1999	11,058	13,577	713	639	25,987
2000	11,192	12,372	1,649	437	25,649
2001	10,730	12,773	1,189	1,317	26,008
2002	10,096	13,094	1,367	1,296	25,852
2003	11,195	10,773	1,521	1,823	25,311
2004	9,927	11,916	1,395	1,783	25,021
2005	10,868	10,232	1,631	1,851	24,582
2006	10,322	10,524	1,113	1,928	23,887
2007	10,723	9,587	2,696	1,874	24,879
2008	12,675	9,675	1,006	1,576	24,932
2009	11,720	8,176	1,231	1,486	22,613
2010	8,982	9,331	1,629	1,523	21,465
2011	9,930	8,572	467	697	19,665
2012	9,705	10,672	143	0	20,519
2013	11,031	10,417	123	0	21,571
2014	8,454	8,491	2,064	0	19,008
2015	8,882	6,592	148	729	16,350

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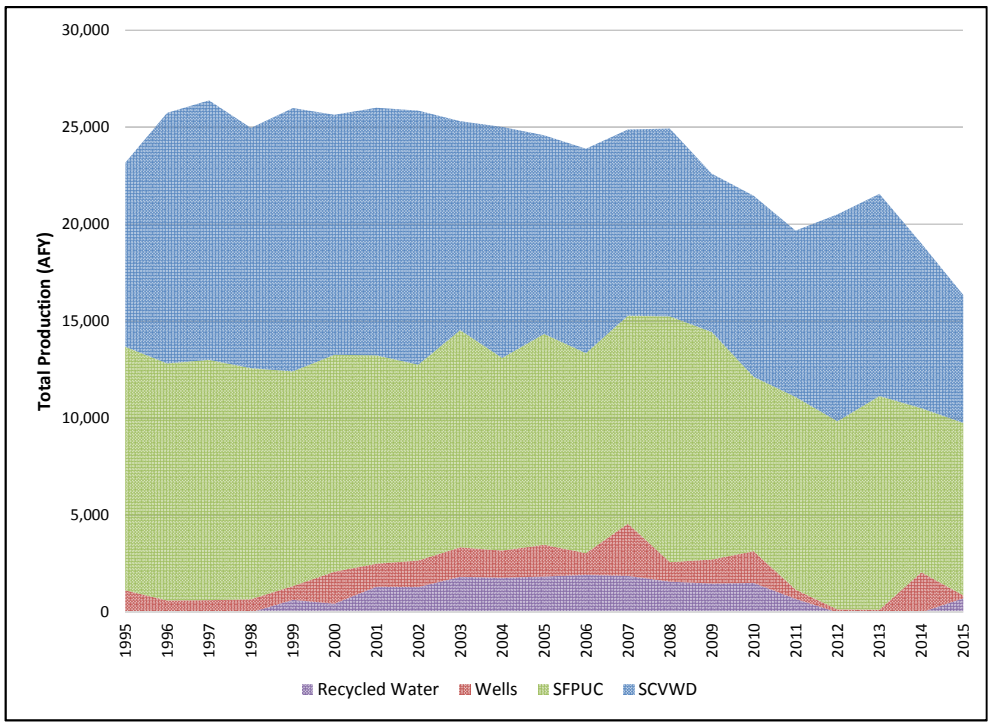
Figure 5-1~~Figure 5-1~~ (below) is a graphical depiction of the annual water production from the City's four water supply sources during the period of 1995 to 2015.

Figure 5-1: Annual Water Production 1995-2015 (AFY)



5.2 Baseline Water Use

In accordance with the Water Conservation Act of 2009, water suppliers must identify a 10- or 15-year water use period for use as the basis for calculating their Base Daily Water Use. This value serves as the baseline for computing future required reductions in gallons per capita per day (gpcd). By 2015, the per capita water use in the retailer's service area must be reduced by ten percent (10%) from the baseline. By 2020, per capita water use must be reduced by twenty percent (20%). In addition, the legislation requires that suppliers must come up with a 5-year baseline period to calculate minimum water use reductions.

For recycled water retailers, there is the option to use a base period of up to 15 years for calculating their Base Daily Water Use. The baseline determination is dependent upon recycled water use during 2008 as a percentage of total water use. If the recycled water use in 2008 was greater than 10% of the total water use, the retailer has the option to use a 15 year baseline. Based on Sunnyvale's 2008 recycled water use, the City is not eligible for the 15-year base period. Thus, the baseline water use is calculated using a 10-year base period.

The base period determination is shown in Table 5-2~~Table 5-2~~. The selected period of 1995 to 2004 is representative of long-term water use for the City. The 5-year base period used to calculate the minimum water use reduction requirement is also shown on Table 5-2~~Table 5-2~~. The period from 2003-2007 was selected for the City's 5-year base.

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Table 5-2: Base Water Use Periods

Parameter	Value
2008 total water deliveries	24,932 AFY
2008 total volume of delivered recycled water	1,576 AFY
2008 recycled water as a percent of total deliveries	6.3%
Number of years in base period[1]	10 years
Year beginning base period range	1995
Year ending base period range	2004
Number of years in base period	5 years
Year beginning base period range	2003
Year ending base period range	2007

Notes:
1. The City is not eligible for the 15-year base period based on the recycled water use during 2008.

Table 5-3~~Table 5-3~~ and Table 5-4~~Table 5-4~~ show the water use rates for each year within the 5 and 10-year baseline periods as well as the base daily per capita water use for each use range.

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Table 5-3: Base Daily per Capita Water Use (10-year Range)

Year	Service Area Population	Gross Water Use (MGD)	Daily per capita water use (gpcd)
1995	124,333	20.69	166
1996	125,841	22.98	183
1997	128,168	23.56	184
1998	129,464	22.28	172
1999	131,127	23.20	177
2000	131,760	22.90	174
2001	132,592	23.22	176
2002	133,424	23.08	175
2003	134,256	22.60	171
2004	135,088	22.34	170
Baseline per capita water use (1995-2004)			**175**

Notes:
1. Population estimates updated for years 2001 through 2004 based on 2010 census using a straight-line approximation.

Table 5-4: Compliance Base Daily per Capita Water Use (5-year Range)

Year	Service Area Population	Gross Water Use (MGD)	Daily per capita water use (gpcd)
2003	131,769	22.60	171
2004	131,647	22.34	170
2005	131,853	21.95	166
2006	132,630	21.33	161
2007	134,232	22.21	165
Baseline per capita water use (2003-2007)			**167**

The baseline per capita water use for the period of 1995-2004 is 175 gpcd as shown on Table 5-3~~Table 5-3~~. The population estimates were calculated using the DWR methodology and Department of Finance (DOF) data. Baseline per capita water use during the 5-year compliance period is calculated to be 167 gpcd, as shown on Table 5-4~~Table 5-4~~. Because the 5-year baseline per capita water use is greater than 100 gpcd, the minimum water use reduction requirement must also be calculated. The calculation is used to determine whether the City's 2015 and 2020 water use targets meet the minimum water use reduction requirement (per Section 10608.22 of the California Water Code).

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5.3 Water Use Targets

Four methods are allowed by Water Conservation Bill of 2009 for calculating the 2015 and 2020 water use targets. The first method was used (wherein per capita daily water use in 2020 is 80% of the base daily per capita water use), because it is the most applicable to available data as well as the water use and demographic characteristics of the service area. The target 2020 per capita water use target cannot exceed 95% of the five-year compliance baseline water use. Target water use in 2015 should be 90% of the base daily per capita water use.

A summary of the baselines, targets, and Method 1 minimum water use reduction values are presented in Table 5-5~~Table 5-5~~.

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Table 5-5: Base Daily per Capita Water Use (5-year Range)

Parameter	Daily per capita water use (gpcd)
10-year Baseline per capita water use (1995-2004)	175
5-year Baseline per capita water use (2003-2007)	167
2020 minimum water use target (95% of 5-year baseline)	159
Method 1 2015 water use target (90% of 10-year baseline)	158
Method 1 2020 water use target (80% of 10-year baseline)	140

The Method 1 2020 target of 140 gpcd is below the minimum water use target of 159 gpcd; therefore, no adjustment to the 2020 target is necessary. Due to water conserving efforts citywide, current 2015 water use is at a low of 96 gpcd, meeting the 2015 target of 158 gpcd. The 2020 projected per capita water use is 128 gpcd, meeting the 2020 target of 140 gpcd.

SECTION 6 – SYSTEM SUPPLIES

The City has three sources of potable water supply: purchased surface water from SFPUC, purchased treated surface water from SCVWD, and groundwater from six, City-owned and operated wells. One additional well remains on stand-by for emergencies. The City also has distribution system inter-ties to the cities of Cupertino, Mountain View, and Santa Clara as well as to California Water Service Company through service connections located within city boundaries that are reserved for use in case of an emergency. A source of non-potable water comes from the City's Water Pollution Control Plant (WPCP or Plant) in the form of recycled water.

Figure 6-1~~Figure 6-1~~ depicts the percentage of water supply from each source for Calendar Year 2015 and Table 6-1~~Table 6-1~~ presents the current water supplies for the City. Table 6-2~~Table 6-2~~ shows the planned water supply as determined by the City.

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Figure 6-1: City of Sunnyvale Sources of Water Supply

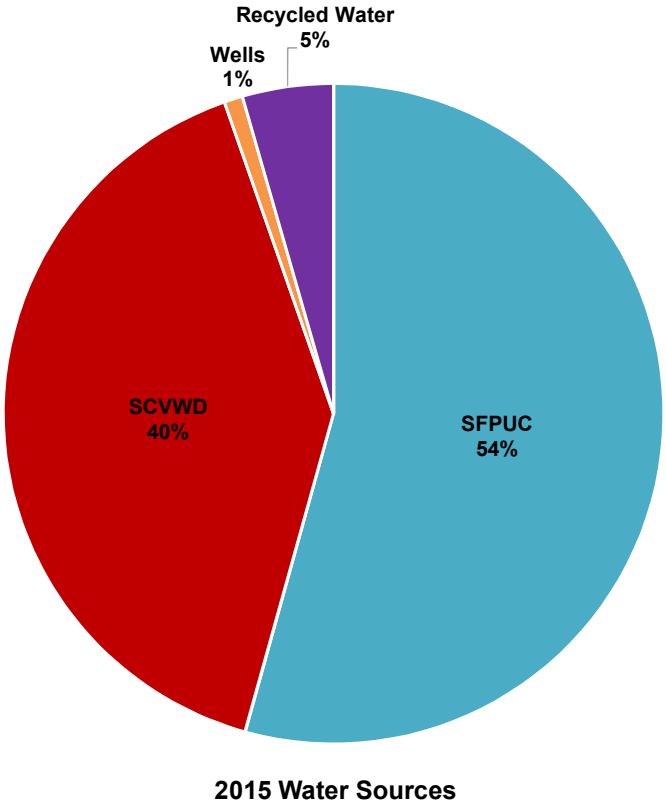

Table 6-1: Water Supplies for 2015 – Actual (AFY)

Water Supply Source	Supply Type	Water Quality	Volume
SFPUC	Purchased	Drinking Water	8,883
SCVWD	Purchased	Drinking Water	6,497
Wells	Groundwater	Drinking Water	134
Recycled Water	Tertiary-treated	Recycled Water	717
		Total	**16,605**

Table 6-2: Water Supplies – Projected (AFY)

Water Supply	Total Right or Safe Yield	2020	2025	2030	2035	2040
SFPUC Purchased Water	14,100	11,124	12,266	12,266	12,266	12,266
SCVWD Purchased Water	-	10,642	11,202	11,762	12,614	12,726
Local Groundwater Wells	8,000	448	336	336	336	336
Recycled Water	-	1,456	1,568	1,680	1,680	1,680
Total		**23,670**	**25,373**	**26,045**	**26,898**	**27,009**

6.1 Purchased Water

6.1.1 SFPUC – Wholesaler (Surface Water)

The City receives water from the City and County of San Francisco's Regional Water System (RWS), operated by 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. Due to these constraints, the SFPUC is very dependent on reservoir storage to ensure ongoing reliability of its water supplies.

The SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from Hetch Hetchy. The local watershed facilities are operated to capture local runoff.

The business relationship between the SFPUC 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" (WSA) entered into in July 2009. This 25 year WSA replaced the Settlement Agreement and Master Water Sales Contract that expired in June 2009. The WSA addresses the rate-making methodology used by the SFPUC in setting wholesale water rates for its customers in addition to addressing water supply and water shortages for the RWS.

The WSA is supplemented by an individual Water Supply Contract between SFPUC and each individual retailer, also entered into in July 2009. These contracts also expire in 25 years. The City of Sunnyvale has an Individual Supply Guarantee (ISG) of 12.58 MGD (or approximately 14,100 AFY). Although the WSA and accompanying Water Supply Contract expire in 2034, the ISG (which quantifies San Francisco's obligation to supply water to its individual wholesale customers) survives their expiration and continues indefinitely. The Sunnyvale contract also includes a minimum purchase amount of 8.93 MGD (10,003 AFY), which Sunnyvale agrees to buy, regardless of whether sales drop below this level.

As previously stated, the WSA provides for a 184 MGD (expressed on an annual average basis) Supply Assurance to the SFPUC's wholesale customers. This Assurance is subject to reduction, to the extent and for the period made necessary by reason of water shortage, due to drought, emergencies, or by malfunctioning or rehabilitation of the regional water system. The WSA does not guarantee that San Francisco will meet peak daily or hourly customer demands when their annual usage exceeds the Supply Assurance. The SFPUC's wholesale customers have agreed to the allocation of the 184 MGD Supply Assurance among themselves, with each entity's share of the Supply Assurance set forth on Attachment C to the WSA.

The Water Shortage Allocation Plan between the SFPUC and its wholesale customers, adopted as part of the WSA in July 2009, addresses shortages of up to 20% of system-wide use. The Tier 1 Shortage Plan allocates water from the RWS between San Francisco Retail and the wholesale customers during system-wide shortages of 20% or less. The WSA also anticipated a Tier 2 Shortage Plan adopted by the wholesale customers which would allocate the available water from the RWS among the wholesale customers. The Tier 2 agreement was completed and approved by all the wholesale customers in March, 2011.

6.1.2 SCVWD – Wholesaler (Surface Water)

SCVWD supplies the City of Sunnyvale with treated surface water through an entitlement of imported Central Valley Project (CVP) water and the State Water Project (SWP), as well as surface water from local reservoirs. The current contractual agreement between the City and SCVWD sunsets in 2051. It was effective in 1976 with a 75-year term.

SCVWD's imported water is conveyed through the Sacramento-San Joaquin Delta then pumped and delivered to the county through three main pipelines: the South Bay Aqueduct, which carries water from the SWP, and the Santa Clara Conduit and Pacheco Conduit, which bring water from the federal CVP.

SCVWD has a contract for 100,000 AFY from the SWP, and nearly all of this supply is used for municipal and industrial (M&I) needs. The CVP contract amount is 152,500 AFY. However, the actual amount of water delivered is typically significantly less than these contractual amounts and depends on hydrology, conveyance limitations, and environmental regulations. On a long-term average basis, 83% of the CVP supply is delivered for M&I use, and 17% is delivered for irrigation use. Actual deliveries from imported sources vary significantly depending on hydrology, regulatory constraints to protect water quality as well as fish and wildlife, and other factors. SCVWD routinely acquires supplemental imported water to meet the county's needs from the water transfer market, water exchanges, and groundwater banking activities.

Local runoff is captured in local reservoirs for recharge into the groundwater basin or treatment at one of SCVWD's three water treatment plants. The total storage capacity of the SCVWD reservoirs is approximately 170,000 AF without the Department of Safety of Dams (DSOD) restrictions. Water stored in local reservoirs provides up to 25% of Santa Clara County's water supply. Reservoir operations are coordinated with imported Bay-Delta water received from the SWP and the CVP.

6.2 Groundwater

The City of Sunnyvale has six operating wells and one well on stand-by for emergencies. The six wells are used by the City as a supplemental source to the imported SFPUC and SCVWD water supplies.

In addition to supplying the City with groundwater, the SCVWD provides the City with basin-wide groundwater and conservation planning assistance. Local groundwater supplies up to half of the county's water supply during normal years. The groundwater basin in Santa Clara County is not adjudicated and has not been identified as a critically overdrafted basin by DWR.

Conjunctive use management is a practice by which the groundwater basin is pumped more in drier years and then replenished (or recharged) during wet and average years. Groundwater is replenished naturally from rainfall and augmented by SCVWD-operated recharge operations. Conjunctive use helps protect the groundwater basin from overdraft, land subsidence, and saltwater intrusion and provides critical groundwater storage reserves.

Within Santa Clara County, SCVWD manages two groundwater subbasins that transmit, filter, and store water: the Santa Clara Subbasin (DWR Subbasin 2-9.02) and the Llagas Subbasin (DWR Subbasin 3.301). In its water supply planning, the SCVWD frequently splits the Santa Clara Subbasin into two subareas, the Santa Clara Plain and the Coyote Valley. Although part of the same subbasin, these two subareas have different groundwater management challenges and opportunities and are in different groundwater charge zones.

These subbasins contain young alluvial fill formation and the older Santa Clara Formation. Both formations are similar in character and consist of gravel, sandy gravel, gravel and clay, sand, and silt and clay. The coarser materials are usually deposited along the elevated lateral edges of the subbasins, while the flat subbasin interiors are predominantly thick silt and clay sections inter-bedded with smaller beds of clean sand and gravel. The City's groundwater comes from the Santa Clara Plain subarea of the Santa Clara Subbasin. A general discussion of this subarea is provided below.

6.2.1 Santa Clara Plain

The Santa Clara Plain is part of the Santa Clara Subbasin, located in a structural trough that is bounded by the Santa Cruz Mountains to the west and the Diablo Range to the east. The Plain, which is approximately 22 miles long, narrows from a width of 15 miles near the county's northern boundary to about half a mile wide at the Coyote Narrows, where the two ranges nearly converge. The Plain has a surface area of 225 square miles. The Santa Clara Plain is approximately 15 square miles smaller than the Santa Clara Subbasin (Basin 2-9.02) as defined by the DWR in Bulletin 118, Update 2003 since it does not include the Coyote Valley portion of the Santa Clara Subbasin. Although hydraulically connected, SCVWD refers to the

Coyote Valley separately since it is in a different groundwater charge zone and has fewer water supply options than the Santa Clara Plain. The Plain underlies the northern portion of Santa Clara County and includes the majority of the streams and recharge facilities operated by SCVWD (SCVWD UWMP, 2010).

In April of each year, when the quantity of imported water available to SCVWD by contract and the local water yield can be estimated somewhat accurately, SCVWD estimates the carryover storage. Based on the calculated carryover capacity and anticipated customer demand, SCVWD reviews and modifies its groundwater management strategy in order to maintain adequate water in the basin and avoid subsidence. A copy of the 2012 SCVWD Groundwater Management Plan can be found in **Appendix D**.

Groundwater is extracted by way of wells, either owned or operated by area retailers or private property owners. The allowable withdrawal of groundwater by the City depends on a number of factors, including withdrawals by other water agencies, the quantity of water recharged and carry-over storage from the previous year. **Figure 6-2**~~**Figure 6-2**~~ illustrates the groundwater basin in relationship to the City's groundwater wells. **Table 6-3**~~**Table 6-3**~~ shows historic metered groundwater pumping data for the City from 2011 to 2015.

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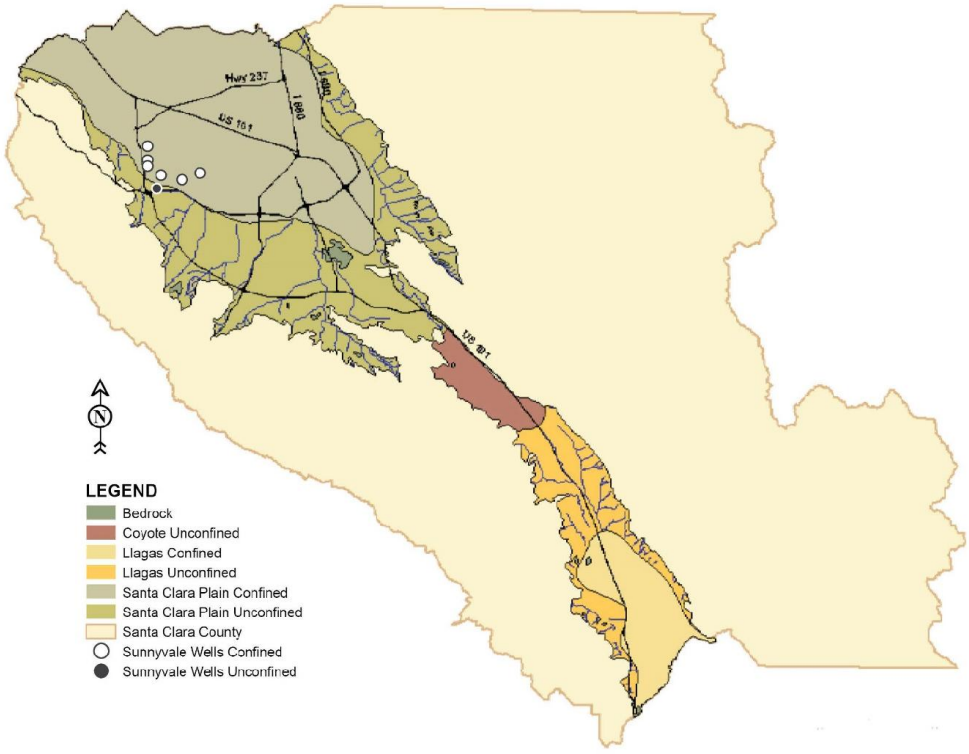
Table 6-3: Groundwater – Volume Pumped (AFY)

Basin Name	Groundwater Type	2011	2012	2013	2014	2015
Santa Clara Plain Subarea	Alluvial Basin	467	142	123	2,064	148
% of Total Water Supply		**2%**	**1%**	**1%**	**11%**	**1%**

6.3 Drought of 2014/2015

The most recent drought, which was declared by Governor Brown on January 17, 2014 asked water retailers to begin implementation of their water shortage contingency plans. The City, in conjunction with the wholesalers, began issuing a voluntary water reduction target of ten percent of water used in 2013. The ten percent water reduction target is in alignment with Stage 2 (see **Section 8**) of the plan. As the drought continued, wholesaler SCVWD called for a mandatory 20 percent water reduction on February 25, 2014. Due to worsening water supply conditions and expected reduced water allocation from federal water, a mandatory 30 percent

Figure 6-2: Santa Clara County Groundwater Basin and City Groundwater Wells



water reduction was called in March 25, 2015. The City implemented a two day maximum for lawn watering to help residents achieve the 30 percent reduction.

Overall the County saw a 36 percent reduction in water use from 2013 water use in the month of July.

6.4 Transfer Opportunities

The City is currently connected to the cities of Cupertino, Mountain View, and Santa Clara and to California Water Service Company through service connections located within Sunnyvale for use during emergency situations as shown in Table 6-4~~Table 6-4~~.

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Table 6-4: Transfer and Exchange Opportunities

Transfer Agency	Transfer or Exchange	Short Term or Long Term	Proposed Volume (AFY)
City of Cupertino	Emergency Transfer	Short Term	0
City of Mountain View	Emergency Transfer	Short Term	0
City of Santa Clara	Emergency Transfer	Short Term	0
California Water Service Company	Emergency Transfer	Short Term	0

Notes:
1. The City is not proposing to transfer or exchange any water other than in the case of emergency.

The majority of the transfer/exchange opportunities are managed by the wholesalers, SFPUC and SCVWD. In general, SFPUC has the ability to purchase additional water from the Tuolumne River and those sellers south of the Delta with water rights or entitlements to water diverted from the Delta. Water can also be purchased upstream of the Delta from sellers along the Sacramento, Feather, Yuba, American, and San Joaquin Rivers; and their tributaries.

SCVWD routinely uses short-term water transfers to increase water supplies in times of shortage. At present, SCVWD has two long-term transfer agreements, one entered into in 1998 with both the Pajaro Valley Water Management Agency and the Westlands Water District, and another entered into in 2010 with the Patterson Irrigation District. Details regarding wholesaler transfers and exchanges can be found in each individual wholesaler's UWMP.

6.5 Desalinated Water Opportunities

Both SFPUC and SCVWD are working together with the East Bay Municipal Utilities District, Contra Costa Water District, and the Zone 7 Water Agency as the Bay Area Regional Desalination Project (BARDP). Since the concept was put forward in 2002, it was considered to consist of one or more desalination facilities that would remove salt from seawater or other brackish water sources, with an ultimate total combined capacity of up to 80 MGD. As the water agencies look to maximize efficiency and reduce footprint, project studies assume 10-20 MGD. Desalination would provide a potential potable water supply for municipal and industrial use. The goals are to:

- Increase supply reliability by providing water supply when needed from a regional facility.

- Provide additional source of water during emergencies such as earthquakes or levee failures.
- Provide a supplemental water supply source during extended droughts.
- Allow other major facilities, such as treatment plants, water pipelines, and pump stations, to be taken out of service for maintenance or repairs.

Pre-feasibility studies, pilot testing, institutional analysis and site analysis have been completed. The dates for completion of the design, permitting, and construction is still to be determined. Additional details regarding desalinated water opportunities can be found in the SFPUC and SCVWD UWMP.

6.6 Recycled Water Opportunities

The City of Sunnyvale has developed a recycled water program which today serves parks, golf courses and the landscaping needs of diverse industries. A wastewater reclamation program was developed in 1991 when the City first identified short-term goals of recycling wastewater of 20% to 30% of high-quality effluent from the Sunnyvale Water Pollution Control Plant (Plant). The long-term goal of the City as stated in the 2000 Recycled Water Master Plan is to reuse 100% of all wastewater (15 MGD) generated from the Plant to reduce all flows to the bay. In 2013, the City performed a Feasibility Study to evaluate expansion of the recycled water program. The Study looked at various alignments to expand the system within the City as well as neighboring cities, improve distribution system reliability, and improve recycled water production capabilities to meet increased demand.

6.6.1 Treatment and Disposal of Wastewater

The Plant is located at 1444 Borregas Avenue and has a designed and permitted flow capacity of 29.5 MGD, though current flows average approximately 13 MGD. The amount of influent wastewater handled by the Plant varies with the time of day and with the seasonal changes in demand.

The Plant collects wastewater from the sanitary sewer system, which consists of more than 380 miles of gravity fed pipes that converge at the Plant. Collected wastewater is subsequently treated to tertiary standards at the Plant before it is discharged to the Lower South Bay subembayment of the San Francisco Bay. The overall treatment consists of the following processes:

- Primary Treatment (Sedimentation)
- Secondary Treatment (Oxidation)
- Tertiary Treatment (Filtration and Disinfection)

These processes provide treatment to a level that will meet NPDES discharge requirements. Most of the treated water is discharged to the San Francisco Bay via Moffett Channel and Guadalupe Slough. Approximately 10% of the Plant flow is treated to a higher level to meet the necessary recycled water quality requirements, and is delivered to customers for non-potable uses, primarily irrigation.

Sunnyvale has experienced a slight decrease in Plant influent over the past five years, but anticipates a conservative level of 15 MGD for plant influent over the next 25 years.

Table 6-5~~Table 6-5~~ presents the amount of wastewater treated and discharge and the amount of recycled water distributed

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Table 6-5: Wastewater Treatment and Discharge within Service Area in 2015 (AFY)

Wastewater Collected	Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
13,476	13,476	11,300	7,981	0

Notes:
1. In 2015, 798 AF of recycled was produced. Potable water is blended with recycled to improve water quality for plants, therefore 1,074 AF of water was delivered through the recycled water system.

6.7 Current, Potential and Projected Use, Optimization Plan with Incentives

6.7.1 Current Uses of Recycled Water – Completed Projects

The City's current recycled water system consist of the WPCP pump station, the San Lucar tank and pump station, the Sunnyvale Golf Course pump station and approximately 18 miles of recycled water pipelines ranging in diameter from 6- to 36-inches. The system now supplies 124 services within the City Limits as well as Moffett Field. Major customers include Baylands Park, Twin Creek Sports Complex, Lockheed/Martin Area, and the Sunnyvale Municipal Golf Course.

Table 6-6~~Table 6-6~~ compares the actual 2010 uses of recycled water to the projected uses in the 2005 UWMP.

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Table 6-6: Recycled Water – 2010 UWMP Use Projection Compared to 2015 Actual (AFY)

User Type	2010 Projection for 2015 (AFY)	2015 Actual Use (AFY)
Landscape and Golf irrigation	870	684
Commercial Use	0	28
Industrial Use	2	5
Other (WPCP)	806	0
Other (Hydrants)	2	0
Total	**1,680**	**717**

6.7.2 Benefits of Recycled Water

The use of recycled water provides for the following benefits:

- Potable water users benefit as this decreases reliance on imported supply

- All Sunnyvale residents benefit from securing a long-term adequate water supply to sustain economic growth and ensure public health.
- Recycled water users benefit by avoiding strict conservation requirements and water use restrictions during times of drought and by paying less than the cost of potable water.
- All water users benefit from bringing in another water source to augment supplies.
- Area wetlands benefit from reduced fresh water discharges into the saline wetlands.

6.7.3 Projected Future Uses of Recycled Water

The 2013 Feasibility Study identified recycled water system pipeline alignments based on existing customers with dedicated landscape meters, location of other major customers and demand clusters, and proximity of potential customers to the existing recycled water pipeline. **Figure 6-3** illustrates the existing and proposed recycled water distribution system. Four alignment/connection types were developed and include:

- **Wolfe Road Main:** This pipeline is intended to extend the recycled water system to the south to capture potential users along the Sunnyvale-Cupertino boundary, including the Apple® Campus 2 that could ultimately use more than 500 AFY.
- **Main Loop:** This alignment is intended to loop the existing recycled water system to provide reliability, connect to future storage tank site(s), and provide opportunity for further expansion and recycled water use along the alignment.
- **Potential Recycled Water Alignments:** These alignments are intended to capture outlying potential high demand users that are not located along the mainline or Wolfe Road alignments. These alignments generally extend to a specific high demand user or cluster of users and attempts to pick up as many viable users along the way.
- **Infill Connections:** Customers that have been identified along the existing recycled water pipelines and do not require pipeline extensions, but rather only retrofits of the sites to receive recycled water.

Figure 6-3: Recycled Water System with Potential Future Extensions

The City plans to build the alignments in four Phases as part of their Capital Improvement Program. Estimates of recycled water demand for sites within the City are based on actual or projected irrigation use, as determined by the review of City water billing records. For sites outside Sunnyvale, estimates are based on the facility area or by comparison to other similar sites within the City. Pipeline alignments were selected to minimize overall piping requirements, and to accommodate a phased approach to construction. Table 6-7~~Table 6-7~~ lists the potential future use of recycled water.

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Table 6-7: Recycled Water – Potential Future Use (AFY)

Use Type	Description	Level of Treatment	2015	2020	2025	2030	2035
Landscape Irrigation	Parks, Commercial Irrigation, Schools, etc.	Tertiary	428	715	770	825	825
Golf Course Irrigation	Fairway Irrigation	Tertiary	256	290	312	335	335
Commercial	Dual Plumbing	Tertiary	28	331	356	382	382
Industrial	Construction	Tertiary	5	120	129	138	138
Total			**717**	**1,456**	**1,568**	**1,680**	**1,680**

6.7.4 Recycled Water Optimization and Incentives

The City promotes the use of recycled water through its price structure. Recycled water is priced at 90 percent of the prevailing, first-tier potable water rate. The City intends to continue this financial incentive in the foreseeable future, as possible.

Division 7, Chapter 7 of the California Water Code, known as the Water Recycling Law, provides a legal basis for mandating the use of recycled water. The law states that the use of potable water for non-potable purposes (including irrigation) constitutes a waste or unreasonable use of water if recycled water of suitable quality is available at reasonable cost. Based on State law, some jurisdictions have implemented "mandatory use" policies through local ordinance. Sunnyvale's use of the market technique of providing recycled water at a ten percent discount and assistance in making on-site modifications (retrofits), along with an active public education process and a user-friendly permit process have resulted in significant expansion of the system. With few exceptions, the pricing policy has been successful in encouraging prospective users to convert to the limited use of recycled water in those areas where it is available. A re-occurrence of drought conditions could be expected to further enhance interest in recycled water.

The City is seeing growth through redevelopment bringing opportunity for installation of dual plumbing commercial buildings under new construction. The City is requiring new construction to be dual plumbed for recycled water. Dual plumbed buildings will use recycled water for toilets and urinals, cooling towers, and any other identified non-potable water use.

Table 6-8~~Table 6-8~~ provides a summary of the methods currently used to encourage recycled water use. Each of the methods are planned to be implemented on an on-going basis.

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Table 6-8: Methods Used to Encourage Recycled Water Use

Name of Action	Description	Expected Increase on Recycled Water Use (AFY)
Reduced pricing of recycled water	Recycled water is discounted 10% of potable water cost	Unknown
Retrofit assistance for irrigation systems	Retrofit of dedicated irrigation meters	Unknown
Dual plumbing standards	Dual plumb new commercial buildings	963
Public education/information	Public outreach and marketing to increase awareness	Unknown
Permit process enhancement	Provide fast-tracked permit processing for recycled water applications	Unknown

6.7.5 Technical and Economic Feasibility of Future Recycled Water Projects

Landscape irrigation/Commercial/Industrial: The City has a phased approach to build alignments to reach customers. The potential demand for full build out is 2,061 AFY with an estimated cost of $432.2 million. Additional capital investment is needed for treatment, pumping, and storage facility improvements to support the expansion of the recycled water system. Therefore, the capital costs associated with treatment, pumping, and storage range from $99.5M to $114.1M.

Dividing the overall recycled water system expansion project into multiple phases and assigning project prioritization serves to create a Capital Improvement Plan (CIP) that is more fiscally manageable by implementing improvements over time and as they are necessary to further develop the recycled water system.

Dual-Plumbed Use: In September 2010, the City evaluated the potential for developing a dual-plumed use ordinance. The decision was to require mandatory recycled water use for landscape irrigation and not dual plumbing for new residential and non-residential buildings. However, the City continues to support and encourage dual-plumbed use in new construction, where applicable.

6.7.6 Recycled Water Stream flow Augmentation and Groundwater Recharge

Non-irrigation uses such as stream flow augmentation and groundwater recharge represent long-term options and solutions that could potentially accommodate large amounts of recycled water flow. Such activities are being evaluated by SCVWD, in its capacity as the groundwater management agency for Santa Clara County. SCVWD has initiated a public outreach program to assess public acceptance. SCVWD also intends to form a technical committee to evaluate water quality issues as it relates to the use of recycled water for groundwater recharge. Studies to be conducted by SCVWD will provide recommendations on treatment technologies and alternatives, conveyance and storage systems, project capital and operating costs, and permitting requirements.

6.7.7 Recycled Water Coordination

The City has collaborated with the SCVWD, California Water Service Company, DWR, and Apple® to fund and implement an exciting new project to extend the recycled water pipeline network. As part of the project, a booster pump station and 13,300 feet of recycled water pipeline will be constructed along Wolfe Road to funnel water from Sunnyvale's water recycling facility to serve many new customers, including the new Apple® Campus 2 in Cupertino. The SCVWD expects construction to begin this fall.

DDW and the State Water Resources Control Board regulate the production and use of recycled water in the State of California. The City provides all required reports, as mandated, including a Recycled Water Program Master Plan (2000), and Recycled Water Annual Reports. Recycled water provided by the City meets the requirements of California Code of Regulations Title 22 as disinfected tertiary treated water.

6.8 Future Water Projects

The City's water supply comes mainly from the two wholesale providers, SCVWD and SFPUC. Groundwater is typically used to offset peak daily demands and for emergency purposes such as drought conditions and wholesale water service interruptions. As such, as a water retailer, Sunnyvale has no current capital projects that would add new potable water supply. The 20-year budget includes a groundwater well study that will look into the need to drill additional wells. If the study concludes that the City would benefit from more groundwater wells, a project may be set up at that time.

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SECTION 7 – WATER SUPPLY RELIABILITY

This Section evaluates and addresses long-term reliability of local and regional water supplies.

7.1 Constraints on Water Sources

In addition to droughts, there are other constraints that can impact water supply. Sunnyvale relies on their diversification of water supply, continuous work with SFPUC and SCVWD, demand management strategies as discussed in **Section 9**, and the Water Conservation Plan (included in **Appendix E**) to address these threats.

7.1.1 Water Quality Impacts on Reliability

As described previously, the City has four sources that supply its water. These are the treated surface water from SCVWD and SFPUC and local groundwater. SCVWD provides approximately 40% of Sunnyvale's annual potable water, SFPUC provides approximately 54%, Sunnyvale owned- and operated-wells provide 1% and the remaining 5% comes from recycled water

SFPUC

SFPUC aggressively protects the natural water resources entrusted to its care. Its annual Hetch Hetchy Watershed survey evaluates the sanitary conditions, water quality, potential contamination sources, and the results of watershed management activities by the SFPUC and its partner agencies, including the National Park Service, to reduce or eliminate contamination sources. SFPUC also conducts sanitary surveys of the local Alameda and Peninsula watersheds every five years. These surveys identified wildlife and human activity as potential contamination sources. The regional system currently meets or exceeds existing water quality standards. However, system upgrades are needed to improve SFPUC's ability to maintain compliance with current water quality standards and to meet anticipated future water quality standards.

SCVWD

Treatment of surface water is necessary to ensure that the water SCVWD provides meets or exceeds all federal and state drinking water standards. Surface water quality programs include: treating local and imported surface water for sale to retailers; participating in regional and statewide coalitions to safeguard source water quality protection; and investigating opportunities for water quality improvements through partnership in regional facilities or exchanges.

SCVWD's source waters are susceptible to potential contamination from sea water intrusion and organic matter in the Delta and from a variety of land use practices, such as agricultural and urban runoff, recreational activities, livestock grazing, and residential and industrial development. Local sources are also vulnerable to potential contamination from commercial stables and historic mining practices. No contaminant associated with any of these activities has been detected in the treated water. The water treatment plants provide multiple barriers for physical removal and disinfection of contaminants. Additionally, SCVWD monitors surface water quality in local reservoirs and in the Sacramento-San Joaquin Delta.

Groundwater

SCVWD monitors groundwater quality to assess current conditions and identify trends or areas of special concern. Wells are monitored for major ions, such as calcium and sodium, nutrients such as nitrate, and trace elements such as iron. Wells are also monitored for man-made contaminants, such as organic solvents. The type and frequency of monitoring depends on the well location, historic and current land use, and the availability of groundwater data in the area. Overall groundwater quality in Santa Clara County is good. The most notable exceptions are nitrate and perchlorate, which have impacted groundwater quality in the Llagas Subbasin.

As the groundwater management agency in Santa Clara County, SCVWD has ongoing groundwater protection programs to ensure high water quality and more reliable water supplies. These programs include well permitting, well destruction, wellhead protection, land use and development review, nitrate management (targeted to areas of elevated nitrate in the Coyote Subarea and the Llagas Subbasin), saltwater intrusion programs, and providing technical assistance to regulatory agencies to ensure local groundwater resources are protected.

Sunnyvale Groundwater Water Quality

Nitrate in the environment comes from both natural and anthropogenic sources. Small amounts of nitrate in groundwater (less than 10 mg/L) are normal, but higher concentrations suggest an anthropogenic origin. Common anthropogenic sources of nitrate in groundwater are fertilizers, septic systems, and animal waste. The drinking water maximum contaminant level (MCL) for nitrate is 45 mg/L as nitrate. Since the Santa Clara Valley has a long history of agricultural production and septic systems are still in use in the unincorporated areas of the county, monitoring for nitrate contamination is an essential groundwater management function in this valley.

7.2 Climate Change

The issue of climate change has become an important factor in water resources planning in the State, 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, such as in the Tuolumne River basin, 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 saltwater intrusion;
- Increased water temperatures with potential accompanying adverse effects on some fisheries and water quality;
- Increases in evaporation and corresponding increased irrigation need; and
- Changes in urban and agricultural water demand.

Both the SFPUC and BAWSCA 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. In addition, the SFPUC continues to study the effect of climate change on the Regional Water System (RWS). These works are summarized below.

7.2.1 Bay Area Integrated Regional Water Management Plan (BAIRWMP)

Climate change adaptation was established as an overarching theme for the 2013 BAIRWMP update. As stated in the BAIRWMP, identification of watershed characteristics that could potentially be vulnerable to future climate change is the first step in assessing vulnerabilities of water resources in the Bay Area Region (Region). In this case, vulnerability is defined as the degree to which a system is exposed to, susceptible to, and able to cope with or adjust to, the adverse effects of climate change. A vulnerability assessment for the Region was conducted in accordance with the Department of Water Resources' (DWR's) Climate Change Handbook for Regional Water Planning and by using the most current science available. The vulnerability assessment, summarized in **Table 7-1~~Table 7-1~~** below, provides the main water planning categories applicable to the region and a general overview of the qualitative assessment of each category with respect to anticipated climate change impacts.

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Table 7-1: Summary of BAIRWMP Climate Change Vulnerability Assessment

Vulnerability Areas	General Overview of Vulnerabilities
Water Demand	**Urban and Agricultural Water Demand** – Changes to hydrology in the Region as a result of climate change could lead to changes in total water demand and use patterns. Increased irrigation (outdoor landscape or agricultural) is anticipated to occur with temperature rise, increased evaporative losses due to warmer temperature, and a longer growing season. Water treatment and distribution systems are most vulnerable to increases in maximum day demand.

Vulnerability Areas	General Overview of Vulnerabilities
Water Supply	**Imported Water** – Imported water derived from the Sierra Nevada sources and Delta diversions provide 66 percent of the water resources available to the Region. Potential impacts on the availability of these sources resulting from climate change directly affect the amount of imported water supply delivered to the Region. **Regional Surface Water** – Although future projections suggest that small changes in total annual precipitation over the Region will not change much, there may be changes to when precipitation occurs with reductions in the spring and more intense rainfall in the winter. **Regional Groundwater** – Changes in local hydrology could affect natural recharge to the local groundwater aquifers and the quantity of groundwater that could be pumped sustainably over the long-term in some areas. Decreased inflow from more flashy or more intense runoff, increased evaporative losses and warmer and shorter winter seasons can alter natural recharge of groundwater. Salinity intrusion into coastal groundwater aquifers due to sea-level rise could interfere with local groundwater uses. Furthermore, additional reductions in imported water supplies would lead to less imported water available for managed recharge of local groundwater basins and potentially more groundwater pumping in lieu of imported water availability.
Water Quality	**Imported Water** – For sources derived from the Delta, sea-level rise could result in increases in chloride and bromide (a disinfection by-product (DBP) precursor that is also a component of sea water), potentially requiring changes in treatment for drinking water. Increased temperature could result in an increase in algal blooms, taste and odor events, and a general increase in DBP formation **Regional Surface Water** – Increased temperature could result in lower dissolved oxygen in streams and prolong thermocline stratification in lakes and reservoirs forming anoxic bottom conditions and algal blooms. Decrease in annual precipitation could result in higher concentrations of contaminants in streams during droughts or in association with flushing rain events. Increased wildfire risk and flashier or more intense storms could increase turbidity loads for water treatment. **Regional Groundwater** – Sea-level rise could result in increases in chlorides and bromide for some coastal groundwater basins in the Region. Water quality changes in imported water used for recharge could also impact groundwater quality.
Sea-Level Rise	Sea-level rise is additive to tidal range, storm surges, stream flows, and wind waves, which together will increase the potential for higher total water levels, overtopping, and erosion. Much of the bay shoreline is comprised of low-lying diked baylands which are already vulnerable to flooding. In addition to rising mean sea level, continued subsidence due to tectonic activity will increase the rate of relative sea-level rise. As sea-level rise increases, both the frequency and consequences of coastal storm events, and the cost of damage to the built and natural environment, will increase. Existing coastal armoring (including levees, breakwaters, and other structures) is likely to be insufficient to protect against projected sea-level rise. Crest elevations of structures will have to be raised or structures relocated to reduce hazards from higher total water levels and larger waves.
Flooding	Climate change projections are not sensitive enough to assess localized flooding, but the general expectation is that more intense storms would occur thereby leading to more frequent, longer and deeper flooding. Changes to precipitation regimes may increase flooding. Elevated Bay elevations due to sea-level rise will increase backwater effects exacerbating the effect of fluvial floods and storm drain backwater flooding.

Vulnerability Areas	General Overview of Vulnerabilities
Ecosystem and Habitat	Changes in the seasonal patterns of temperature, precipitation, and fire due to climate change can dramatically alter ecosystems that provide habitats for California's native species. These impacts can result in species loss, increased invasive species ranges, loss of ecosystem functions, and changes in vegetation growing ranges. Reduced rain and changes in the seasonal distribution of rainfall may alter timing of low flows in streams and rivers, which in turn would have consequences for aquatic ecosystems. Changes in rainfall patterns and air temperature may affect water temperatures, potentially affecting coldwater aquatic species. Bay Area ecosystems and habitat provide important ecosystem services, such as: carbon storage, enhanced water supply and quality, flood protection, food and fiber production. Climate change is expected to substantially change several of these services. The region provides substantial aquatic and habitat-related recreational opportunities, including: fishing, wildlife viewing, and wine industry tourism (a significant asset to the region) that may be at risk due to climate change effects.
Hydropower	Currently, several agencies in the Region produce or rely on hydropower produced outside of the Region for a portion of their power needs. As the hydropower is produced in the Sierra, there may be changes in the future in the timing and amount of energy produced due to changes in the timing and amount of runoff as a result of climate change. Some hydropower is also produced within the region and could also be affected by changes in the timing and amount of runoff.

7.2.2 SFPUC Climate Change Studies

The SFPUC views assessment of the effects of climate change as an ongoing project requiring regular updating to reflect improvements in climate science, atmospheric/ocean modeling, and human response to the threat of greenhouse gas emissions. 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 given 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% to 2.1% from present-day conditions by 2040 and by 2.6% to 10.2% 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% to 8.6% from present-day conditions by 2040 and by 24.7% to 29.4% 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% 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.

7.2.3 Delta Pumping Restrictions

Increases in average temperature due to climate change are generally agreed upon and the impacts of increasing temperature have already been observed. Climate change effects on precipitation are more difficult to predict, with some models forecasting less rainfall for the state and some models forecasting more rainfall. Regardless of the impacts on the total amount of precipitation, rises in average temperature will increase sea level and decrease the snow pack—by far the largest surface water "storage" facility in California. Decreased snow pack and projected earlier spring melts will reduce the amount of water available to meet peak demands in late spring and summer. These changes could decrease imported water and possibly local water supplies, while increasing salinity in the Delta, adversely impacting water quality and Bay-Delta ecosystems.

Based on the SWP Delivery Capability Report 2015 and associated modeling results, projected imported supplies under climate change conditions from the Delta for average, normal year, dry year and multiple dry years, Drought Planning

7.3 Average/Normal Water Year

The "normal" year for the purposes of this Plan, is a year in the historical sequence that most closely represents median runoff levels and patterns. Carryover storage is that portion of SCVWD's local and outside of the county surface storage, local groundwater storage, and outside the county banked storage that is not required to meet this year's demands but could potentially be utilized in subsequent years. Note that groundwater is used in all year types (including years where the total supplies exceed total demands) for distribution, storage and treatment. The average/normal water year used by both wholesalers and the City is 2002.

The City selected 1985 as a representation of a "normal" or "average" water year based on an analysis of past water use. The year 1985 was determined to be representative of a year with both average precipitation and average water usage by the City.

7.4 Single-Dry Year Supply

The single dry year supply is defined as the year with the minimum usable supply. The hydrology of 1977 represents the minimum total supply that has been observed in the historical record, according to SCVWD. SCVWD will be able to meet the water needs of the county during the single dry year even with increasing demands, based on the historical hydrologic sequence and carryover supplies that are projected to be available leading into a single dry year. If a similar dry year occurred when carryover storage was not available, implementation of actions associated with the water shortage contingency plan would be required.

In the single dry year analysis, supplies for SCVWD from carryover storage are needed to meet the annual demands under all demand years and make up almost half of the total supplies in the single dry year. SCVWD's ability to take water from the Semitropic Water Bank is proportional to SWP allocation percentages for the year. During drought years, this can significantly limit how much of its water bank balance SCVWD can withdraw.

The City selected 1977 as the single dry year since groundwater managed by SCVWD will be relied upon to make up the deficit from water wholesalers.

7.5 Multiple-Dry Year Supply

Multiple dry year scenario analysis is useful particularly in the evaluation of carryover storage. Evaluating the availability of the county's water supplies requires an understanding of the driest periods that can reasonably be expected to occur. Over the more than 120 years of recorded rainfall, seven major drought events have occurred. SCVWD modeling results indicate that the county's water supply system is more vulnerable to successive dry years, such as those that occurred in 1928-1934 and 1987-1992. Multiple dry year periods deplete water storage reserves in local and imported supply reservoirs and in the groundwater subbasins. Multiple dry years (such as the 1987-1992 drought) pose the greatest challenge to SCVWD's water supply. Although the supply in each year may be greater than in a single very dry year, as drought lingers, storage reserves are relied on more and more. The multiple dry year period used in this analysis is 2013 through 2015, which modeling performed by SCVWD indicates has lower supplies than in any consecutive three-year period in either of the 1987 and or 1992 droughts. The water supply available to individual retailers will ultimately be determined by SCVWD and SFPUC. The City will work closely with SCVWD, SFPUC, and other water retail agencies to implement any stages of action to reduce the demand for water during water shortages.

Table 7-2~~Table 7-2~~ summarizes the average, single dry, and multiple dry water years used to determine the minimum water supply available as compared to the average/normal water year.

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Table 7-2: Basis of Water Year Data

Water Year Type	Base Year(s)
Average Water Year	2002
Single Dry Water Year	1977
Multiple Dry Water Years	2013 - 2015

As discussed earlier in this report, the City relies mostly on SFPUC and SCVWD for its water supply and is directly affected by the water supply conditions both wholesaler faces. This section discusses water supply conditions as it affects the wholesalers.

7.6 Supply and Demand Assessment

In the event of a decrease of local supplies, the City would respond by pursuing demand reduction programs in accordance with the severity of the supply shortage. Any supply deficit would be compensated for by increased conservation levels and restrictions in consumption.

Table 7-3~~Table 7-3~~ is based on the projected demands during the indicated years, and analyses of the average/normal deliveries to the City from SFPUC and SCVWD in 1985. This analysis uses decreased supply availability in accordance with historic conditions as described in Table 7 3; however, an analysis of current supply and wholesale supplier systems indicates that supplies would be available to meet demands even in times of drought, with no reduction of supply necessary until the fifth year and beyond of a multi-year drought.

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Table 7-3: Supply Reliability – Basis of Water Year by Sources (AFY)

Source	Average/Normal Water Year (2002)	Single Dry Water Year (1977)	Multiple Dry Water Years		
			Year 2013	Year 2014	Year 2015
SFPUC	10,096	10,956	11,031	8,454	8,883
SCVWD	13,094	6,636	10,417	8,491	6,497
Groundwater	1,367	5,104	123	2,064	134
Recycled Water	1,296	0	0	0	717
Totals	**25,853**	**22,696**	**21,571**	**19,009**	**16,231**
Percent of Average/Normal		88%	83%	74%	63%

Table 7-4~~Table 7-4~~ through Table 7-9~~Table 7-9~~ provides a comparison between supply and demand for normal, single dry and multiple dry water years. As SFPUC supply decreases, groundwater supplies increase, leaving a zero percent difference between supply and demand.

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Table 7-4: Supply and Demand Comparison – Normal Year (AFY)

Source	2020	2025	2030	2035
SFPUC	11,124	12,266	12,266	12,266
SCVWD	10,642	11,202	11,762	12,614
Groundwater	448	336	336	336
Recycled Water	1,456	1,568	1,680	1,680
Supply Totals	**23,670**	**25,372**	**26,044**	**26,896**
Demand Totals	**23,670**	**25,372**	**26,044**	**26,896**
Difference	0	0	0	0
Difference as % Supply	0%	0%	0%	0%
Difference as % Demand	0%	0%	0%	0%

Table 7-5: Supply and Demand Comparison – Single Dry Year (AFY)

Source	2020	2025	2030	2035
SFPUC	11,124	12,266	12,266	12,266
SCVWD	10,642	11,202	11,762	12,614
Groundwater	448	336	336	336
Recycled Water	1,456	1,568	1,680	1,680
Supply Totals	**23,670**	**25,372**	**26,044**	**26,896**
Demand Totals	**23,670**	**25,372**	**26,044**	**26,896**
Difference	0	0	0	0
Difference as % Supply	0%	0%	0%	0%
Difference as % Demand	0%	0%	0%	0%

Table 7-6: Supply and Demand Comparison – Multiple Dry Year for 2020 (AFY)

Source	Year 1 2020	Year 2 2021	Year 3 2022
SFPUC	11,124	8,454	8,883
SCVWD	10,642	13,078	12,967
Groundwater	448	1,000	1,000
Recycled Water	1,456	1,478	1,501
Supply Totals	**23,670**	**24,011**	**24,351**
Demand Totals	**23,670**	**24,011**	**24,351**
Difference	0	0	0
Difference as % Supply	0%	0%	0%
Difference as % Demand	0%	0%	0%

Table 7-7: Supply and Demand Comparison – Multiple Dry Year for 2025 (AFY)

Source	Year 1 2025	Year 2 2026	Year 3 2027
SFPUC	12,266	8,454	8,883
SCVWD	11,202	14,462	14,145
Groundwater	336	1,000	1,000
Recycled Water	1,568	1,590	1,613
Supply Totals	**25,372**	**25,506**	**25,641**
Demand Totals	**25,372**	**25,506**	**25,641**
Difference	0	0	0
Difference as % Supply	0%	0%	0%
Difference as % Demand	0%	0%	0%

Table 7-8: Supply and Demand Comparison – Multiple Dry Year for 2030 (AFY)

Source	Year 1 2030	Year 2 2031	Year 3 2032
SFPUC	12,266	8,454	8,883
SCVWD	11,762	15,080	14,822
Groundwater	336	1,000	1,000
Recycled Water	1,680	1,680	1,680
Supply Totals	**26,044**	**26,214**	**26,385**
Demand Totals	**26,044**	**26,214**	**26,385**
Difference	0	0	0
Difference as % Supply	0%	0%	0%
Difference as % Demand	0%	0%	0%

Table 7-9: Supply and Demand Comparison – Multiple Dry Year for 2035 (AFY)

Source	Year 1 2035	Year 2 2036	Year 3 2037
SFPUC	12,266	8,454	8,883
SCVWD	12,614	15,785	15,378
Groundwater	336	1,000	1,000
Recycled Water	1,680	1,680	1,680
Supply Totals	**26,896**	**26,919**	**26,941**
Demand Totals	**26,896**	**26,919**	**26,941**
Difference	0	0	0
Difference as % Supply	0%	0%	0%
Difference as % Demand	0%	0%	0%

As shown in the tables above, Sunnyvale would be able to increase the amount of groundwater pumped to meet reasonably anticipated deficiencies from other sources, thus supply is projected to be sufficient to meet demand out to 2035. The Sunnyvale groundwater basin is not adjudicated, which means the right to pump groundwater from the basin has not been given by judgment of a court or board.

For each of the five-year increments presented above, the three-year dry period indicates that supplies will be able to meet demands through increased groundwater pumping and implementation of drought conservation programs. The City will be able to address the projected demands without rationing.

7.7 Regional Supply Reliability

7.7.1 Reliability of Treated Water Provided by SFPUC

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. Due to these constraints, the SFPUC is very dependent on reservoir storage to ensure the reliability of its water supplies.

The SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from Hetch Hetchy. In practice, the local watershed facilities are operated to capture local runoff.

Regional Wholesale Contractual Obligations

Individual Supply Guarantee: San Francisco has a perpetual commitment (Supply Assurance) to deliver 184 MGD to the 24 permanent wholesale customers collectively. San Jose and Santa Clara are not included in the Supply Assurance commitment and each has temporary and interruptible water supply contracts with San Francisco. The Supply Assurance is allocated among the 24 permanent wholesale customers through Individual Supply Guarantees (ISG), which represent each wholesale customer's allocation of the 184 MGD Supply Assurance. Sunnyvale's ISG is 14,100 AFY.

2018 Interim Supply Limitation: As part of its adoption of the Water System Improvement Program (WSIP) in October 2008, discussed separately herein, the SFPUC adopted a water supply limitation, the Interim Supply Limitation (ISL), which limits sales from San Francisco Regional Water System (RWS) watersheds to an average annual~~annual~~ average of 265 MGD through 2018.

All 26 wholesale customers and San Francisco are subject to the ISL. The wholesale customers' collective allocation under the ISL is 184 MGD and San Francisco'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 wholesale customer allocations on the lesser of the projected fiscal year

2017-18 purchase projections or Individual Supply Guarantees. The ISAs are effective only until December 31, 2018 and do not affect the Supply Assurance or the Individual Supply Guarantees, both discussed separately herein. San Francisco's ISA is 81 MGD. Sunnyvale's ISA is 10,572 AFY

As stated in the WSA, the wholesale customers do not concede the legality of the Commission'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.

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 fiscal year 2011-12. 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.

SFPUC Water System Improvement Program

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 provided in Table 7-10~~Table 7-10~~.

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Table 7-10: SFPUC's WSIP Goals and Objectives

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.

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.

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.

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 **Table 7-11**~~Table 7-11~~ below.

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Table 7-11: Water Deliveries in San Francisco Regional Water System Service Area

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

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.
Notes:
1. No groundwater use is included in this number. Non-revenue water is included.

To date, during the current drought, 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 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.

7.7.2 Bay Area Water Supply & Conservation Agency (BAWSCA)

The City of Sunnyvale is a member of BAWSCA, who 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.

BAWSCA's 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.

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.

7.7.3 Reliability of Treated Water Provided by SCVWD

To maintain water supply reliability and flexibility, SCVWD's water supply includes a variety of sources including local groundwater, imported water and local surface water. SCVWD has an active conjunctive water management program to optimize the use of groundwater and surface water, and to prevent groundwater overdraft and land subsidence.

Several factors have the potential to negatively impact reliability, including: hydrologic variability, climate change, invasive species, infrastructure failure, regulatory actions as well as institutional, political and other uncertainties. Hydrologic uncertainties influence the projections of both local and imported water supplies and the anticipated reliability of those supplies. Supply analyses performed by SCVWD are based on the assumption of historical patterns of precipitation. The development of SCVWD projects and programs to meet future needs takes hydrologic variability and climate change into account.

Under any climate change scenario, SCVWD may need to consider additional treatment options to respond to water quality impacts associated with increased salinity in the Delta. SCVWD may also need to consider additional storage to take advantage of more wet-season water, long-term implementation of indirect potable reuse, additional supplies to replace reduced water supply from existing sources, and additional water transfers (depending on water market impacts).

In determining the long-range availability of water, consideration must be given to the vulnerability of imported supplies to the effects of prolonged state-wide drought and environmental impacts. Reductions by DWR or the U.S. Bureau of Reclamation (USBR) to SCVWD allocations of State Water Project (SWP) or Central Valley Project (CVP) – San

Felipe Division water may result in a temporary supply shortfall for the City and other SCVWD retailers. Water demands could be met with groundwater, additional imported water supply, water conservation measures, and with expanded recycled water use.

SCVWD obtains its local and imported water supplies from a variety of sources to maintain maximum efficiency, flexibility, and reliability. SCVWD augments natural groundwater recharge with a managed recharge program to offset groundwater pumping, sustain storage reserves, and minimize the risk of land subsidence. Through these recharge activities, SCVWD works to keep groundwater basins "full" to protect against drought. Storing surplus water in the groundwater basins enables part of the supply to be carried over from wet years to dry years. SCVWD also has a contract for 100,000 AFY from the SWP, and 152,500 AFY from the CVP. However, the actual amount of water delivered is typically significantly less than these contractual amounts and depends on hydrology, conveyance limitations, and environmental regulations, including regulatory constraints to protect water quality as well as aquatic wildlife. On a long-term average basis, 83% of the CVP supply is delivered for municipal and industrial use, and 17% is delivered for irrigation use. SCVWD routinely acquires supplemental imported water to meet the county's needs from the water transfer market, water exchanges, and groundwater banking activities.

In May 1996, SCVWD approved an agreement with Semitropic Water Storage District (Semitropic) to store 45,000 AF of SWP water in Semitropic's groundwater basin on behalf of SCVWD. In 1997, SCVWD approved a long-term agreement with Semitropic. In the fourteen years since this agreement was approved, SCVWD has banked water in ten of the years, while withdrawing water in only four. The agreement allows SCVWD to maximize the economic value of its imported water contracts by fully utilizing water that might otherwise have to be turned back to the SWP or CVP.

The District plans to update its Water Supply and Infrastructure Master Plan (Water Master Plan) in 2017. As part of the planning process, the District will identify supply projects and programs to fill in the gap between average supplies and demands 2040. In addition, the Water Master Plan will identify projects and programs necessary to minimize the need to call for water use reductions greater than 10 percent. This is consistent with District BAO Interpretation Strategy S 2.4, which states, "[d]evelop water supplies designed to meet at least 100 percent of average annual water demand identified in the District's Urban Water Management Plan during non-drought years and at least 90 percent of average annual water demand in drought years." Additional projects and programs may include additional water conservation, water recycling, recharge capacity, storm water capture and reuse, banking, and storage.

7.7.4 Reliability of Well Water

Protecting the local groundwater basins is critical to maintaining water supply reliability in the County of Santa Clara, especially when random risks are considered. The basins supply nearly half of the water used annually in the County and also provide emergency reserve for droughts or outages.

SCVWD's Groundwater Management Plan ensures that local groundwater resources are sustained and protected. Groundwater management encompasses activities and programs that identify and mitigate contamination threats to the groundwater basin, replenish and recharge groundwater supplies, prevent groundwater overdraft and land subsidence, and

sustain storage reserves. SCVWD programs to sustain and protect groundwater resources are described in detail in the SCVWD's Groundwater Management Plan of 2012 included as **Appendix D** of this document.

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SECTION 8 – WATER SHORTAGE CONTINGENCY PLANNING

This section describes the water shortage contingency planning for each of the water wholesalers as well as the City's contingency plans. The City's plan is designed to mirror the local wholesaler, SCVWD.

8.1 Wholesalers Water Shortage Allocation Plans

The following describes the water shortage allocation plans for both of the City's water wholesalers.

8.1.1 SFPUC Water Shortage Allocation Plan

In July 2009, the wholesale customers and San Francisco adopted the Water Supply Agreement (WSA), which includes a Water Shortage Allocation Plan (WSAP) to allocate water from the Regional Water System (RWS) to retail and wholesale customers during system-wide shortages of 20 percent or less (the Tier One Plan). The WSAP has two components:

- The Tier One Plan, which allocates water between San Francisco and the wholesale customers collectively; and
- The Tier Two Plan, which allocates the collective wholesale customer share among the wholesale customers.

These allocation plans are described below.

Tier One Drought Allocations

The Tier One Plan allocates water between San Francisco and the wholesale customers collectively based on the level of shortage. Table 8-1~~Table 8-1~~ breaks down that allocation share.

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Table 8-1: Allocation of Water between SFPUC and Wholesale Customers

Level of System-Wide Reduction in Water Use Required	Share of Available Water	
	SFPUC Share	Wholesale Customers Share
5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

The Tier One Plan allows for voluntary transfers of shortage allocations between the SFPUC and any wholesale customer and between wholesale customers themselves. In addition, water "banked" by a wholesale customer, through reductions in usage greater than required, may also be transferred.

The Tier One Plan will expire at the end of the term of the WSA in 2034, unless mutually extended by San Francisco and the wholesale customers.

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. Separate from a declaration of a water shortage emergency, the SFPUC may opt to request voluntary cutbacks from San Francisco and the wholesale customers to achieve necessary water use reductions during drought periods. To date, during the current drought, the SFPUC has requested, but has not mandated, a 10% system-wide reduction since January 2014. The SFPUC has not yet been compelled to declare a water shortage emergency and implement the Tier One Plan because its customers have exceeded the 10% voluntary system-wide reduction in conjunction with the state-wide mandatory reductions assigned by the State Water Resources Control Board.

Tier Two Drought Allocations

In 2010, the wholesale customers negotiated and adopted the Tier Two Drought Implementation Plan (Tier Two Plan), which allocates the collective wholesale customer share among each of the 26 wholesale customers. This Tier Two Plan allocation is based on a formula that takes into account multiple factors for each wholesale customer including:

- Individual Supply Guarantee;
- Seasonal use of all available water supplies; and
- Residential per capita use.

The water supplies made available from the SFPUC will be allocated to the individual wholesale customers in proportion to each wholesale customer's Allocation Basis, expressed in millions of gallons per day (MGD), which in turn is the weighted average of two components. The first component is the fixed wholesale customer's Individual Supply Guarantee as stated in the WSA. The second component is the Base/Seasonal Component, which is variable and is calculated using each wholesale customers total monthly water use from all available water supplies during the three consecutive years prior to the onset of the drought. The second component is accorded twice the weight of the first component in calculating the Allocation Basis. Minor adjustments to the Allocation Basis are then made to ensure a minimum cutback level, a maximum cutback level, and a minimum level of supply to meet health and safety needs for certain wholesale customers.

Each wholesale customer's Allocation Factor, which represents its percentage allocation of the total available water supplies, is calculated from its proportionate share of the total of all wholesale customers' Allocation Bases. The final shortage allocation for each wholesale customer is determined by multiplying the amount of water available to the wholesale customers' collectively under the Tier One Plan, by the wholesale customer's Allocation Factor.

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 current Tier Two Plan will expire in 2018 unless extended by the wholesale customers.

8.2 SCVWD Water Shortage Plan

The following is a description of the SCVWD water supply strategy and water shortage contingency plan.

8.2.1 SCVWD Water Supply Strategy

Overall, the SCVWD manages water supplies and programs to maximize storage of wet period supplies for use during dry periods when other sources of supply are insufficient to meet demands. Because the groundwater subbasins are able to store the largest amount of local reserves, the SCVWD depends on maintaining adequate storage in the subbasins to get through extended dry periods. The SCVWD also has storage in Semitropic Groundwater Bank and has withdrawn more than 120,000 AF during the last three years.

In addition to working with retailers, cities, and the County to manage water use during shortages, the SCVWD augments supplies by investing in supplemental supply sources. Supplemental supplies include transfers, exchanges, and Semitropic Groundwater Bank takes. The decision on when and in which sequence supply will be utilized during different stages of shortage is managed by annual operations and planning and includes consideration of availability and cost.

8.2.2 SCVWD Water Shortage Contingency Plan

SCVWD's water shortage contingency plan stages and water use reduction targets were developed to be consistent with the SCVWD's Board Policy, Water Supply Objective 2.1.1 "…maintain and develop groundwater to optimize reliability…" and in consideration of the following water shortage management objectives:

- Minimize economic, social, and environmental hardships to the community caused by water shortages. As water becomes more scarce and the community is faced with increasing cutbacks, the costs of shortage rise and the risk of lasting damages to residences, businesses and the environment increases.
- Establish water use reduction targets, manage supplies and work closely with retailers and cities in developing efficient and effective demand reduction measures that concentrate on eliminating non-essential uses first.
- Maintain and safeguard essential water supplies for public health and safety needs. The water shortage contingency plan anticipates and accounts for water supply shortages due to acute catastrophic events. The SCVWD's water supply system is vulnerable to several disaster scenarios including a loss of imported supplies due to a Delta levee outage, an

interruption of San Francisco's regional water system deliveries to Santa Clara County, and/or a major earthquake.

SCVWD's Water Shortage Contingency Plan is provided in **Table 8-2**~~**Table 8-2**~~.

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Table 8-2: SCVWD Water Shortage Contingency Plan

Stage	Stage Title	Projected End-of-Year Groundwater Storage	Requested Short-Term Water Use Reduction	Actions
Stage 1	Normal	Above 300,000 AF	None	SCVWD continues ongoing outreach strategies aimed toward achieving long-term water conservation targets. Messages in this stage focus on services and rebate programs SCVWD provides to facilitate water use efficiency for residents, agriculture, and business. While other stages are more urgent, successful outcomes in Stage 1 are vital to long-term water supply reliability.
Stage 2	Alert	250,000 – 300,000 AF	0 – 10%	This stage is meant to warn customers that current water use is tapping groundwater reserves. Coordinate ordinances with cities and prepare for a Stage 3 situation. Additional communication tools can be employed to augment Stage 1 efforts, promote immediate behavioral changes, and set the tone for the onset of shortages. Specific implementation plans will be developed when a worsening of the water shortage has occurred. Supplemental funding may be identified to augment budgeted efforts.
Stage 3	Severe	200,000 – 250,000 AF	10 – 20%	Shortage conditions are worsening, requiring close coordination with retailers and cities to enact ordinances and water use restrictions. Requires significant behavioral change by water users. The intensity of communication efforts will increase as the severity of shortage increases. Messages are modified to reflect for dire circumstances.
Stage 4	Critical	150,000 – 200,000 AF	20 – 40%	This is the most severe stage in a multiyear drought. SCVWD will expand Stage 3 activities and encourage retailers and cities to enforce their water shortage contingency plans, which could include fines for repeated violations.
Stage 5	Emergency	Below 150,000 AF	50%	Stage 5 of the water shortage contingency plan is meant to address an immediate crisis such as a major infrastructure failure. Water supply would only be available to meet health and safety needs. SCVWD would activate its EOC and provide daily updates on conditions.

The purpose of contingency planning is to be prepared ahead of time and to establish actions and procedures for managing water supplies and demands during water supply reductions and water shortages. An important component of meaningful shortage response is the ability to recognize a pending shortage before it occurs, early enough so that several options remain available and before supplies that may be crucial later have not been depleted.

Many factors and events can and do affect water supply availability in any given year. The SCVWD has determined that projected end-of-year groundwater storage serves as an early warning sign for and is a good indicator of potential water shortages. Groundwater storage accounts for surface water supplies as these supplies either directly or indirectly contribute to projected groundwater storage.

The SCVWD is the groundwater management agency for Santa Clara County. However, groundwater is pumped by others including water retailers, private well owners, and agricultural users. The SCVWD can influence groundwater pumping through financial and management practices, but it does not directly control the amount of pumping. Therefore, to execute effective responses to a water shortage, the SCVWD works closely with groundwater users, cities, and water retailers to plan and coordinate water shortage contingency actions.

Water Shortage Actions by SCVWD

When SCVWD's Board of Directors calls for short-term water use reductions, the cities and water retailers consider implementing the water shortage contingency plan actions identified in their UWMPs in order to achieve the necessary water use reductions. Actions to achieve the desired shortage response may be different for each water retailer depending on service area composition (commercial, industrial, residential) and source of water supplies. However, some actions are common to several of the water retailers, providing for more consistent implementation and messaging.

Reducing water consumption during a water shortage is generally achieved through increased education leading to behavioral changes (e.g., shutting off the water while brushing one's teeth) and water use restrictions (e.g., yard irrigation only allowed two days a week). These water savings are considered short term water use reductions and are distinct from long term on-going conservation programs described in **Section 9**.

8.3 Sunnyvale's Stages of Action

Sunnyvale staff, in anticipation of 10, 20, 50, and greater than 50% supply reductions developed a water shortage contingency plan adopted in March of 1989, ~~then recently~~and scheduled to be amended in ~~(Month)~~June ~~2015~~2016, that includes mandatory (and voluntary) water use restrictions, rate block adjustment, and approaches for enforcement associated with each stage of anticipated reduction.

In 2015, in response to continued drought conditions, the City implemented water use prohibitions in addition to the Stage 2 (formerly Stage 1) prohibitions. In addition to new prohibitions the City adopted a resolution declaring a 30 percent water reduction target through ~~April~~ June 30, 2016.

The following **Table 8-3**~~**Table 8-3**~~ describes the five levels of supply reductions that were used for development of Sunnyvale's water shortage contingency plan. The City initiates the stage based on the wholesaler's declaration of shortage and restrictions.

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Table 8-3: Sunnyvale Water Shortage Contingency – Rationing Stages

Stage	% Shortage	Water Supply Conditions
0	None	Supply conditions are adequate. The City continues to encourage water conservation and water use efficiency.
1	up ~~to10~~to15%	Stage 1 exists when City Council declares a water shortage exists due to supply conditions and calls for up to 10% water reduction.
2	up to ~~25~~30%	Stage 2 exists when City Council declares a water shortage emergency exists due to water supply conditions and calls for up to 25% water reduction.
3	up to ~~40~~45%	Stage 3 exists when City Council declares that a water shortage emergency exists due to water supply conditions and calls for up to 40% water reduction.
4	Greater than ~~40~~45%	Stage 4 exists when City Council declares that a water shortage emergency exists and demands water reduction greater than 40% in response to existing water conditions.

8.3.1 Prohibitions, Penalties, and Consumption Reduction Methods

Table 8-4~~Table 8-4~~ details the use restrictions for each stage of reduction declared by the City.

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Table 8-4: Water Shortage Contingency – ~~Mandatory Prohibitions adopted in 2011~~Actions/Prohibitions

Stage No.	Action/Prohibition
Stage 0 ~~None~~Normal	*Permanent water use prohibitions please refer to City's Municipal Code 12.34.020* • Allowing plumbing fixtures to leak • Using potable water in a manner where it floods premises and runoff into the street • Using a hose to wash vehicles without shut off valve. • Using a hose to wash hard surfaces without a shut off valve. • Service of water to restaurants patrons without being requested. • Installation of single pass cooling process in new construction • Sprinkler irrigation between the hours of 9 AM – 6 PM when daylight savings is in effect. • Irrigating for more than 15 minutes per day each station. ~~*For more details on the above prohibitions please refer to City's Municipal Code 12.34.020*~~
Stage 1 up to ~~10~~15%	• All of the above • Low level informational outreach • Enforcement of permanent water use restriction Ordinance (Muni Code 12.34.020) • Irrigation with potable water during and within 48 hours after measureable rainfall is prohibited. • Using potable water for cleaning sidewalks, driveways, ~~buildings, patios,~~ parking lots or other paved/hard surfaced areas except by use to hand bucket or similar container or when necessary to alleviate safety or sanitary hazards~~.~~ • Using hose without positive automatic shutoff ~~value~~ valve for washing cars, buses, boats, trailers • Use of decorative fountains without recirculation • Hydrant flushing (unless for public health or safety)
Stage 2 up to ~~25~~30%	• All of the above • Stepped up outreach effort • Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. • Irrigation of ornamental landscapes with potable water more than two days per week is prohibited. ~~• Watering with a sprinkler system more than two days per week.~~ ~~• New installations of lawns.~~
Stage 3	• All of the above

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up to 4045%	• Water allocation may be imposed • Washing vehicles with potable water except at commercial vehicle washing facility • Watering turf, grass or dichondra lawns (can provide minimal water for sports playing fields) • New installations of lawns. • Irrigating with potable water of golf courses except for tees and greens
Stage 4 Greater than 4045%	• All of the above • New swimming pool or pond construction • Filling or refilling swimming pools (can replace water loss due to evaporation) • Outdoor watering December through March. • Landscape irrigation with potable water of any City-owned premises or businesses where recycled water is available for connection. • ~~Utilization of potable water for any City operation where recycled water could be used.~~

In addition, Sunnyvale has adopted a series of water conservation action plans for City departments that correspond to each of the stages. These plans apply mandatory prohibitions to potable water usage at City golf courses, City parks, City streetscape trees and landscaping, and public safety. The rates and charges for water services will be further increased for the greater than 50% reduction case. Table 8-5~~Table 8-5~~ outlines the penalties and charges associated with water use violations.

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Table 8-5: Water Shortage Contingency – Penalties and Charges

Stage No.	Description	Penalty/Charge
3	Fine for non-essential water uses as described in City ordinance	Not to exceed $1,000
3	Cost recovery for Installation and removal of flow restricting valves	$100

8.3.2 2015 Drought Response Updates

In response to an executive order issued by Governor Brown on April 25, 2014 and an adopted emergency regulation for urban water conservation by the State Water Resources Control Board on July 15, 2014, the City adopted Resolution 693-15 on May 12, 2015. This Resolution establishes a Stage 2 (formerly Stage 1) water use reduction goal of 30%, additional water restrictions, and an updated Master Fee schedule with penalties for non-compliance.

New additional restrictions include:

- Potable water for landscape and turf irrigation is limited to two days per week
- Landscape watering prohibited within two days of rain
- Hotels are to offer patrons the option of not laundering towels and linens on a daily basis
- Use of potable water for irrigation of ornamental turf on public streets and medians is prohibited
- Use of potable water for irrigation outside of newly constructed homes and buildings is prohibited

The master fee schedule was updated to allow citations to occur for Stage 3 (formerly Stage 2) prohibitions. Table 8-6~~Table 8-6~~ shows the citation schedule.

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Table 8-6: Penalties for Violation of Stage 2 Drought Restrictions

Violation of drought restrictions	Penalty
First Violation	$0 – written warning
Second Violation	$0 – written warning
Third Violation	$250
Fourth Violation	$500

8.4 Consumption Reduction Methods

There are a number of methods actively implementation by the City to encourage consumption reduction, which are described below.

8.4.1 Water Rate Structure for Conservation

A major part of Sunnyvale's strategy for water conservation developed in 1989 is a block rate pricing structure involving a lifeline rate set at 15% above the existing rates, a conservation block rate set at a multiple of two times usage in applicable existing rate blocks, and a high impact/high use category at a multiple of 3.5 times the existing rate blocks. The lifeline category exists for all categories of users whereas the conservation and high use rates are applied to recognize the greatest opportunities and needs for reduction and to be sensitive to the importance of manufacturing production and commercial needs. The same approach would be used should the City move to a 10%, 20%, 50%, or greater than 50% reduction. However, the multipliers would escalate.

Separate metering systems have been set up for fire and landscape uses with potable water utilized for landscaping purposes at a different rate than domestic water.

8.4.2 Enforcement Approach

The thrust of enforcement of Sunnyvale's conservation program is to solicit cooperation from water users who are unaware of the restrictions or have failed to comply with the provisions of the ordinance. Every effort is made to inform these users of the need for conserving water. If discussions with the user are unsuccessful in obtaining compliance, enforcement mechanisms are available.

The Departments of Public Works and Public Safety cooperate on the responsibility for enforcement of the City's conservation plan. Computerized systems track complaints throughout the enforcement process. The process involves first establishing contact with the individual who may be in violation; giving the individual information about code requirements; and verbally requesting that the user comply with these requirements. If a complaint has been registered with Neighborhood Preservation, the complainant is contacted and notified of the results of the preliminary investigation. The complainant is kept informed at each step of the process. Upon receipt of a second violation complaint, the violator will receive a written notice to comply and a warning that the next violation may result in a citation and/or the installation of a flow restricting device at the water meter. This flow restricting device would reduce the flow of water to a trickle, thereby allowing the occupant only enough water for health and sanitation

purposes. If there are further complaints and a citation is to be issued, the Department of Public Safety is called to issue the citation.

A "hot line" telephone number is established for drought information and to register complaints. Trained staff is available to provide information and to respond to complaints.

8.4.3 Water Use Monitoring Procedure

For the purposes of implementing the water shortage contingency plan, the City relies on both staff observations regarding excessive water use as well as customer complaints. City staff is also studying the economic and operational feasibility of using metering technology to implement the plan, but no specific plans exist to make such a change.

8.4.4 Public Outreach/Rebates

The City participates in public information campaigns and available water conservation rebates managed by each wholesaler encouraging water conservation. During dry periods, the City notifies the public of water conservation programs available through bill stuffers and direct mailing.

8.5 Determining Water Shortage Reductions

As customers begin to comply with water reduction measures the overall water use will decrease. The City continuously monitors water usage each month from billed consumption through water meters and will be able to determine the amount of water reductions compared to previous years. The City's billing system provides the capability for the City to evaluate water consumption from customer types. In stages 3 and higher, the City would expect to see large reductions from the dedicated landscape meters and residential customers due to mandatory restrictions on outdoor irrigation.

8.6 Analysis of Revenue Impacts of Reduced Sales during Shortages

In the event of a water shortage scenario, water fund revenues may decrease from the implementation of conservation measures and corresponding reduction in water sales. Conversely, expenses will increase as a result of the implementation and enforcement of water conservation measures. Expenditures will also rise on a per-unit basis, as wholesalers increase their per-unit price to compensate for the loss of revenue from wholesale sales.

The City has several options to address financial issues during a water shortage. First, the City retains two significant reserves, one for operating contingencies (Contingency Reserve) such as water shortages that is set at 25% of operations and purchased water costs, and a second for the purpose of stabilizing rates over time (Rate Stabilization Reserve). Each will help the City balance the Water Supply and Distribution fund during supply shortages. The City is developing an emergency tiered rate structure that sends hard conservation pricing signals to customers during a period of supply shortage. Finally, the City has four sources of supply and the ability to move most of its supply from any one point to any other point (the exception being recycled water). In the event of a water shortage, especially in the short term, the City

has multiple supply options that should contribute to a more-stable revenue base than if the City were under very limited wholesale supplies.

8.7 Resolution

The City maintains water conservation restrictions within Chapter 12 of the Sunnyvale Municipal Code and has the capability to amend or supersede through adoption of Resolution by the City Council. The latest adopted resolution was in 2015, to re-implement Stage 2 (formerly Stage 1) water use reduction, implement additional water use prohibitions, and allow for penalties to be cited for violations of water use prohibitions.

8.8 Catastrophic Supply Interruption

Disasters such as earthquakes could threaten water delivery infrastructure. SFPUC and SCVWD are taking steps to ensure water supply reliability.

8.8.1 SFPUC Catastrophic Supply Planning

Natural Disasters

Following San Francisco's experience with the 1989 Loma Prieta Earthquake, the SFPUC created a departmental Emergency Operations Plan (SFPUC EOP). The SFPUC EOP was originally released in 1992, and has been updated on average every two years. The latest plan update was released in 2013. The SFPUC EOP addresses a broad range of potential emergency situations that may affect the SFPUC and that supplements the City and County of San Francisco's EOP prepared by the Department of Emergency Management and updated in 2008. Specifically, the purpose of the SFPUC EOP is to describe the department's emergency management organization, roles and responsibilities and emergency policies and procedures.

In addition, SFPUC divisions and bureaus have their own EOPs that are in alignment with the SFPUC EOP and describe each division's/bureau's specific emergency management organization, roles and responsibilities and emergency policies and procedures. The SFPUC tests its emergency plans on a regular basis by conducting emergency exercises. Through these exercises the SFPUC learns how well the plans will or will not work in response to an emergency. Plan improvements are based on exercise and sometimes real world event response and evaluation. Also, the SFPUC has an emergency response training plan that is based on federal, state and local standards and exercise and incident improvement plans. SFPUC employees have emergency training requirements that are based on their emergency response role.

SFPUC Emergency Drinking Water Planning

In February 2005, the SFPUC Water Quality Bureau published a City Emergency Drinking Water Alternatives report. The purpose of this project was to develop a plan for supplying emergency drinking water in the City after damage and/or contamination of the SFPUC raw and/or treated water systems resulting from a major disaster. The report addresses immediate response after a major disaster. Since the publication of this report, the SFPUC has

implemented a number of projects to increase its capability to support the provision of emergency drinking water during an emergency. These projects include:

- Public Information and materials for home and business;
- Designation and identification of 67 emergency drinking water hydrants throughout San Francisco;
- Purchase of emergency related equipment including water bladders and water bagging machines to help with water distribution post disaster; and
- Coordinated planning with City Departments, neighboring jurisdictions and other public and private partners to maximize resources and supplies for emergency response

With respect to emergency response for the SFPUC Regional Water System, the SFPUC has prepared the SFPUC Regional Water System Emergency Response and Recovery Plan (ERRP), completed in 2003 and updated in 2006. The purpose of this plan is to describe the SFPUC RWS emergency management organizations, roles and responsibilities within those organizations, and emergency management procedures. This contingency plan addresses how to respond to and to recover from a major RWS seismic event, or other major disaster. The ERRP complements the other SFPUC emergency operations plans at the Department, Division and Bureau levels for major system emergencies.

The SFPUC has also prepared a SFPUC-Suburban Customer Water Supply Emergency Operations and Notification Plan. The plan was first prepared in 1996 and has been updated several times, most recently in July of 2010. The purpose of this plan is to provide contact information, procedures and guidelines to be implemented by the following entities when a potential or actual water supply problem arises: the SFPUC Water Supply and Treatment Division (WS&TD), Water Quality Bureau (WQB), and SFPUC wholesale customers, BAWSCA, and City Distribution Division (CDD – considered to be a customer for the purposes of this plan). For the purposes of this plan, water quality issues are treated as potential or actual supply problems.

Power Outage Preparedness and Response by SFPUC

SFPUC's water transmission system is primarily gravity fed, from the Hetch Hetchy Reservoir to the City and County of San Francisco. Within San Francisco's in-city distribution system, the key pump stations have generators in place and all others have connections in place that would allow portable generators to be used.

Although water conveyance throughout the RWS would not be greatly impacted by power outages because it is gravity fed, the SFPUC has prepared for potential regional power outages as follows:

- The Tesla disinfection facility, the Sunol Valley Water Treatment Plant, and the San Antonio Pump Station have back-up power in place in the form of generators or diesel powered pumps. Additionally, both the Sunol Valley Water Treatment Plant and the San Antonio Pump Station would not be impacted by a failure of the regional power grid because it runs off of the SFPUC hydro-power generated by the RWS.
- Both the Harry Tracy Water Treatment Plant and the Baden Pump Station have back-up generators in place.

- Additionally, the WSIP includes projects which will expand the SFPUC's ability to remain in operation during power outages and other emergency situations.

8.8.2 Catastrophic Interruption Planning by SCVWD

SCVWD Emergency Operations Center

The SCVWD's Security and Emergency Services Unit (SESU) coordinates emergency response and recovery for the SCVWD. During any emergency, the SCVWD continues the primary missions of providing clean, safe water and flood protection to the people of Santa Clara County. SESU ensures that critical services are maintained and emergency response is centralized. SESU maintains a full-time professional emergency management staff trained and equipped to respond quickly at any time of day or night to support the SCVWD's Emergency Operations Center (EOC) and field responders.

The EOC is connected to other agencies and jurisdictions by an array of telecommunications, two-way radio, satellite telephone, and wireless messaging systems. In addition, two response vehicles with many of the same communications capabilities of the EOC enable staff to establish mobile emergency command posts just about anywhere field operations may require. OES maintains communications with local, state and national emergency management organizations and allied disaster preparedness and response agencies.

Infrastructure Reliability Project

The SCVWD completed its first Water Utility Infrastructure Reliability Plan in 2005. The project measured the baseline performance of critical SCVWD facilities in emergency events and identified system vulnerabilities. The plan concluded that the SCVWD's water supply system could suffer up to a 60-day outage if a major event, such as a 7.9 magnitude earthquake on the San Andreas Fault, were to occur. Less severe hazards, such as other earthquakes, flooding and regional power outages had less of an impact on the SCVWD, with outage times ranging from one to 45 days. The project recommended several improvements to reduce the expected outage times, which the SCVWD has been implementing. In 2007, the SCVWD created a stockpile of emergency pipeline repair materials including large diameter spare pipe, internal pipeline joint seals, valves, and appurtenances. The stockpile marks a significant increase in reliability of the SCVWD's water supply system, as it helps to reduce outage time following a large earthquake from approximately 60 to 30 days. The SCVWD has also implemented several emergency planning recommendations to meet the goal of reducing outage time to 30 days. These include developing a list of contractors available on standing order to use during an emergency event and participating in CalWARN, a mutual aid network for water and wastewater utilities. Additional planned projects include installing four line valves on the SCVWD's treated water pipelines to allow the SCVWD to isolate damaged portions of pipelines.

The 2005 plan also recommended constructing approximately 40 distributed groundwater wells that would be tied into the treated water system to provide backup emergency supply if the SCVWD's treatment plants and raw water sources went down. Since that study was completed in 2005, the SCVWD found that the 40 groundwater wells are not fully needed because treated water retailers have learned to operate their systems without SCVWD treated water supplies for several weeks during SCVWD pipeline shutdowns for maintenance. In addition, the SCVWD is making other substantial investments in reliability, including seismic

retrofits at Anderson and Calero Dams and reliability upgrades at the Rinconada Water Treatment Plant, and retailers have made substantial improvements to their systems.

Because of these changed conditions, the SCVWD is currently updating its Infrastructure Reliability Plan. The goal of the update is to identify new reliability improvements that are more regional, less capital intensive alternatives to the well fields. So far, the project has analyzed several outage scenarios including earthquake, super-storm, and Delta outage (discussed in the following section), and has identified the expected outage duration of the SCVWD's system for each event. Analyses show that expected outage time for the SCVWD's system in a major event is approximately 30 days. The project team has also worked with the SCVWD's retail customers to identify a reasonable level of service goal for hazard events. In most cases, retailers can continue to provide average winter demands without SCVWD treated water for the full outage duration of 30 days or more. There are some exceptions, and specific geographical areas that will benefit from some modest reliability improvements, and the plan will focus on making recommendations for these specific areas. Projects likely to be recommended include new or upgraded retailer interties, more isolation valves on the SCVWD's pipelines, new retailer wells, and operational agreements for use of SCVWD or retailer systems to convey water to other retailers. The updated plan and final recommendations will be complete in June 2016.

Delta-Conveyed Supply Interruption

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

DWR's Delta Flood Emergency Management Plan includes strategies for responding to Delta levee failures, including establishing an emergency freshwater pathway from the central Delta to the export pumps in the south Delta. The plan includes the pre-positioning of emergency construction materials at existing and new stockpiles and warehouse sites in the Delta, and development of tactical modeling tools (DWR Emergency Response Tool) to predict levee repair logistics, water quality conditions, and timelines of levee repair and suitable water quality to restore exports. The plan has been extensively coordinated with state, federal and local emergency response agencies. DWR, in conjunction with local agencies, the Corps and Cal OES, regularly conduct simulated and field exercises to test and revise the plan under real time conditions.

The DWR Delta Levees Subvention Program has prioritized, funded, and implemented levee improvements along the emergency freshwater pathway and other water supply corridors in the central and south Delta region. These efforts have been complementary to the DWR Delta Flood Emergency Management Plan, which along with use of pre-positioned emergency flood fight materials in the Delta, relies on pathway and other levees providing reasonable seismic performance to facilitate restoration of the freshwater pathway after a severe earthquake. Together, these two DWR programs have been successful in implementing a coordinated strategy of emergency preparedness for the benefit of SWP and CVP export systems.

The SCVWD analyzed the impacts of a Delta outage to determine if the SCVWD could continue limited service for the outage duration with no imported water supplies. The analysis assumed that all local SCVWD infrastructure will remain intact. An earthquake or flood in the Delta is unlikely to also badly damage local infrastructure. The analysis also assumed normal hydrologic conditions and starting storage conditions, rather than stacking disaster upon disaster (i.e., earthquake plus drought, etc.), access to SFPUC supplies, and implementation of water use reductions of 20 percent.

The analysis indicates that the impacts of a six-month Delta outage are largely operational as they would require retailers to supplement their treated water supplies with groundwater and for the SCVWD to actively manage the groundwater recharge program to meet countywide needs. Even with increased pumping, groundwater storage is estimated to remain in the normal/Stage 1 range. Thus, the impacts of a Delta outage are manageable assuming the SCVWD continues with planned investments described in the 2012 Water Supply and Infrastructure Master Plan.

The SCVWD would call for more aggressive water use reductions (up to 50 percent) if a Delta outage were to occur during a drought.

8.9 Minimum Supply Next Three Years

Table 8-7~~Table 8-7~~ is based on the projected demands during the indicated years, and analyses of the average/normal deliveries to the City from SFPUC and SCVWD in 2002. This analysis uses decreased supply availability in accordance with historic conditions as described in Table 8-7~~Table 8-7~~; however, an analysis of current supply and wholesale supplier systems indicates that supplies would be available to meet demands even in times of drought, with no reduction of supply necessary until the fifth year and beyond of a multi-year drought.

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Table 8-7: Supply Reliability – Current Water Sources (AFY)

Source	Multiple Dry Water Years		
	Year 2016	Year 2017	Year 2018
SFPUC	9,331	9,779	10,228
SCVWD	7,326	8,155	8,984
Groundwater	197	260	322
Recycled Water1	865	1,013	1,160
Totals	17,719	19,207	20,694

Notes:
1. Additional groundwater supply will be used to supplement decreases in purchased treated water supply.

SECTION 9 – DEMAND MANAGEMENT MEASURES

The City of Sunnyvale has a commitment to water conservation and implementation of the Demand Management Measures (DMMs) identified by the State as tools to help water agencies achieve water use targets.

9.1 Demand Management Measures for Retail Agencies

Table 9-1~~Table 9-1~~ below lists current and planned program components implemented by the City for each measure and indicates who administers the program.

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Table 9-1: Demand Management Measures (DMMs)

Demand Management Measure	City Program	SCVWD Program	BAWSCA Program
Water Waste Prevention Ordinance			
Adopted water waste prohibition ordinance	X		
Metering			
Fully metered service connections	X		
Retrofit or replacement of aging meters	X		
Submeter rebate program		X	
Conservation Pricing			
Conservation rate structures	X		
Public Education and Outreach			
Public information programs	X	X	
School education programs	X	X	
Programs to assess and manage distribution system real loss			
System water audits, leak detection, and repair	X		
Water Conservation Program Coordination and Staffing Support			
Dedicated water conservation coordinator	X		
Other Demand Management Measures			
Water survey programs for residential, and Commercial, Industrial, Institutional (CII) customers		X	
Residential plumbing retrofit		X	
Large landscape conservation programs and incentives		X	
High-efficiency washing machine rebate programs		X	
Conservation programs for CII accounts		X	
Ultra-low-flush toilet and urinal replacement programs		X	
Graywater landscape irrigation rebates and incentives	X	X	
Rain barrel rebate program	X		X
Landscape Conversion Rebate Program	X	X	

DMMs can be water conservation programs, outreach or monetary incentives offered to customers as well as institutional tools to help water purveyors reduce water use through system losses or metering water consumption.

Many of the DMMs offered by the City to customers are programs run by or coordinated through the wholesaler SCVWD or the Bay Area Water Supply and Conservation Agency (BAWSCA). The programs are either funded through the wholesale water rates paid by the City, or are directly reimbursed by the City. Additional program descriptions including implementation over the past five years and the nature and extent of each program component within a DMM are explained in the next section.

The City, as a municipally-owned water utility, has the legal authority to implement DMMs by ordinance or resolution of the City Council. This authority has been exercised through past implementation of demand management measure, fees, and penalties. This section describes the DMMs that are implemented within the City's service area in an effort to increase water conservation and meet the 2020 and 2025 water use targets.

9.2 DMM Implementation over the past five years

Below is a description of the various DMMs that are implemented within the City either by the City, SCVWD, or BAWSCA.

9.2.1 Water Waste Prevention Ordinance

Implementation: Drought and water conservation requirements are implemented by the City and will continue to be implemented by the City in the future.

Description: On May 2015, the City Council adopted a resolution and established a 30% water use reduction target from 2013 levels (increased from 15%) through June 2016 out of concern for drought conditions, groundwater depletion and land subsidence. The City's resolution instituted a two (2) day watering schedule, prohibits outside irrigation within 48 hours of rainfall, between 9AM and 6 p.m., and requires hotels to give patrons the option of having linens laundered daily. Prohibitions implemented by the City previous to this resolution include:

- Serving water in restaurants except upon request
- The application of potable water to outdoor landscapes in a manner that causes runoff.
- The application of potable water to driveways and sidewalks
- The use of potable water in a fountain or other decorative water features unless the water is part of a recirculating system
- Landscape irrigation between the hours of 9 a.m. and 6 p.m.
- Using a hose without a positive shutoff valve to wash cars, buses, boats, or trailers
- Water waste due to broken or defective plumbing, sprinkler, watering, or irrigation systems.

Violation of these provisions may escalate to installation of a flow restricting device upon the water service lines and cumulative fines. The Water Conservation Plan and Municipal Code is included as **Appendix E** and **Appendix F**, respectively.

9.2.2 Metering

Implementation: The City implements metering requirements within the service area and will continue to do so. Additionally, the City implements a program to retrofit and replace meters as they age. Through SCVWD, the City offers multi-family housing the opportunity to receive a rebate for installation of submeters.

Description: The City requires that all service connections within the service area are metered. All new service connections are metered and are billed by volume of water used. There are no known connections operating without a meter. Connections to the City are governed by Chapter 12.24 of the Sunnyvale Municipal Code, which is provided as **Appendix F**.

Sunnyvale encourages all new commercial, industrial, and multi-family developments to have dedicated water meters and separate accounts and meters for landscape irrigation. As older developments are replaced with newer ones, any customers without a dedicated landscape irrigation meter will be encouraged to acquire one.

SCVWD's Submeter Rebate Program: This program, which began as a pilot program in FY 2000-2001, gives a rebate of $150 for every water submeter installed at multi-family housing complexes, such as mobile home parks and condominium complexes. Water use records from participating mobile home parks showed an average water savings of 23% per mobile home.

9.2.3 Conservation Pricing

Implementation: Conservation pricing is implemented by the City and will continue to be implemented by the City in the future.

Description: In March 1989, in response to drought conditions, the City adopted a water conservation plan that required implementation of demand management measures such as an inverted rate structure, deterrents to water waste, landscaping restrictions and the institution of a recycled water program.

Prior to the 1976-1978 drought, the City had a traditional declining-rate block structure, which meant that the more water that was used by a customer, the lower the cost per unit. In 1977, a flat-rate block structure was established with costs fixed regardless of the quantity used. In the year following the drought, an inverted rate structure was adopted and is regularly modified to ensure water conservation and to adequately reflect the high cost of developing new water resources projects.

With the inverted rate structure, each user category has between one and seven rate blocks. The first rate block, providing up to 600 cubic feet of water, represents the lifeline rate, which is a minimum rate for basic water requirements of customers. For the other rate blocks, rates increase with increased water usage to encourage water conservation.

Sunnyvale's Fiscal Year 2015/2016 Utility Fee Schedule is attached as **Appendix G**.

9.2.4 Public Education and Outreach

Public Information Programs

Implementation: The City and SCVWD participate in developing and implementing public information programs. The City also implements outreach programs in the service area. The City and SCVWD will continue to implement public information programs in the future.

Description: The City and SCVWD have carried out various public information campaigns in the past and continue to do so. Multi-media advertising has covered topics such as water conservation, urban runoff pollution prevention, water quality, groundwater recharge, water supply, water recycling, watershed and flood protection, and stream stewardship. Efforts included paid advertising, public service announcements, bill inserts/brochures, targeted mailings, website development, social media, community outreach, school programs, and special events. One highlight was for a high-efficiency washing machine, encouraging participation in rebate programs and learning more about the district's conservation efforts. Campaigns have been carried out in various languages including English, Spanish, Vietnamese, and Chinese.

The City also participates by including inserts and information flyers in customer utility bills, and by distributing articles and information in newsletters and reports sent to City residents. All utility bills include a water usage chart comparing current year to previous year usage to help customers who have unknowingly increased their water consumption to check on the cause of the increase.

Sunnyvale also participates in public activities such as the Columbia Health and Safety Fair and Earth Day Celebration. Partnerships with the Public Safety and Community Services departments in activities sponsored by those departments (Pancake Breakfast, Summer Camp) provide more opportunities to reach youth and the general public with a message extolling the virtue of water conservation.

The City maintains a water conservation website that provides information on water conservation program incentives and rebates, water conservation tips and tools, drought restrictions, and links to wholesaler water conservation programs or other informative websites.

School Education Programs

Implementation: In 1995, SCVWD's Public Information Office hired a full-time, fully credentialed educator who holds lifetime teaching and Administrative Services credentials to coordinate their school education programs. From 2001-2007, a second, bilingual educator joined SCVWD's full-time staff to assist with the program. The City has also been implementing school education programs in the WPCP service area for over 15 years. The City and SCVWD will continue to implement school education programs in the future.

Description: SCVWD's educators develop school programs, contract with the Youth Science Institute for additional instructors, and supervise university student interns as classroom assistants. SCVWD has been continuously active in this area by providing free classroom

presentations, puppet plays, and tours of SCVWD facilities to schools within the County. The objective is to teach students about water conservation, water supply, watershed stewardship, and flood protection. SCVWD also provides school curricula to area educators, including workbooks and videos, as well as hands-on training for teachers. Materials distributed to students include topical lessons. All meet state education framework requirements and are grade-level appropriate.

The City also has a water pollution and conservation outreach program spearheaded by Sunnyvale's Water Pollution Control Plant staff. This program offers tours of the plant, classroom presentations and a creek water education program. Plant tours teach youth about the function of wastewater treatment, water pollution prevention, and water conservation. Oftentimes, the tour is a supplement to a water study module in the classroom, and approximately 50% are repeat tours scheduled year after year by teachers.

The Creek Education program provides watershed, urban runoff, water pollution prevention, storm water, creek education, water conservation and wastewater information to Sunnyvale students at schools in the Cupertino & Sunnyvale school districts. Students take a yearly field trip to Stevens Creek at McClellan Ranch Park after studying water and structures of life courses in class.

Classroom presentations involve a watershed pollution demonstration designed to correlate with the State of California curriculum standards for earth sciences. Subjects covered include water cycle, groundwater, aquifers, water pollution and water conservation.

9.2.5 Programs to Assess and Manage Distribution System Real Loss

Implementation: The City continuously implements water audits and leak detection and repair for the water distribution system. In addition to City staff continuously monitoring the water distribution system through SCADA technology and field inspections, the City also implements a leak detection program. The City expects this to be an ongoing program.

Description: In order to fulfill this measure, all accounts within the City service area are metered. The City also offers help to its residential customers in determining if a leak exists at the property. Water Meter Readers report leaky meters or water meters running when a residence does not appear to be occupied so that a technician can be dispatched to investigate and make repairs as needed.

Additionally, a leak detection company conducts annual inspections of distribution pipeline. The length of pipe inspected annually is a determined by the City. The leak detection contractor generates a condition assessment report for the inspected pipeline, and reported leaks are promptly remediated by City staff or a hired contractor. These programs have helped the City attain lower-than-average system losses.

9.2.6 Water Conservation Program Coordination and Staffing Support

Implementation and Description: The City established the position of Water Conservation Coordinator in 1999. The current Water Conservation Coordinator information is provided below and it is expected that there will continue to be a staff member dedicated to water conservation programs

Water Conservation Coordinator:

Name:	Nupor Hiremath
Title:	Environmental Sustainability Coordinator
	Department of Public Works
Address:	City of Sunnyvale
	Water Pollution Control Plant
	1444 Borregas Avenue
	Sunnyvale, CA 94089
Phone:	(408) 730-7260
Fax:	(408) 747-1139
Email:	Nhiremath@sunnyvale.ca.gov

9.2.7 Other Demand Management Measures

Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

Implementation: This program was first implemented in July of 1998 as a pilot program. It is an active program administered by SCVWD. The City shares the cost to support this program. SCVWD plans to continue its program to meet the region's long-term water conservation goals.

Description: SCVWD markets water-use surveys to single-family and multi-family residential customers throughout the County. Since 1998, SCVWD has performed more than 34,496 residential audits (SCVWD Annual Water Conservation Report for Fiscal Year 2012-2013). From 2011 to 2015, 2,304 were completed in the Sunnyvale City service area

The program includes educating the customer on how to read a water meter; checking flow rates of showerheads, faucet aerators and toilets; checking for leaks; installing low-flow showerheads, aerators and/or toilet flappers if necessary; checking the irrigation system for efficiency (including leaks); measuring landscaped area; developing an efficient irrigation schedule for the different seasons; and providing the customer with evaluation results, water savings recommendations, and other educational materials. In 2004, SCVWD began programming the irrigation controllers for the homeowners as well (i.e., if allowed by the homeowner, the surveyors will input the recommended schedules into the controller).

Each year these programs are promoted countywide through a summer media campaign, which typically includes television, radio, and print advertisements.

Residential Plumbing Retrofit

Implementation: This program was first implemented in 1992. It is an active program administered by SCVWD. The City also implements the program and shares the cost to support this program. The City plans to continue offering free showerheads and aerators both directly and through the District's Water-Wise House Call Program.

Description: The City and SCVWD distribute high-quality, low-flow showerheads and faucet aerators to single-family and multi-family residents as the implementation of the residential plumbing retrofits program. The City makes low-flow showerheads and aerators available to residents free of charge and to date has directly distributed thousands of units to interested parties. Since program inception, more than 317,623 low-flow showerheads and aerators have been distributed throughout the County, including more than 4,400 in FY 2012-2013. The cost for these devices is not tracked by the City.

Large Landscape Conservation Programs and Incentives

Implementation: Large landscape conservation programs are administered by SCVWD. There are currently two programs implemented, including the Landscape Survey Program (LSP), formerly known as the Irrigation Technical Assistance Program (ITAP), and the Landscape Rebate Program. The landscape survey program was first implemented in 1995.

The landscape rebate program is a combination of programs including the weather-based irrigation controllers (WBICs) program, the Irrigation System Hardware Rebate Program (ISHRP), the Residential Irrigation System Hardware Rebate Program (RISHRP), and the Water Efficient Landscape Rebate Program (WELRP). The WELRP was first implemented in 2005 and the other three programs were first implemented in 2006. The four programs were then combined into the Landscape Rebate Program in 2009. Both survey and rebate programs are currently active and both programs will continue to be implemented in the future.

The City also issued Ordinance No. 19.37 regulating conservation in landscaping. This ordinance applies to all new and rehabilitated landscaping for public agency projects and private development projects that require a permit, as well as developer-installed landscaping in single-family and multi-family projects. A copy of this ordinance is included in **Appendix F**.

Description of Landscape Survey Program (LSP): Since 1995, SCVWD has offered and provided large landscape water audits to sites in the County with one acre or more of landscaping. Landscape managers have been provided water-use analyses, scheduling information, in-depth irrigation evaluation, and recommendations for affordable irrigation upgrades. Each site receives a detailed report upon completion of the audit. An annual report is generated to recap the previous year's efforts. To generate several reporting and monitoring options, water use history, meter numbers, account numbers, and site contacts and addresses are captured for each site in a specialized database Participation is limited to sites with a minimum of half an acre or 1,000 CCF of annual irrigation usage.

The LSP reaches the community through advertising in Tri-County Apartment Association's monthly Apartment Management magazine, colorful flyers at the biannual Home & Garden Show, NCTLC Turf & Landscape Expo, and retailer outreach through direct mailing of personalized letters to high water use customers and also through City newsletters and business newsletters. There have been 17 audits conducted in the City's service area through this program in between the years 2011 through 2015.

Description of Landscape Rebate Program: In 2006, SCVWD partnered with five Bay Area water supply agencies and received a DWR Proposition 13 grant that provided funding for the installation of Weather-Based Irrigation Controllers (WBICs). This new generation of irrigation controller utilizes the principals of evapo-transpiration (ET) to automatically calculate a site-specific irrigation schedule based on several factors, including plants and soil type. The

controller then adjusts the irrigation schedule as local weather changes to regulate unnecessary irrigation.

SCVWD first implemented a direct install program which installed two types of WBICs (real-time and historic) in both residential and commercial sites throughout SCVWD's service area. In order to expedite program participation and include emerging WBIC manufacturers, SCVWD shifted the WBIC program to a rebate style program that offered rebates of $300-$2,000 per approved controller installed in 2014.

SCVWD expanded its irrigation equipment incentives beyond the WBIC program, when two grants were received in 2006 for the implementation of two types of water efficient irrigation hardware installation rebate programs.

The first grant, received from DWR, kicked off implementation of the Irrigation System Hardware Rebate Program (ISHRP). This program aimed to install a variety of water efficient irrigation hardware at commercial, industrial, and institutional sites throughout the County. Through ISHRP, SCVWD provided rebates ranging from $200 to a maximum of $2,000 per site (not to exceed 50% of the hardware cost). Qualifying hardware included rain sensors, high distribution uniformity nozzles, dedicated landscape meters, replacement sprinkler heads, converting overhead irrigation to drip irrigation, pressure reducing valves, and spray heads or rotors with pressure compensating heads and/or check valves.

The second water efficient irrigation equipment grant was received from the United States Bureau of Reclamation and was to launch the RISHRP. The program was designed to retrofit inefficient irrigation equipment at residential sites with new water conserving equipment. This residential version of the ISHRP offered rebates for the same efficient irrigation equipment but was unique as RISRHP offered flat rebate amounts per equipment items. Through the RISHRP program, residents could receive rebates ranging from $50 up to $1,000 per site.

In addition to efficient irrigation equipment retrofits, SCVWD began to focus on water efficient landscapes by launching the Water Efficient Landscape Rebate Program (WELRP) in early 2005. The WELRP offered rebates to residential and commercial sites for the replacement of approved high water using landscape with low water use plants, mulch, and permeable hardscape. WELRP participants could receive up to $2.00 per square foot of irrigated turf grass with a maximum of rebate of $50,000 for Single Family, Multi-Family and Business/Institutional properties. In an effort to expedite program participation, SCVWD Board of Directors moved to double the maximum rebate from $1,000 up to $2,000 for residents and from $10,000 up to $20,000 for commercial sites in March 2009.

A summary of the surveys and rebates issued within the City's service area from 2011 to 2015is provided in **Table 9-2~~Table 9-2~~**.

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Table 9-2: Large Landscape Surveys Conducted during FY 2009-2010

Program	Landscape Surveys Completed	Equipment Retrofit Rebates	Landscape Conversion Rebates	WBIC Rebates
No. of Rebates/Surveys	17	147	44	170

Source: SCVWD – Water Conservation Program Monthly Report Totals through 2011, to 2015

High-Efficiency Washing Machine Rebate Programs

Implementation: In October 2001, SCVWD began participating in the regional Bay Area Water Utility Clothes Washer Rebate Program. Since January 2008, the regional program has partnered with Pacific Gas & Electric (PG&E). This is an active program administered by SCVWD and the City shares the cost to support this program. The program is expected to continue in the future, through the year 2019, it is expected that higher clothes washer standards will be in effect and cost-sharing may be re-evaluated at that time.

Description: Residents of the County are eligible for a rebate of up to $175 for qualifying clothes washers. Qualifying clothes washers are rated by the Consortium for Energy Efficiency (CEE) as Tier 3. The total rebate is a combined rebate from both SCVWD and PG&E. From 2011 to 2015 3,774 residential clothes washer rebates were issued in the Sunnyvale service area. The number of rebates distributed over the last five years within the City's service area is provided in Table 9-3~~Table 9-3~~.

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Table 9-3: High-Efficiency Clothes Washer Machines Rebate

	2011	2012	2013	2014	2015
No. of Rebates	1,074	676	835	724	465

Source: SCVWD – Water Conservation Program Monthly Report Totals through June 2010, dated August 3, 2010.

Conservation Programs for Commercial, Industrial, and Institutional (CII) accounts

Implementation: Since 1992, SCVWD has implemented various programs targeting commercial, industrial, and institutional (CII) customers for water efficiency outreach and education. Both the City and SCVWD expect to continue the programs in the future, with the potential for minor changes based on technological advancements.

Description: Many initiatives and programs are implemented to increase water efficiency in the CII sectors. Following is a description of the programs offered:

- **SCVWD's Commercial Toilet Program:** SCVWD has a free high-efficiency toilet replacement program specifically for businesses in Santa Clara County. The program is for CII users as well as multi-family residential customers. The existing toilet must flush at 3.5 gallons per flush or higher. The toilets to be installed are high-efficiency toilets (HETs) utilizing state-of-the-art technology. The toilet and the installation are provided free of charge.
- **SCVWD's Pre-Rinse Spray Valve Program:** SCVWD purchased a quantity of high-efficiency pre-rinse spray valves with a flow rate of 1.15 gallons per minute for distribution to commercial sites, especially those identified through the CII Water Survey Program.

Table 9-4~~Table 9-4~~ below provides a summary of the rebates and installations implemented by SCVWD in the City service area during FY 2011-2015.

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Table 9-4: Rebate Programs Implemented by SCVWD for the City (2011-2015)

Program	WET Program	Commercial HETs	Commercial Washers	Pre-Rinse Spray Valves	Submeters
No. of Rebates/Installs	1	866	192	45	0

Source: SCVWD – Water Conservation Program Monthly Report Totals from 2011 - 2015.

Residential Ultra-Low-Flush Toilet Replacement Programs

Implementation: This program was first implemented by SCVWD in 1992 as a ULFT program and was active through 2003. Beginning in 2004, SCVWD began implementing a High Efficiency Toilet (HET) program as described below. This program is an active program that the City also shares the cost to implement.

Description: The current program consists of a rebate program for single-family and multi-family accounts and a full-installation program for multi-family accounts. County residents can receive up to $125 per toilet for replacing old, high water-use toilets that use 3.5 gallons per flush (gpf) or more, with a new HET or Dual Flush Toilet from an approved toilet list. .From 2011 to 2015, 1,523 HET or Dual Flush Toilet rebates were issued in the City's service area.

Graywater Landscape Irrigation Rebates and Incentives

Implementation: This program is new to SCVWD suite of programs and is offered to residential customers interested in using graywater from laundry machines to irrigation landscape at their homes. The program is temporary and currently funded through June 30, 2016.

Description: The program offers $200 per single family residential site for properly connection a clothes washer to a graywater irrigation system. The program is still new and the City will be marketing heavily until the drought ends.

Rain Barrel Rebate Program

Implementation: This program began in October 2014 in partnership with the Bay Area Water Supply and Conservation Agency (BAWSCA) to offer rebates to user of rain barrel as part of encouraging using alternative water sources for landscaping water needs.

Description: Sunnyvale will offer $50 rebates per barrel up to two barrels per household or four for commercial properties. Owners are responsible for installing the barrels according to program guidelines including screening to prevent mosquito breeding. The City has paid 25 rebates since the program began.

Landscape Conversion Rebate Program

Implementation: This program was adopted by the City in 2015 and is managed by the SCVWD. The program is offered to residential, multi-family and CII properties. As of January 2016, the program funds were depleted causing the program to be stopped until the next fiscal year when budget will be made available again.

Description: Properties with qualifying irrigation landscapes can receive rebates for replacing high water using landscape, such as irrigation turf grass with a minimum of 50 percent plant coverage consisting of low water using plants from an approved plant list. Rebate amounts are

$2.00 per square feet of high water using landscape replaced with a site cap of $50,000. The City has paid 170 rebates since the program began.

9.3 Planned Implementation to Achieve Water Use Targets

9.3.1 Planned DMM Implementation

The City plans to continue to offer the current DMM suite of programs over next five years in order to achieve water use targets. Every year the City evaluates programs for cost effectiveness and may discontinue certain rebate or incentive programs to be replaced with new programs in order to target certain water savings. The City may promote programs based on popularity or demand, for example the rain barrel rebate program will likely be promoted until funds are exhausted.

9.3.2 Evaluation of Effectiveness

Evaluating the effectiveness of a single DMM is difficult and generally not cost-effective for the City, so each program is not necessarily monitored separately for effectiveness and water savings. Evaluating the effectiveness of all DMMs as a whole provides a better representation and can be translated into overall water conservation savings, which is discussed below. The City will use these countywide water savings tracked by SCVWD to evaluate the effectiveness of overall implementation efforts by both the City and SCVWD.

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SECTION 10 – PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

Notice of Public Hearing, Plan Adoption, and Implementation. A public meeting was held on May 23, 2016 to receive public input. The public hearing ~~and~~ for consideration ~~of~~ and adoption of the 2015 UWMP byu the city Council took place on ~~May 24~~June 21, 2016 during a normal City Council session. A notice was posted in local newspapers to inform the public of the hearing. The notice included the time and place of the hearing, as well as locations where the plan was made available for public inspection.

Upon adoption of the 2015 UWMP by City Council, implementation took place as identified in this document. Submission of the adopted UWMP to DWR was done electronically within 30 days from the date of adoption. The adopted UWMP was made available to the public via the internet at www.sunnyvale.ca.gov within 30 days of submission to DWR and was submitted to the California State Library. The adopted resolution is included in **Appendix H**. The confirmation of electronic submission to DWR is included in **Appendix I**.

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APPENDIX A

City of Sunnyvale
2015 Urban Water Management Plan
Postings and Notifications for UWMP Preparation

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APPENDIX B
City of Sunnyvale
2015 Urban Water Management Plan
City of Sunnyvale Detailed Demographic Data

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APPENDIX C
City of Sunnyvale
2015 Urban Water Management Plan
Projected Demands Provided to Wholesale Agencies

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APPENDIX D
City of Sunnyvale
2015 Urban Water Management Plan
SCVWD Groundwater Management Plan

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APPENDIX E

City of Sunnyvale

2015 Urban Water Management Plan Water Conservation Plan

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APPENDIX F
City of Sunnyvale
2015 Urban Water Management Plan
Water Shortage Contingency Plan and Municipal Code

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APPENDIX G
City of Sunnyvale
2015 Urban Water Management Plan
Sunnyvale's Fiscal Year 2015/2016 Utility Fee Schedule

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APPENDIX H
City of Sunnyvale
2015 Urban Water Management Plan Resolution for Adoption of the UWMP

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APPENDIX I

City of Sunnyvale
2015 Urban Water Management Plan
Electronic Submission of UWMP to Department of Water Resources

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APPENDIX J
City of Sunnyvale
2015 Urban Water Management Plan
UWMP Checklist

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Table J-1: UWMP Checklist

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location
Introduction and Overview – Section 1				
10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1	Section 1
Plan Preparation - Section 2				
10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.5.2	Section 2.2 Table 2-2
10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	Plan Preparation	Section 2.5.2	Appendix A
System Description - Section 3				
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	Sections 3.1 – 3.2 and 3.6
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	Section 3.3
10631(a)	Provide population projections for 2020, 2025, 2030, and 2035.	System Description	Section 3.4	Section 3.4 Table 3-2
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	Section 3.5
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4	Sections 3.4 and 5.2
System Water Use - Section 4				
10631(e)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2	Section 4.1 Table 4-1
10631(e)(3)(A)	Report the distribution system water loss for the most recent 12-month period available.	System Water Use	Section 4.3	Section 4.2
10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.5	Section 4.3 Table 4-4

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location
Baselines and Targets - Section 5				
10608.20(b)	Retail suppliers shall adopt a 2020 water use target using one of four methods.	Baselines and Targets	Section 5.7 and App E	Section 5.3
10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Chapter 5 and App E	Section 5.3 Table 5-5
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 is the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.7.2	Sections 5.2-5.3
10608.24(a)	Retail suppliers shall meet their interim target by December 31, 2015.	Baselines and Targets	Section 5.8 and App E	Section 5.3
1608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Section 5.8.2	N/A
10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	Section 5.1	N/A
10608.40	Retail suppliers shall report on their progress in meeting their water use targets. The data shall be reported using a standardized form.	Baselines and Targets	Section 5.8 and App E	Appendix K
System Supplies – Section 6				
10631(b)	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, 2030, and 2035.	System Supplies	Chapter 6	Sections 6.1-6.3 Table 6-1 and 6-2
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	Section 6.3
10631(b)(1)	Indicate whether a groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	Section 6.2.2	Section 6.3.1 Appendix D
10631(b)(2)	Describe the groundwater basin.	System Supplies	Section 6.2.1	Section 6.3.1
10631(b)(2)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2.2	Section 6.3

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location
10631(b)(2)	For unadjudicated basins, indicate whether or not the department has identified the basin as overdrafted, or projected to become overdrafted. Describe efforts by the supplier to eliminate the long-term overdraft condition.	System Supplies	Section 6.2.3	Section 6.3
10631(b)(3)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	Section 6.2.4	Section 6.3.1 Figure 6-2
10631(b)(4)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Sections 6.2 and 6.9	Section 6.3.1 Figure 6-2
10631(d)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	System Supplies	Section 6.7	Section 6.4 Table 6-4
10631(g)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years.	System Supplies	Section 6.8	Section 6.8
10631(i)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6	Section 6.5
10631(j)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) – if any - with water use projections from that source.	System Supplies	Section 2.5.1	Appendix C
10631(j)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	Section 2.5.1	N/A
10633	For wastewater and recycled water, coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.1	Section 6.6
10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area. Include quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	System Supplies (Recycled Water)	Section 6.5.2	Section 6.6.1
10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	Section 6.5.2.2	Section 6.6.1 Table 6-7
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3 and 6.5.4	Section 6.7.1 Table 6-9
10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.5.4	Section 6.7.3
10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 6.5.4	Table 6-8

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location
10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	Section 6.5.5	Section 6.7.4 Table 6-9
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.5	Section 6.7.4
Water Supply Reliability – Section 7				
10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.4	Section 7.3
10631(c)(1)	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage.	Water Supply Reliability Assessment	Section 7.1	Section 7.1 & 7.3
10631(c)(1)	Provide data for an average water year, a single dry water year, and multiple dry water years	Water Supply Reliability Assessment	Section 7.2	Section 7.2
10631(c)(2)	For any water source that may not be available at a consistent level of use, describe plans to supplement or replace that source.	Water Supply Reliability Assessment	Section 7.1	NA
10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 7.1	Section 7.1
10635(a)	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.3	Section 7.2 – 7.3
Water Shortage Contingency Planning – Section 8				
10632(a) and 10632(a)(1)	Provide an urban water shortage contingency analysis that specifies stages of action and an outline of specific water supply conditions at each stage.	Water Shortage Contingency Planning	Section 8.1	Section 8.1 Table 8.1
10632(a)(2)	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency.	Water Shortage Contingency Planning	Section 8.9	Section 8.9 Table 8-6
10632(a)(3)	Identify actions to be undertaken by the urban water supplier in case of a catastrophic interruption of water supplies.	Water Shortage Contingency Planning	Section 8.8	Section 8.8
10632(a)(4)	Identify mandatory prohibitions against specific water use practices during water shortages.	Water Shortage Contingency Planning	Section 8.2	Section 8.3
10632(a)(5)	Specify consumption reduction methods in the most restrictive stages.	Water Shortage Contingency Planning	Section 8.4	Section 8.4
10632(a)(6)	Indicated penalties or charges for excessive use, where applicable.	Water Shortage Contingency Planning	Section 8.3	Section 8.3.2

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location
10632(a)(7)	Provide an analysis of the impacts of each of the actions and conditions in the water shortage contingency analysis on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts.	Water Shortage Contingency Planning	Section 8.6	Section 8.6
10632(a)(8)	Provide a draft water shortage contingency resolution or ordinance.	Water Shortage Contingency Planning	Section 8.7	Section 8.7
10632(a)(9)	Indicate a mechanism for determining actual reductions in water use pursuant to the water shortage contingency analysis.	Water Shortage Contingency Planning	Section 8.5	Section 8.5
Demand Management Measures – Section 9				
10631(f)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Sections 9.2 and 9.3	Section 9.1 Table 9-1
10631(f)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Sections 9.1 and 9.3	N/A
10631(j)	CUWCC members may submit their 2013-2014 CUWCC BMP annual reports in lieu of, or in addition to, describing the DMM implementation in their UWMPs. This option is only allowable if the supplier has been found to be in full compliance with the CUWCC MOU.	Demand Management Measures	Section 9.5	N/A
Plan Adoption, Submittal, and Implementation – Section 10				
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Plan Adoption, Submittal, and Implementation	Section 10.3	Section 10.2
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	Section 10.2.1	Section 10.2
10621(d)	Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.	Plan Adoption, Submittal, and Implementation	Sections 10.3.1 and 10.4	Section 10.2
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	Section 10.4.4	N/A
10642	Provide supporting documentation that the urban water supplier made the plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan.	Plan Adoption, Submittal, and Implementation	Sections 10.2.2, 10.3, and 10.5	Appendix A

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location
10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Sections 10.2.1	Section 10.2
10642	Provide supporting documentation that the plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.1	Appendix H
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4.3	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	Section 10.4.4	N/A
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2	Section 10.2
10645	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5	Appendix A

APPENDIX K
City of Sunnyvale
2015 Urban Water Management Plan
Required 2015 UWMP Tables

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