Appendix E
Water Supply Assessment

El Camino Real Specific Plan
Environmental Impact Report

California Senate Bill 610

Water Supply Assessment

for

City of Sunnyvale
El Camino Real Corridor Specific Plan Project

Prepared for
The City of Sunnyvale

by:

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September 2019

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Water Supply Assessment
City of Sunnyvale
El Camino Real Corridor Specific Plan Project

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ACRONYMS AND ABBREVIATIONS

ACT	Urban Water Management Planning Act of 1983
AF	Acre Feet
AFY	Acre Feet per Year
AWPF	Advanced Water Purification Facilities
BARDP	Bay Area Regional Desalination Project
BAWSCA	Bay Area Water Supply and Conservation Agency
CALSIM	California Water Allocation and Reservoir Operations Model
CDD	City Distribution Division
CVP	Central Valley Project
DSOD	Department of Safety of Dams
DU	Dwelling Unit
DWR	Department of Water Resources
EIR	Environmental Impact Report (see PEIR)
EO	Executive Order
EOC	Emergency Operations Plan
ERRP	Emergency Response and Recovery Plan
GP	General Plan
gpd	Gallons Per Day
gpm	Gallons Per Minute
IRP	Infrastructure Reliability Project
ISA	Interim Supply Allocation
ISL	Interim Supply Limitation
ITR	Industrial to Residential
KSF	Thousand Square Feet
LUTE	Land Use and Transportation Element
MAF	Million Acre Feet
Max	Maximum
MCL	Maximum Contaminant Level
MGD	Million Gallons per Day
mg/L	Milligrams Per Liter
Min	Minimum
PEIR	Program Environmental Impact Report
RWQCB	Regional Water Quality Control Board
RWS	Regional Water System
SB	Senate Bill
SBx 7-7	Water Conservation Act of 2009
SCVWD	Santa Clara Valley Water District
SF	Square Feet
SFPUC	San Francisco Public Utilities Commission
SWP	State Water Project
SWRCB	State Water Resources Control Board
USBR	U.S. Bureau of Reclamation
UWMP	Urban Water Management Plan
WCIP	Water Conservation Implementation Plan
WPCP	Water Pollution Control Plant
WSA	Water Supply Assessment or Water Supply Agreement
WSIP	Water System Improvement Program
WS&TD	Water Supply and Treatment Division
WUMP	Water Utility Master Plan
WWTP	Waste Water Treatment Plant

EXECUTIVE SUMMARY

The purpose of the "Water Supply Assessment Report" is to satisfy the requirements under Senate Bill 610 (SB 610), Water Code Section 10910 et seq., and Senate Bill 221 (SB 221), Government Code Section 66473.7 that adequate water supplies are or will be available to meet the water demand associated with the proposed development. While recognizing that it is not possible to guarantee a permanent water supply for all users in California in the amounts requested, SB 610 requires that a water supply assessment (WSA), based on specific criteria, be prepared to document the sufficiency of available water supply for the City of Sunnyvale (City, Sunnyvale) and the proposed project. WSA's are typically prepared for specific development projects. In this particular case, the El Camino Real Corridor Specific Plan Project (Project) incorporates up to 6,900 residential units and 730,000 SF of commercial development. The WSA identifies water supply and reliability within the City, now and into the future, and makes a determination regarding water supply sufficiency for the Project. **The WSA does not, nor is it intended to, identify infrastructure needs for service distribution for the proposed projects.**

The WSA is considered at a point in time when known future projects are considered. It is also understood that new and innovative programs and projects in concept are yet to be designed. Therefore, WSAs are a part of the ongoing planning efforts of the City to optimize its water resource program.

The WSA includes a discussion of the relevant legislation requiring the WSA, an overview of the proposed Project, analysis of water demands for the City's existing service area and the Project through 2035, and an analysis of reliability of the City's water supplies. This WSA includes discussion of the potential impacts each agency that supplies water to the region has on the City and concludes with a sufficiency analysis of water supply during normal, single-dry, and multiple dry years over a 20-year planning period.

The El Camino Real Corridor Specific Plan (ECR Plan) has been drafted with the goal of enabling the transition of the corridor to a vibrant, mixed-use area with improved streetscapes and safer environments for walking, bicycling and other modes of transportation. The ECR Plan builds upon the 2007 Precise Plan for El Camino Real and the corridor's assets, and includes a comprehensive strategy to address land use, economic vitality, urban design, and multimodal connectivity.

The Sunnyvale Horizon 2035 General Plan – Land Use and Transportation Element (Horizon 2035 LUTE) WSA was prepared in November 2015 to specifically address the increased water demand associated with updating and increasing land use within the City limits. The Project's development area was included in the General Plan growth areas as well as the updated growth areas of the Horizon 2035 LUTE growth. The Horizon 2035 LUTE WSA, begun in November 2015, was based on the 2010 UWMP demand estimates. Subsequently, the City has completed the 2015 UWMP, July 2016, which incorporates the expected growth and water demands from the Horizon 2035 LUTE WSA. With the understandings provided above, the Project WSA uses a conservative approach by using the 2015 UWMP as a baseline and adding the Project's expected growth and water demand estimates without consideration for any previous inclusion in the General Plan. The change in water demand estimate for the Project's site will consider the estimated water demand associated with the land use.

Water Supply

The City of Sunnyvale 2015 Urban Water Management Plan (UWMP) provides a recognized source for water supply planning and is included, in its entirety, in this document. As described in the City's 2015 UWMP, the City of Sunnyvale relies on four sources for its long-term water supply -- City-produced local groundwater from wells, imported water from San Francisco's Public Utilities Commission (SFPUC) Regional Water System, imported water from Santa Clara Valley Water District (SCVWD), and recycled water.

- The City of Sunnyvale has groundwater supplied by a total of 6 wells, and one other stand-by well which only operates during emergencies. The groundwater wells only produce 1% of total supply and are used as a supplementary source to the imported water. Local groundwater from the Santa Clara Sub-basin supplies about half of the County's water supply during typical years. SCVWD also provides the City with groundwater.

- The City of Sunnyvale receives water from the City and County of San Francisco Regional Water System (RWS) which is operated by SFPUC. This business relationship started in July 2009 and was 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". The City has an Individual Supply Guarantee of 12.58 MGD (14,100 AFY) and a minimum purchase amount of 8.93 MGD (10,003 AFY).

- SCVWD has a contract for 100,000 AFY from the State Water Project and 152,500 AFY from the Central Valley Project (CVP), however typically significantly less than these contractual amounts are able to be delivered. The City holds a 75-year contract with SCVWD which started in 1976 and will sunset in 2051. The Contract prescribes a reevaluation of water allotment every three years, which was last completed for the 13/14 to 16/17 fiscal years. The 16/17 fiscal year water allotment was 10,200 AFY.

In 1991 a wastewater reclamation program was developed to reuse 20% to 30% of the high-quality effluent from the Sunnyvale Water Pollution Control Plant. This recycled wastewater program serves parks, golf courses, and landscaping needs. The long-term goal of this project is to use the Plant to its full capacity by producing 15 MGD of recycled water from treated wastewater (approximately 16,800 AFY).

Water Demand

The City's 2015 UWMP looks at water demand and water supply for a 20-year planning period in 5-year increments. Based on the 2015 UWMP Table 4-1, the 2015 total potable water demand was 15,090 AFY, and the estimated 2035 potable demand is 25,216 AFY. The Project is proposing to develop a new mixed-use corridor along 4 miles of El Camino Real in the City limits. The Project estimates that total build-out of the Plan Area would accommodate approximately 8,500 residential units and 3,947,000 square feet of commercial floor area, which are increases of approximately 6,900 residential units and 730,000 square feet of commercial floor area above the existing as the area is built out through 2035. The development potential for the ECR Plan area in the current General Plan is 4,200 residential units and 510,000 square feet. The ECR Plan allows for 2,700 residential units and 220,000 square feet beyond the limitation of the current General Plan.

The Project's future water demand, less the water demand from the previous land use, is estimated to add 600 AFY to the system by development buildout in 2025. Combining the Project with the estimated future water demands from the rest of the City, the total City estimated water demand is anticipated to increase to from 23,804 to 24,404 AFY by 2025 under normal water year conditions (drought years would see reduced water demands as a result of conservation measures).

Demand and Supply Projections

The City of Sunnyvale will meet its future water demands, including the demands for the Project, from existing supply sources as well as sources that are currently being planned, developed and implemented. Future sources include an expanded service area for recycled water and additional water conservation. Supplies of imported water are expected to remain relatively stable throughout the forecast period. Enhanced water conservation and increased local well production are anticipated to provide for the balance of needed supplies.

Analysis of water demand and supply projections for the City demonstrates that the City has water supply contracts with SFPUC and SCVWD. The existing water supply contracts, groundwater, conservation, and recycled water offset of potable water are sufficient to meet the Project's increased water demand through the study period to year 2035.

Reliability

Reliability of future water supplies to the region is based on implementation of the regional projects, implementation of local agency programs, and combined efforts and programs among agencies, including all water retailers, and the SFPUC, SCVWD, Regional Water Quality Control Board (RWQCB) and BAWSCA.

In the recent past, drought conditions throughout California and the Colorado River Basin, coupled with environmental issues affecting deliveries of SWP and CVP water through the Sacramento – San Joaquin Delta, have resulted in diminished imported surface water supplies throughout California. SFPUC and SCVWD continually re-evaluate their plans and programs for effectiveness in consideration of changing conditions. Their plans describe a progressive series of actions, including tapping into stored water reserves and, if necessary, reductions in deliveries. In addition, SCVWD is working with seven water agencies in the Bay Area (Alameda County Water District, BAWSCA, Contra Costa Water District, East Bay Municipal Utility District, Martin Municipal Water District, SFPUC and Zone 7 Water Agency) to investigate opportunities for regional collaboration. One purpose of this planning effort, known as Bay Area Regional Reliability (BARR) is to facilitate water transfers during critical shortages. This WSA demonstrates that possible reductions in imported water deliveries due to drought conditions do not prevent the City from satisfying its anticipated demands.

Conclusion

The information included in this WSA identifies a sufficient program of water supply for the City, now and into the future, including a sufficient water supply for the proposed Project needs. If SFPUC supply decreases during dry years, groundwater supplies increase, leaving a zero percent difference between supply and demand (as discussed in Section 5.4.6).

1.0 INTRODUCTION

The original Precise Plan for El Camino Real was adopted by the City Council in 1993, and last updated in 2007 (Precise Plan for El Camino Real). Since that time, market conditions have continued to evolve and development interest in the El Camino Real corridor has greatly increased. Today, the 4-mile stretch of El Camino Real in Sunnyvale remains an important regional connector as well as a valuable economic asset to the City. The corridor is the most traveled multimodal corridor in the City and serves the needs of local neighborhoods as well as regional communities. In January 2014, the Sunnyvale City Council initiated the process to update the Precise Plan for El Camino Real.

In August 2017, the City Council identified a Preferred Land Use Alternative, and the analysis began to assess and refine the details of the proposed land use mix. One of the key goals of the ECR Plan is to recalibrate the development pattern along El Camino Real from an automobile-focused, separated land use pattern to a mixed-use focus. The Project will also include land use amendments to the Sunnyvale General Plan and the Sunnyvale Municipal Code.

Senate Bill 610 (SB 610), requires that a water supply assessment (WSA), based on specific criteria, be prepared to document the sufficiency of available water supply for the City and the proposed project. WSA's are typically prepared for specific development projects. The WSA identifies water supply and reliability to the City, now and into the future, and makes a determination regarding water supply sufficiency for the Project. **The WSA does not, nor is it intended to, identify infrastructure needs for service distribution for the proposed project.** The regional vicinity of the proposed El Camino Real Specific Plan Project location is shown in **Exhibit 1**.

The Sunnyvale Horizon 2035 General Plan – Land Use and Transportation Element (Horizon 2035 LUTE) WSA was prepared in November 2015 to specifically address the increased water demand associated with updating and increasing land use within the City limits. The Horizon 2035 LUTE WSA, begun in November 2015, was based on the 2010 UWMP demand estimates. Subsequently, the City has completed the 2015 UWMP, July 2016, which incorporates the expected growth and water demands from the Horizon 2035 LUTE WSA. With the understandings provided above, the Project WSA uses a conservative approach by using the 2015 UWMP as a baseline and adding the Project's expected growth and water demand estimates without consideration for any previous inclusion in Sunnyvale's General Plan or 2015 UWMP. The change in water demand estimate for the Project's site will consider the water demand associated with the previous land use.

The specific growth elements contained within the Project are discussed in more detail in Section 3 of this WSA. For the purposes of this WSA, the proposed total increase in all land use types will be referred to as the "Project." The proposed Project includes an increase of approximately 730,000 square feet of commercial space, and 6,900 new residential units. The Project's conceptual site plan is displayed in **Exhibit 2**.

This Project's WSA uses the 2015 UWMP as the basis for data and includes a discussion of the Senate Bill 610 legislation, an overview of the proposed land use changes identified in the Project, analysis of water demands for the City's existing service area, and the Project and other development projects over a 20-year planning period. The WSA also includes an analysis of reliability of the City's water supplies and water quality, and concludes with an analysis describing water supply during normal, single-dry, and multiple dry years over a 20-year planning period.

1.1 REFERENCES

The following documents were used as reference information in the development of this WSA:

1. City of Sunnyvale, Water Supply Assessment for Sunnyvale Horizon 2035 – Draft Land Use and Transportation Element (LUTE), November 2015
2. City of Sunnyvale, 2015 Urban Water Management Plan, June 2016
3. City of Sunnyvale, Water Utility Master Plan, November 2010
4. City of Sunnyvale Recycled Water Master Plan, 2000
5. City of Sunnyvale, General Plan, consolidated July 2011
6. Sunnyvale ECR Corridor Specific Plan, Section 3.11 Population and Housing

CHANGING CONDITIONS 2010-2035

EXHIBIT1

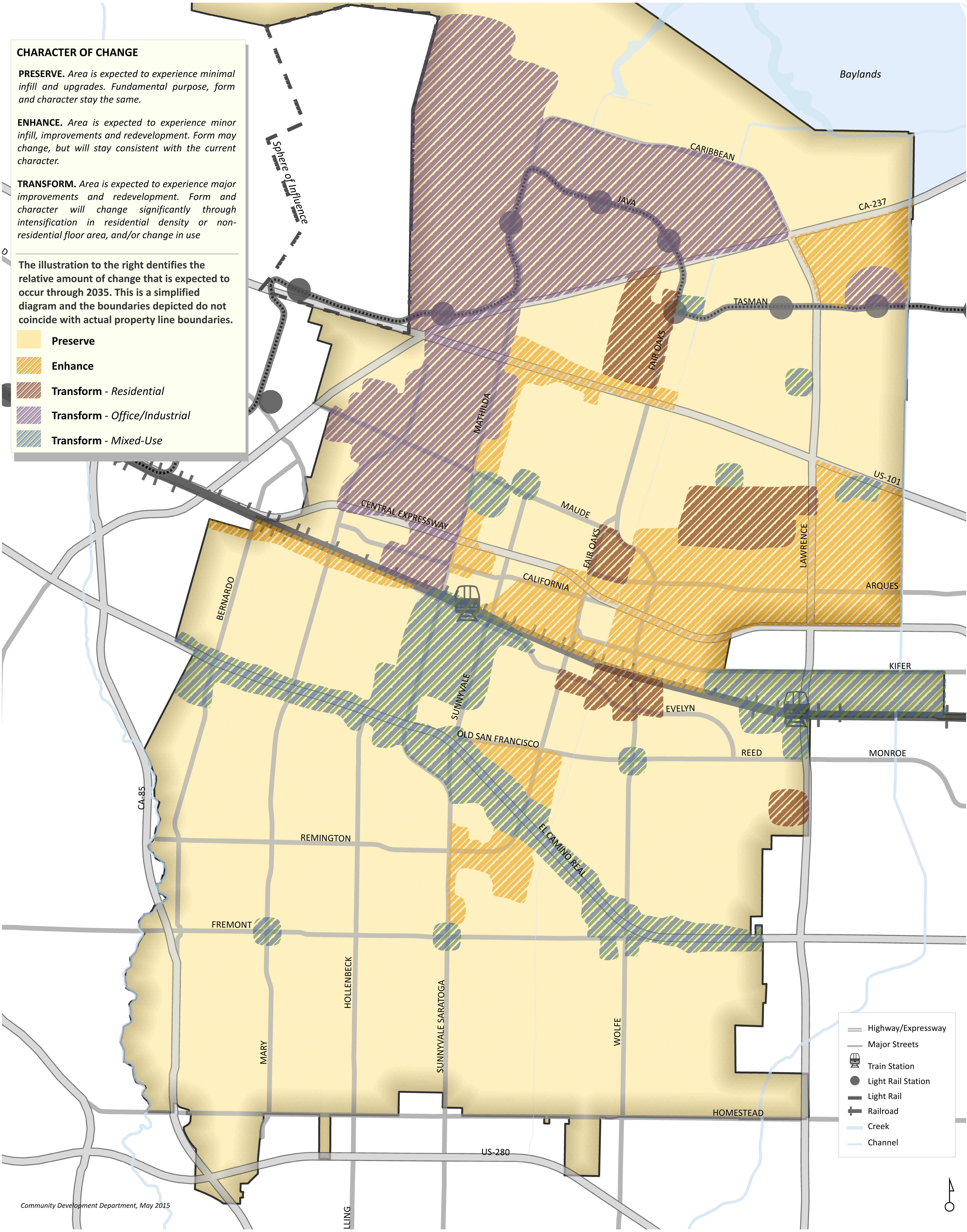
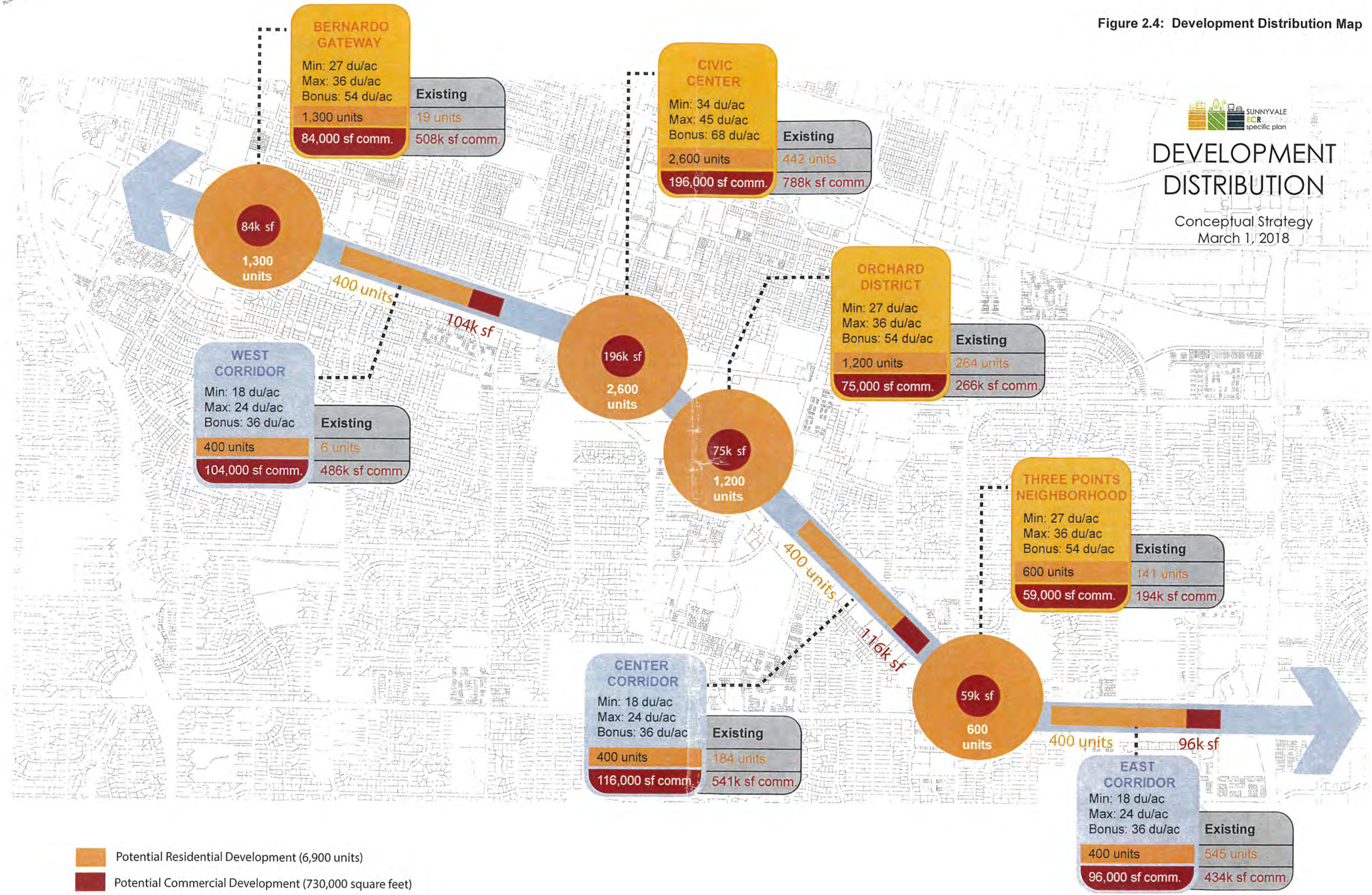


Figure 2.4: Development Distribution Map



2.0 LEGISLATION

2.1 SB 610 – COSTA – WATER SUPPLY PLANNING

Senate Bill (SB) 610 was implemented in January 2002. SB 610 requires any development that qualifies as a "Project" under Water Code 10912 to be supported with a Water Supply Assessment report drafted specifically to identify the public water system that shall supply water to the project and analyze the availability and reliability of water supply to the development. The Water Supply Assessment is to include the following, if applicable to the supply conditions:

1. Discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses.
2. Identification of existing water supply entitlements, water rights, or water service contracts secured by the purveying agency and water received in prior years pursuant to those entitlements, rights, and contracts.
3. Description of the quantities of water received in prior years by the public water system under the existing water supply entitlements, water rights or water service contracts.
4. Water supply entitlements, water rights or water service contracts shall be demonstrated by supporting documentation such as the following:
   a. Written contracts or other proof of entitlement to an identified water supply.
   b. Copies of capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.
   c. Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.
   d. Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.
5. Identification of other public water systems or water service contract holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system.
6. If groundwater is included for the supply for a proposed project, the following additional information is required:
   a. Description of groundwater basin(s) from which the proposed project will be supplied. Adjudicated basins must have a copy of the court order or decree adopted and a description of the amount of groundwater the public water system has the legal right to pump. For non-adjudicated basins, information on whether the DWR has identified the basin as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of DWR that characterizes the condition of the basin, and a detailed description of the efforts being undertaken in the basin to eliminate the long-term overdraft condition.
   b. Description and analysis of the amount and location of groundwater pumped by the public water system for the past five (5) years from any groundwater basin from which the proposed project will be supplied. Analysis should be based on information that is reasonably available, including, but not limited to, historic use records.
   c. Description and analysis of the amount and location of groundwater projected to be pumped by the public water system from any groundwater basin from which the

proposed project will be supplied. Analysis should be based on information that is reasonably available, including, but not limited to, historic use records.

d. Analysis of sufficiency of the groundwater from the basin(s) from which the proposed project will be supplied.

7. The water supply assessment shall be included in any environmental document prepared for the project.
8. The assessment may include an evaluation of any information included in that environmental document. A determination shall be made whether the projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses.

2.2 SBx7-7 and EO B-37-16 and EO B-40-17

The Water Conservation Act of 2009 (SBx7-7) requires all California urban water agencies to set and meet certain demand reduction targets in order to assist the State in reducing urban water use 20 percent by 2020. The Act also requires each agency to monitor its progress toward its targets. This was implemented for the purpose of meeting the mandate to reduce per capita urban water consumption 20 percent statewide. SBx7-7 describes the overall process by which the City of Sunnyvale is to comply with the requirements. It specifically identifies methods for establishing urban water use targets. These requirements and the City of Sunnyvale's specific Compliance Plan are outlined in the City's 2015 UWMP.

The Governor issued a State of Emergency and Continued State of Emergency in 2014 in response to the persistent state-wide drought. In April 2015, Executive Order B-29-15 was issued by the Governor, which required a water use reduction of 25 percent, as compared to 2013 usage, throughout the State. The EO outlined specific water use reductions designed to heighten the urgency to reduce water consumption and facilitate the ability of local agencies to implement and enforce water conservation requirements.

Following unprecedented water conservation and plentiful winter rain and snow, on April 7, 2017 Governor Edmund G. Brown Jr. ended the drought State of Emergency in most of California, while maintaining water reporting requirements and prohibitions on wasteful practices such as water during or right after rainfall. Executive Order B-40-17 lifts the drought emergency in all California counties except Fresno, Kings, Tulare, and Tuolumne, where emergency drinking water projects will continue to be implemented to help address diminished groundwater supplies. The Order also rescinds two emergency proclamations from January and April 2014 and four drought-related Executive Orders issued in 2014 and 2015, as briefly discussed above. Executive Order B-40-17 builds on actions taken in Executive Order B-37-16, which remains in effect, to continue making water conservation a way of life in California. The State Water Resources Control Board (SWRCB) maintains urban water use report requirements and prohibitions on wasteful practices such as watering during or after rainfall, hosing off sidewalks and irrigating ornamental turf on public street medians. As directed by Governor Brown Jr. in Executive Order B-37-16, the Board will separately take action to make reporting of wasteful water practices permanent.

The Executive Director for the SWRCB, on April 26, 2017, rescinded the water supply stress test requirements and remaining mandatory conservation standards for urban water suppliers. The action was in response to Governor Brown's earlier announcement ending the drought state of emergency and transitioning to a permanent framework for making water conservation a California way of life. Additional information can be found on the SWRCB website at:
http://www.swrcb.ca.gov/waterrights/water_issues/programs/drought/emergency_mandatory_regulations.shtml

3.0 EL CAMINO REAL CORRIDOR SPECIFIC PLAN PROJECT

3.1 PROJECT DESCRIPTION

For the purposes of this WSA, the El Camino Real Corridor Specific Plan Project will be referred to as the "Project." The Project goal is to enable the transition of the corridor to a vibrant, mixed use area with improved streetscapes and safer environments for walking, biking, and other methods of transportation. The growth area, and the proposed land use change, is summarized in **Table 3-1**. The Project estimates the Plan Area accommodates approximately 8,500 residential units and 3,980,000 square feet of commercial floor area which are increase of approximately 6,900 residential units and 730,000 square feet of commercial floor area above the existing as the area built out through 2035. **Table 3-1** summarizes the development in each node/segment.

Table 3-1 Summary of Project Land Use Changes

2035 Development Buildout: El Camino Real Corridor					
Development Zone	Residential Units		Commercial Area		Net Change
	Existing	Ultimate	Existing (SF)	Ultimate (SF)	
Bernardo Gateway	19	1,300	508,000	592,000	1,300 units and 84,00 SF
West Corridor	6	400	486,000	590,000	400 units and 104,000 SF
Civic Center	442	2,600	788,000	984,000	2,600 units and 196,000 SF
Orchard District	264	1200	266,000	341,000	1,200 units and 75,000 SF
Center Corridor	184	400	541,000	657,000	400 units and 116,000 SF
Three Points Neighborhood	141	600	194,000	253,000	600 units and 59,000 SF
East Corridor	545	400	434,000	530,000	400 units and 96,000 SF
Total Residential	1,601	6,900			6,900 units will be added (8,500 units in total)
Total Commercial			3,217,000	3,947,000	730,000 SF of commercial
Total New Development				6,900 units and 730,000 SF	

3.2 PROJECT WATER DEMAND PROJECTIONS

The land use changes proposed as a part of the El Camino Real Corridor Specific Plan Project will result in increased water demands. **Table 3-2** shows land use designation.

Table 3-2 ECR Land Use Designation

WUMP Zoning Classification	ECR Land Use Designation
Low Density Residential	Low Density Residential (0-7 DU/AC)
Low-Med Density Residential	Low Density Residential (7-14 DU/AC)
Medium Density Residential	Medium Density Residential (15-24 DU/AC)
High Density Residential	High Density Residential (25-36 DU/AC)
Mobile Home Residential	Mobile Home Residential (0-12 DU/AC)
Commercial	Commercial

According to the Land Use Designation, ECR development zones can be classified as shown in **Table 3-3**.

Table 3-3 ECR Land Use Designation

2035 Development Buildout: El Camino Real Corridor		
Development Zone	**Residential du/ac**	**ECR Land Use Designation**
Bernardo Gateway	27-54 units	ECR-Bernardo Gateway
West Corridor	18-36 units	ECR-West Corridor
Civic Center	34-68 units	ECR-Civic Center
Orchard District	27-54 units	ECR-Orchard District
Center Corridor	18-36 units	ECR-Center Corridor
Three Points Neighborhood	27-54 units	ECR-Three Points Neighborhood
East Corridor	18-36 units	ECR-East Corridor

The water duty factors developed and recommended in the City's Water Utility Master Plan (November 2010). Water duty factors in the Water Utility Master Plan (WUMP) were developed for several land use zoning classifications. The water duty factors are based on actual water meter data and take into account both the indoor and outdoor water use for residential and commercial areas. **Table 3-4** summarizes the land use designations and the corresponding water duty factors to be used in the demand calculations.

Table 3-4 Summary of Water Duty Factors

WUMP Zoning Classification	Draft LUTE Land Use Designation	Water Duty Factor [1]	
		(gpd/du)	(gpd/ksf)
Low Density Residential	Low Density Residential (0-7 DU/AC)	310-375	
Low-Med Density Residential	Low Density Residential (7-14 DU/AC)	220-320	
Medium Density Residential	Medium Density Residential (15-24 DU/AC)	170	
High Density Residential	High Density Residential (25-36 DU/AC)	170	
Mobile Home Residential	Mobile Home Residential (0-12 DU/AC)	180	
Commercial	Commercial		270
Industrial	Industrial		130
Moffett Park TOD	Moffett Park Specific Plan (MPSP)		210
Administration - Office	Office		210
Public Facility (Parks)	Public Facilities		270

[1] Reference: Table 4-5, 2010 City of Sunnyvale Water Utility Master Plan

The City's Sanitary Sewer System Design Standards assume 150 gallons per day of sanitary sewer production from each high density residential with 90% water/sewer ratio, and 245 gallons per day per 1,000 SF commercial with 70% water/sewer ratio. Per this standard, the water usage of each residential unit in the Project will be 167 gpd/du, and commercial water usage would be 350 gpd/ksf. In this assessment, the water duty factor of 170 gpd/du for residential, and 350 gpd/ksf for commercial area are anticipated.

Utilizing the water duty factors from the WUMP, the total Project water demand and the net increase in water demand was calculated, as shown in **Table 3-5**.

The ECR Plan allows for 2,700 residential units and 220,000 square feet beyond the limitation of the Horizon 2035 LUTE Growth which will add up 459,000 gpd to residential water demand and 77,000 gpd to commercial water demand, as shown in **Table 3-5.**

Table 3-5 Project Water Demand Estimate

El Camino Real Corridor	Proposed Growth (DU, sf)	Water Duty Factors (gpd/DU, gpd/ksf)	Demand (gpd)	Demand (AFY)	Demand Change
Residential Growth per Horizon 2035 LUTE	4,200	170	714,000	800	459,000 (gpd) = 514 (AFY)
Residential Growth per ECR Corridor Specific Plan	6,900	170	1,173,000	1,314	
Commercial Growth per Horizon 2035 LUTE	510,000	350	178,500	200	77,000 (gpd) = 86 (AFY)
Commercial Growth per ECR Corridor Specific Plan	730,000	350	255,500	286	

Based upon the proposed land use, the total average water demand for the Project is expected to be approximately 536,000 gpd representing a net increase of 600 AFY. Potable water demand may be reduced by recycled water implementation for park irrigation. The estimated project development buildout will be assumed to be completed by 2025. The Project demand calculations are conservative. A previous version of this development was included in Sunnyvale's existing General Plan and the Horizon 2035 LUTE WSA which was subsequently incorporated into the 2015 UWMP.

4.0 CITY OF SUNNYVALE WATER DEMAND AND SUPPLIES

The City of Sunnyvale owns, operates, and maintains the water distribution system that provides retail potable and non-potable water service to a majority of the residents and businesses within the City limits, including the Project area (California Water Service Company provides retail potable water service to pocket areas within the City). The City water service area is approximately 24 square miles.

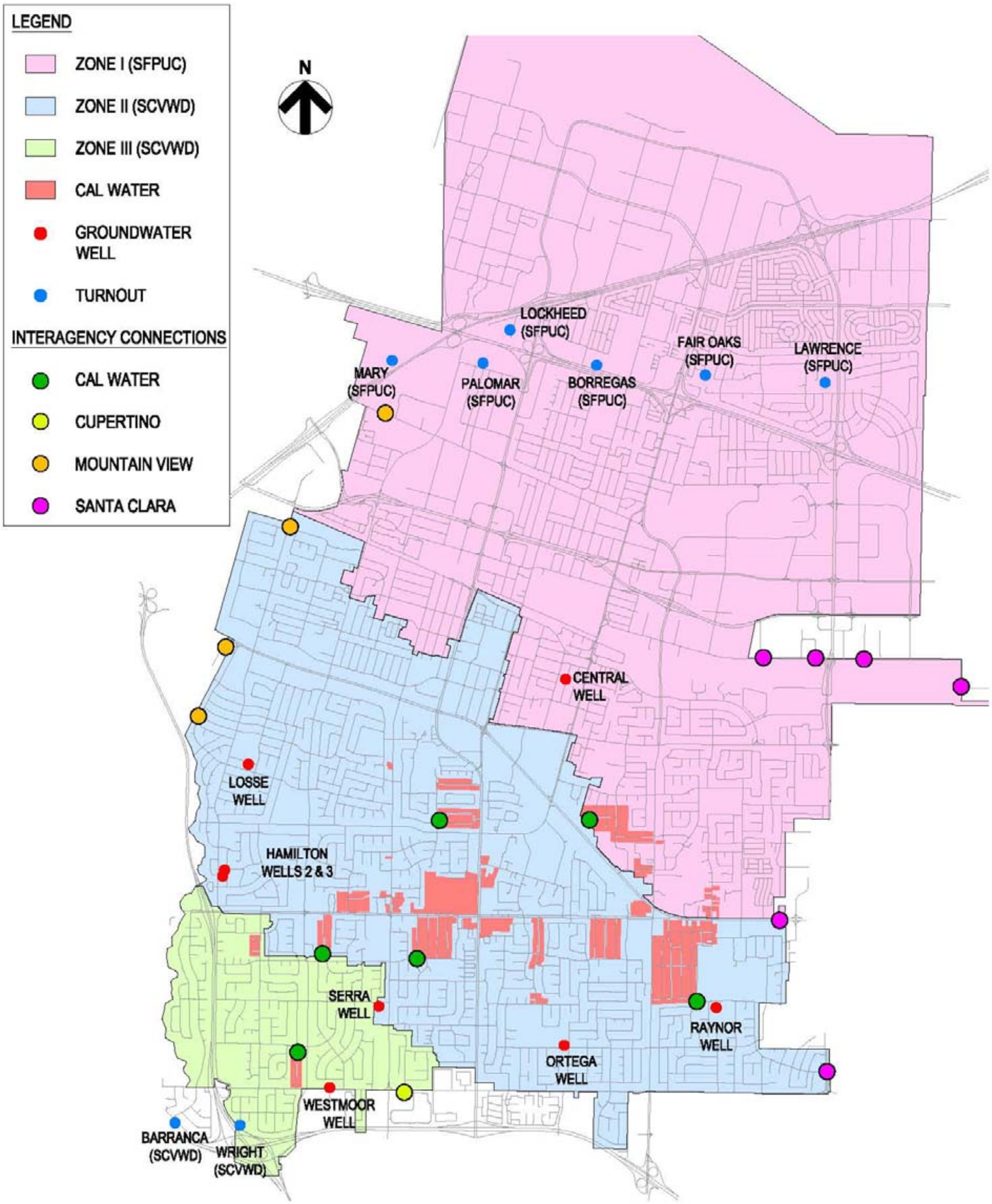
The City has three sources of potable water supply: purchased surface water from the San Francisco Public Utilities Commission (SFPUC), purchased treated surface water from Santa Clara Valley Water District (SCVWD), and groundwater from seven, City-owned and operated wells. One of the seven well remains on stand-by for emergencies. An additional source of non-potable water comes from the City's Water Pollution Control Plant in the form of recycled water. 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.

The City's potable water distribution 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 extend 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. The Project is located in the City's pressure Zone I and Zone II.

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.

Refer to **Exhibit 3** for an overview of the City's service area and location of supply connections and sources.

Figure 2-1: City of Sunnyvale Service Area Map



4.1 WATER DEMAND PER 2015 UWMP

The legislation requiring this WSA dictates that certain data must be sourced from the water purveyor's current UWMP. This WSA uses the Sunnyvale 2015 UWMP as its base source. Tables presented here in Section 4.0 are taken directly from the 2015 UWMP and have not been revised unless specifically noted. It should be noted that some information included, or values reported in this section may differ from other sections in this WSA due to either different data sources, newer information availability or specific requirements of either the urban water management plans or water supply assessments. It should further be noted that during the period that the 2015 UWMP was based and written, California was experiencing a current and continuing extended drought. Due to increased rain and snowfall during the 16/17 water year, the drought was lifted in the Spring of 2017 therefore the data in the 2015 UWMP will differ from current data.

Historical and Project Water System Use

Table 4-1 depicts City of Sunnyvale water production for the years 1995 through 2015. Since 2001, water production has generally been on the decline.

Table 4-1 Historical Water Production (AFY)

Year	SFPUC	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
2016	9,064	7,273	154	702	17,193
2017	10,489	8,036	118	36	18,680
2018	9,037	9,438	105	799	19,380

Source: Sunnyvale 2015 UWMP Table 5-1 and the City of Sunnyvale

The City of Sunnyvale categorizes its water accounts into five broad customer categories: single-family, multi-family, commercial (incorporating industrial and institutional), irrigation, and fire services. The commercial sector includes all non-residential accounts that are not classified as irrigation. Historical and projected water use in the City are summarized by classification of the water delivered to all customers in **Table 4-2**, and by source in **Table 4-3**.

Table 4-2 Historical and Projected Potable Water Use by Customer Type (AFY)

Customer Type	2010	2015	2020	2025	2030	2035
Single Family Residential	7,023	5,449	7,619	7,796	7,563	7,351
Multi-Family Residential	8,309	4,452	5,575	5,705	5,534	5,379
Commercial	4,261	3,806	6,722	7,952	8,986	10,268
Irrigation	970	1,374	2,288	2341	2,271	2,208
Other (Firelines)	911	9	10	10	10	10
Total	**21,474**	**15,090**	**22,214**	**23,804**	**24,364**	**25,216**

Table 4-3 Historical Potable Demand by Supply Source

Supply Source	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
Groundwater Wells	134	448	336	336	336
Conservation	6,139	840	1,075	1,120	1,154
Total	**21,653**	**23,054**	**24,879**	**25,484**	**26,370**

Source: Sunnyvale 2015 UWMP Table 4-2

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%. The system loss projections and total demand projections assume a future system loss percentage of approximately 6%, which was recommended by the City in the 2015 UWMP.

Table 4-4 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 4-4 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**

Source: Sunnyvale 2015 UWMP Table 4-3

SBx7-7 Baseline Water Demand and Water Use Targets

The Water Conservation Act of 2009 (SBx7-7) requires all California urban water agencies to set and meet certain demand reduction targets to assist the State in reducing urban water use by 20 percent by 2020. The Act also requires each agency to monitor its progress toward its targets, achieving a 10 percent reduction by 2015. This was implemented for the purpose of meeting the mandate to reduce per capita urban water consumption by 20 percent statewide. SBx7-7 describes the overall process by which the City of Sunnyvale is to comply with the requirements. It specifically identifies methods for establishing urban water use targets. These requirements and the City of Sunnyvale's specific Compliance Plan are outlined in the 2015 UWMP.

The baseline per capita water use for the 10-year period of 1995-2004 is 174 gpcd. Baseline per capita water use during the 5-year compliance period (2003-2007) is calculated to be 167 gpcd. 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). A summary of the baselines, targets, and Method 1 minimum water use reduction values are presented in **Table 4-5.**

Table 4-5 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)	174
5-year Baseline per capita water use (2003-2007)	167
2020 minimum water use target (95% of 5-year baseline)	158
Method 1 2015 water use target (90% of 10-year baseline)	156
Method 1 2020 water use target (80% of 10-year baseline)	139

Source: Sunnyvale 2015 UWMP Table 5-5

Population Projections

Population estimates as shown in **Table 4-6** were calculated using the DWR methodology 2, Category 1 since the City's service area overlaps the City boundaries by more than 95%. The population estimates are from data provided by the State Department of Finance (DOF).

Table 4-6 City Population Projections

Year	2015	2020	2025	2030	2035	2040
City Population	141,700	147,300	152,000	157,900	174,600	181,243

Source: Sunnyvale 2015 UWMP Table 3-2
Note: Year 2035 is the assumed build-out year for El Camino Real Corridor Specific Project

The Association of Bay Area Governments (ABAG) projects a constant 11 percent increase in population in each of the decades post-2010 (to 2020 and 2040), resulting in an estimated city population of approximately 178,300 in year 2035 (ECR Corridor Specific Plan, Section 3.11).

4.2 WATER SUPPLY

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. An additional source of non-potable water comes from the City's Water Pollution Control Plant in the form of recycled water. 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. City conservation efforts and regulations can be put into place to reduce water supply.

4.2.1 Groundwater

The City of Sunnyvale has six operating wells and one well on stand-by for emergencies. The seven wells are used by the City as a supplemental source to the imported water supplies. The City's current wells are listed in **Table 4-7**.

Table 4-7 Existing Well Information

Well Name	Ground Elevation (ft)	Average Well Level (ft)	Average Discharge Head		Average Flow Rate (gpm)	Total HGL (ft)
			(psi)	(ft)		
Hamilton Well No. 2	201	125	48	110	600	311
Hamilton Well No. 3	201	125	48	110	800	311
Ortega Well	172	98	65	150	1,400	322
Raynor Well	130	60	87	200	1,900	330
Serra Well	200	126	56	130	650	330
Westmoor Well	239	160	61	140	500	379
Losse Well (Emergency Only)	170	100	61	141	400	311

Source: Sunnyvale 2010 Water Utility Master Plan, Table 3-3.

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 or projected to be in overdraft 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 sub basins that transmit, filter, and store water: the Santa Clara Sub basin (DWR Sub basin 2-9.02) and the Llagas Sub-basin (DWR Sub basin 3.301). In its water supply planning, the District frequently splits the Santa Clara Sub-basin into two subareas, the Santa Clara Plain and the Coyote Valley. Although part of the same sub-basin, these two subareas have different groundwater management challenges and opportunities and are in different groundwater charge zones.

These sub-basins 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 sub-basins, while the flat sub basin 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 Sub-basin. A general discussion of this subarea is provided below.

Santa Clara Plain

The Santa Clara Plain is part of the Santa Clara Sub-basin, 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 Sub-basin (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 Sub-basin. 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.

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. **Table 4-8** shows historic metered groundwater pumping data for the City in 2011 to 2015.

Table 4-8 Groundwater – Volume Pumped from the Santa Clara Plain Basin (AFY)

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

Source: Sunnyvale 2015 UWMP Table 6-3

Although the City has historically called upon groundwater to meet between 1 and 11 percent of its total demand (approximately 120 – 2,100 AFY), the City wells have the production capacity to produce approximately 8,000 AFY (Total Right or Safe Yield per 2015 UWMP).

4.2.2 Imported Water (Surface Water)

The City purchases imported water from two sources: The City and County of San Francisco (via the SFPUC), and the Santa Clara Valley Water District (SCVWD).

SFPUC
The City receives imported 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 (WSA) and set to expire in 2034. 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-acre feet per year). 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 million gallon per day (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.

SFPUC deliveries to the City reached a maximum of 12,675 AFY in 2008. The 2014 deliveries were 8,454 AFY, and the 2015 deliveries were 8,883 AFY (2015 UWMP Table 7-3).

SCVWD
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 and Pacheco Conduits, 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 District 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.

The quantity of water available to the City is based upon a requested 3-year delivery schedule submitted by the City and approved by the District (see Appendix B). The request for each year in the 3-year delivery schedule may not be less than 95 percent of the maximum amount requested in the 3-year period. District deliveries to the City reached a maximum of 13,577 AFY in 1999. The 2017 deliveries were 8,036 AF, and the 2018 deliveries were estimated to be 9,438 AF The 2018-2019 fiscal year minimum contract amount was 8,950 AF.

Per the City's 2015 UWMP, the City plans to increase water supply from SCVWD in years ahead to meet the increase in demands.

4.2.3 Recycled Water

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 is to reuse 100% of all wastewater (15 MGD) generated from the Plant to reduce all flows to the bay, as stated in the 2000 Recycled Water Master Plan. This goal, if attained, would involve the export of water to a location or agency outside the City limits. The Plant has a design flow capacity of 10 MGD for treatment of wastewater from the City.

The City has completed Phases I and II of the 2000 Recycled Water Master Plan, which now serves Baylands Park, Lockheed/Martin Area, the Sunnyvale Municipal Golf Course, and other parks and industrial areas in the northern part of the City. A storage tank was built in the Year

2000 to allow for more recycled water to be developed and stored in order to keep up with demand on the system once the area is built out. In September 2013, the City Council approved the Recycled Water Feasibility Study that identifies possible extensions of the recycled water system. Possible extensions to serve the south end of Sunnyvale along Wolfe road are currently under way. Possible extensions to serve the south end of the City and also Cupertino and Los Altos may be evaluated in the future. **Table 4-9** projects the Recycled Water Use.

Table 4-9 Historical and Projected Recycled Water Use within the City (AFY)

	2015	2020	2025	2030	2035
Total Recycled Water Use	717[1]	1,456	1,567	1,680	1,680

Source: portion of Sunnyvale 2015 UWMP Table 6-2

[1] Sunnyvale 2015 UWMP, Errata Correction 3, Reconciling discrepancy

The City's current recycled water system consists 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. The 2015 actual recycled water use was 717 AFY, which was mostly landscape and golf irrigation.

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.

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 allowing 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.

The following summarizes of the City's methods used to encourage recycled water use:

- Reducing pricing of recycled water – Recycled water is discounted 10% of potable water cost.
- Retrofit assistance for irrigation systems – Retrofit of dedicated irrigation meters.
- Dual pluming standards – Dual plumb new commercial buildings.
- Public education/information – Public outreach and marketing to increase awareness.
- Permit process enhancement – Provide fast-tracked permit processing for recycled water applications.

4.2.4 Desalinated Water

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). BARDP may 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. 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 and pilot testing have been completed. Additional details regarding desalinated water opportunities can be found in the SFPUC and SCVWD UWMPs. 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.

4.3 SUMMARY OF PROJECTED SUPPLY AND DEMAND

A summary of the City's historical and available water supply is provided in **Table 4-10**. Despite the contractual or operational limits on water supply in 2015, the 2015 UWMP clearly shows that additional supply is expected to be available in future years as shown in Table 6-2 of the 2015 UWMP. The City's water supply projections along with all projected demands, as identified in the 2015 UWMP and elsewhere in this WSA are summarized in **Table 4-11** below.

Table 4-10 Historical and Actual Water Supply

	Historical		Actual			Contractual / Operational Limits	
Supply Source	**Minimum**	**Maximum**	**2010**	**2014**	**2015**	**Minimum**	**Maximum**
SFPUC	8,454	12,675	8,982	8,454	8,883	10,003	14,100 [1]
SCVWD	8,176	13,577	9,331	8,491	6,592	0	10,200 [2]
Groundwater	123	3,786	1,629	2,064	148	0	8,000 [3]
Recycled Water	0	1,928	1,523	0	717 [5]	0	1,456 [4]
Total	**16,753**	**31,966**	**21,465**	**19,008**	**16,340**	**10,003**	**33,756**

[1] Per SFPUC contract values and Sunnyvale 2015 UWMP, Table 6-2.
[2] Per 2016-2017 Fiscal Year Allotment and Sunnyvale 2015 UWMP, Table 6-2
[3] Per 2010 Water Utility Master Plan and Sunnyvale 2015 UWMP, Table 6-2
[4] Per Table 6-2 of 2015 Sunnyvale UWMP, City will be able to produce recycled water at a maximum of 1,456 AFY by 2020
[5] Per Sunnyvale 2015 UWMP, Errata Correction 3, Reconciling discrepancy

Table 4-11 Water Supply Projections and Projected Demands

	Supply Projections			
Supply Source	**2020**	**2025**	**2030**	**2035**
SFPUC	11,124	12,266	12,266	12,266
SCVWD[2]	10,642	11,202	11,762	12,614
Groundwater	448	336	336	336
Recycled Water	1,456	1,567	1,680	1,680
Total Water Supply	**23,670**	**25,371**	**26,044**	**26,896**
Total Potable Water Supply	**22,214**	**23,804**	**24,364**	**25,216**
Demand Projections	**Demand Projections**			
Projected Potable Water Demand [3]	22,214	23,804	24,364	25,216
Unforeseen demand of ECR Project	-	600	600	600
Total Demand	**22,214**	**24,404**	**24,964**	**25,816**

[1] Source: Sunnyvale 2015 UWMP, Table 6-2
[2] The City may purchase additional available water from SCVWD during non-dry years when water is available.
[3] Source: Sunnyvale 2015 UWMP, Table 4-1

4.4 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.

5.0 WATER SUPPLY RELIABILITY

Historical Drought

Historically, on January 28, 2014, the Santa Clara Valley Water District's (District) Board of Directors (Board) received the initial 2014 water supply outlook and set a preliminary 2014 water use reduction target equal to 10 percent of 2013 countywide water use. On February 25, 2014, the Board approved a resolution setting a countywide water use reduction target equal to 20 percent of 2013 water use through December 31, 2014, and recommended that retail water agencies, local municipalities and the County of Santa Clara (County) implement mandatory measures as needed to achieve the 20 percent water use reduction target. The call for 20 percent reductions was extended on November 25, 2014, to be in place through June 30, 2015. These actions were based on the District's Water Shortage Contingency Plan and estimated 2014 water supply conditions that showed groundwater reserves would reach the Stage 3 ("Severe") level by the end of the calendar year if water use reduction measures were not implemented.

In early 2015, the statewide drought condition was still in the severe to exceptional stage. Furthermore, local surface water and groundwater supplies were well below average and imported water allocations for 2015 were very low (25% or less). In consideration of the continued severity of the drought and worsening water supply projections, increased water use reductions beyond the previous call for 20 percent were determined to be necessary to preserve groundwater storage. Therefore, on March 24, 2015, the Board called for 30 percent water use reductions, and recommended that retail water agencies, municipalities and the County implement mandatory measures as needed to accomplish that target, including a two day a week outdoor irrigation schedule.

During the drought, groundwater recharge was reduced due to limited surface water availability, and groundwater pumping increased in some areas to meet Santa Clara County water needs. Most retailers called for at least 30 percent reductions, and all activated or adopted water use restrictions.

Following unprecedented water conservation and plentiful winter rain and snow, on April 7, 2017 Governor Edmund G. Brown Jr. ended the drought State of Emergency in most of California, while maintaining water reporting requirements and prohibitions on wasteful practices such as water during or right after rainfall. Executive Order B-40-17 lifts the drought emergency in all California counties except Fresno, Kings, Tulare, and Tuolumne, where emergency drinking water projects will continue to be implemented to help address diminished groundwater supplies. The Order also rescinds two emergency proclamations from January and April 2014 and four drought-related Executive Orders issued in 2014 and 2015, as briefly discussed above. Executive Order B-40-17 builds on actions taken in Executive Order B-37-16, which remains in effect, to continue making water conservation a way of life in California. The State Water Resources Control Board (SWRCB) maintains urban water use report requirements and prohibitions on wasteful practices such as watering during or after rainfall, hosing off sidewalks and irrigating ornamental turf on public street medians. As directed by Governor Brown Jr. in Executive Order B-37-16, the Board will separately take action to make reporting of wasteful water practices permanent.

The Executive Director for the SWRCB, on April 26, 2017, rescinded the water supply stress test requirements and remaining mandatory conservation standards for urban water suppliers. The action was in response to Governor Brown's earlier announcement ending the drought state of emergency and transitioning to a permanent framework for making water conservation a California way of life.

5.1 CITY WATER SUPPLY RELIABILITY

5.1.1 Groundwater

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 activities are intended protect and sustain local groundwater resources. 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 are intended to sustain and protect groundwater resources, while developing other water supply sources to address needs beyond year 2025.

During this drought, groundwater recharge has been reduced due to limited surface water availability, and groundwater pumping has increased in some areas to meet Santa Clara County water needs. Because of this, it is estimated that 79,000 acre-feet was used from the groundwater storage reserve was used in 2014, causing the storage level to drop to approximately 260,000 acre-feet (350,000 acre-feet is the long-term operational storage capacity for the Santa Clara Plain). Managed groundwater recharge in the Santa Clara Plain is 34% of normal due to limited supplies. To augment the reduced imported water allocations, the District was able to retrieve some of its previously-stored water supplies (approximately 35,000 acre-feet) from Semitropic groundwater bank in 2014. The District is currently pursuing withdrawals of up to 45,000 acre-feet from the bank. The total storage capacity available to SCVWD in the Semitropic Water Bank is 350,000 AF and the current storage balance as of August 1, 2015 is 220,590 AF (SCVWD August 2015 Drought Monthly Status Report). Thus, the District is managing the groundwater resources in a manner to address the drought conditions and protect local groundwater resources.

5.1.2 SCVWD Imported Water

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 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, 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. For example, in 2006, a very wet year, SCVWD was able to store nearly 58,000 AF of imported water for use in future dry years. The total storage capacity available to SCVWD in the Semitropic Water Bank is 350,000 AF and the current storage balance as of August 1, 2015 is 220,590 AF (SCVWD August 2015 Drought Monthly Status Report).

If demands are anticipated to reach the upper end of the demand range, SCVWD could consider additional long-term transfers. At present, SCVWD has two agreements that are classified as long-term transfers. In 1998, SCVWD and two other agencies (Pajaro Valley Water Management Agency and Westlands Water District) jointly participated in the permanent assignment of 6,260 AF from Mercy Springs Water District, an agricultural CVP contractor. Under the agreement, SCVWD has an option for dry-year supplies totaling at least 20,000 AF over a 20-year period. The dry-year option may continue for subsequent terms depending on the future plan of Pajaro Valley Water Management Agency.

5.1.3 SFPUC Imported Water

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. The following describes allocation of SFPUC water supply during drought conditions.

5.1.3.1 Water Shortage Allocation Plan

In July 2009, in connection with the WSA, the wholesale customers and the City of San Francisco adopted a Water Shortage Allocation Plan (WSAP) to allocate water from the regional water system to retail and wholesale customers during system-wide shortages of up to 20% (the "Tier One Plan"). The Tier One Plan replaced the prior Interim WSAP, adopted in 2000, which also allocated water during shortages up to 20%. The Tier One Plan also allows for voluntary transfers of shortage allocations between SFPUC and any wholesale customer and between wholesale customers themselves. In addition, water "banked" by a wholesale customer, through greater than required reductions in usage, may also be transferred

<u>Tier One Drought Allocations</u>

The Tier One Plan, which allocates water between San Francisco and the wholesale customers collectively, distributes water based on the level of shortage, as seen in **Table 5-1**:

Table 5-1 Distribution of Water Based on Level of System-Wide Reduction

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%

Source: Sunnyvale 2015 UWMP, Table 8-1

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

<u>Tier Two Drought Allocations</u>

The wholesale customers have negotiated and adopted the "Tier Two Plan," the second component of the WSAP which allocates the collective wholesale customer share among each of the 26 wholesale customers. This Tier Two allocation is based on a formula that takes multiple factors into account for each wholesale customer, including:

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

The water made available to the wholesale customers collectively will be allocated among them in proportion to each wholesale customer's Allocation Basis, expressed in million gallons per day (MGD), which in turn is the weighted average of two components. The first component is the wholesale customer's Individual Supply Guarantee, as stated in the WSA, and is fixed. The second component, the Base/Seasonal Component, is variable and is calculated using the monthly water use for three consecutive years prior to the onset of the drought for each of the wholesale customers for all available water supplies. The second component is accorded twice the weight of the first, fixed 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 enough supply for certain wholesale customers.

The Allocation Basis is used in a fraction, as numerator, over the sum of all wholesale customers' Allocation Bases to determine each wholesale customer's Allocation Factor. 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. However, for long-term planning purposes, each wholesale customer shall use as its Allocation Factor, the value identified in the Tier Two Plan, when adopted. The Tier Two Plan will expire in 2018 unless extended by the wholesale customers.

5.1.3.2 Water System Improvement Program

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

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

In approving the WSIP, SFPUC adopted a Phased WSIP Variant for water supply that was analyzed in the PEIR. This Phased WSIP Variant established a mid-term water supply planning milestone in 2018 when SFPUC would reevaluate water demands through 2030. At the same meeting, SFPUC also imposed the Interim Supply Limitation, which limits the volume of water that the member agencies and San Francisco can collectively purchase from Regional Water System (RWS) to 265 MGD until at least 2018. Although the Phased WSIP Variant included a mid-term water supply planning milestone, it did include full implementation of all proposed WSIP facility improvement projects to ensure that the public health, seismic safety, and delivery reliability goals were achieved as soon as possible.

Interim Supply Limitation

As part of its adoption of the WSIP, SFPUC adopted a water supply element, the Interim Supply Limitation (ISL), to limit sales from the RWS watersheds to an average of 265 MGD annually through 2018. 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, the WSA provides a framework for administering the ISL. Strategies to address wholesale customers' unmet needs resulting from the ISL are discussed in greater detail below.

Interim Supply Allocations

The Interim Supply Allocations (ISAs) refer to each individual wholesale customer's share of the ISL. On December 14, 2010, SFPUC established each agency's ISA through 2018. In general, SFPUC based the allocations on the lesser of the projected fiscal year 2017-18 purchase projections or Individual Supply Guarantees. The ISAs were effective only until December 31, 2018 and do not affect the Supply Assurance or the Individual Supply Guarantees. Sunnyvale's ISA was 9.44 MGD.

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

Environmental Enhancement Surcharge

SFPUC plans to establish the Environmental Enhancement Surcharge concurrently with the budget-coordinated rate process. This surcharge will be unilaterally imposed by SFPUC on individual wholesale customers, and SFPUC retail customers, when each agency's use exceeds their ISA and when sales of water to the wholesale customers and City of San Francisco retail customers, collectively, exceeds the Interim Supply Limitation of 265 MGD.

5.1.3.3 Water Conservation Implementation Plan

In September 2009, BAWSCA completed the Water Conservation Implementation Plan (WCIP). The goal of the WCIP is to develop an implementation plan for BAWSCA member agencies to attain the water efficiency goals that the agencies committed to in

2004 as part of the PEIR. The WCIP's goal was expanded to include identification of how BAWSCA member agencies could use water conservation in a way to continue to provide reliable water supplies to their customers through 2018 given the SFPUC's 265 MGD ISL. SFPUC imposed the ISL on October 31, 2008, to limit the volume of water that the BAWSCA member agencies and City of San Francisco can collectively purchase from the RWS to 265 MGD until at least 2018.

Based on the WCIP development and analysis process, BAWSCA and its member agencies identified five new water conservation measures, which, if implemented fully throughout the BAWSCA service area, could potentially save an additional 8.4 MGD by 2018 and 12.5 MGD by 2030. The demand projections for the BAWSCA member agencies, as transmitted to SFPUC on June 30, 2010, indicate that collective purchases from SFPUC will stay below 184 MGD through 2018 as a result of revised water demand projections, the identified water conservation savings, and other actions.

Several member agencies have elected to participate in the BAWSCA regional water conservation programs and BAWSCA continues to work with individual member agencies to incorporate the savings identified in the WCIP into their future water supply portfolios with the goal of maintaining collective SFPUC purchases below 184 MGD through 2018.

5.1.3.4 Long Term Reliable Water Supply Strategy

BAWSCA's water management objective is to ensure that a reliable, high quality supply of water is available where and when people within the BAWSCA service area need it. A reliable supply of water is required to support the health, safety, employment, and economic opportunities of the existing and expected future residents in the BAWSCA service area and to supply water to the agencies, businesses, and organizations that serve those communities. BAWSCA is developing the Long-Term Reliable Water Supply Strategy (Strategy) to meet the projected water needs of its member agencies and their customers through 2035 and to increase their water supply reliability under normal and drought conditions.

The Strategy is proceeding in three phases. Phase I was completed in 2010 and defined the magnitude of the water supply issue and the scope of work for the Strategy. Phase II will result in a refined estimate of when, where, and how much additional supply reliability and new water supplies are needed throughout the BAWSCA service area through 2035, as well as a detailed analysis of the water supply management projects, and the development of the Strategy implementation plan. Phase III will include the implementation of specific water supply management projects. Depending on cost-effectiveness, as well as other considerations, the projects may be implemented by a single member agency, by a collection of the member agencies, or by BAWSCA in an appropriate timeframe to meet the identified needs. Project implementation will continue throughout the Strategy planning horizon, in coordination with the timing and magnitude of the supply need.

The development and implementation of the Strategy will be coordinated with the BAWCSA member agencies and will be adaptively managed to ensure that the goals of the Strategy (i.e., increased normal and drought year reliability) are efficiently and cost-effectively being met.

5.2 FACTORS AFFECTING WATER SUPPLY

In addition to droughts, there are other threats to sources of water supply. Sunnyvale relies on their diversification of water supply, continuous work with SFPUC and SCVWD, demand management strategies, and the Water Conservation Plan to address these threats.

5.2.1 Global Climate Change

The issue of climate change has become an important factor in water resources planning in the State,and is frequently being considered in urban water management planning activities, though the extent and precise effects of climate change remain uncertain. As described by the SFPUC in its Final Water Supply Availability Study for the City and County of San Francisco, dated October 2009, there is evidence that increasing concentrations of greenhouse gases 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, there is evidence that a warming trend occurred during the latter part of the 20th century and will likely 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;
- Sea level rise and an increase in saltwater intrusion;
- Increased water temperatures with accompanying potential adverse effects on some fisheries and water quality;
- Increases in evaporation and concomitant 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.

5.2.2 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.

5.2.3 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 give 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.

5.2.4 2018 Bay-Delta Amendment

In December 2018, the State Water Resources Control Board (SWRCB) adopted amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento- San Joaquin Delta Estuary (Bay-Delta Plan Amendment) to establish water quality objectives to maintain the health of the Bay-Delta ecosystem. The SWRCB is required by law to regularly review this plan. The adopted Bay-Delta Plan Amendment was developed with the stated goal of increasing salmonid populations in three San Joaquin River tributaries (the Stanislaus, Merced, and Tuolumne Rivers) and the Bay-Delta.

The Bay-Delta Plan Amendment requires the release of 40% of the “unimpaired flow”[1] on the three tributaries from February through June in every year type, whether wet, normal, dry, or critically dry.

If the Bay-Delta Plan Amendment is implemented, the SFPUC will be able to meet the projected water demands presented in the 2015 UWMP in normal years but would experience supply shortages in single dry years or multiple dry years. The 2015 UWMP already assumes limited rationing may be needed in multiple dry years to address an anticipated supply shortage by 2040, but implementation of the Bay-Delta Plan Amendment will require rationing in all single dry years and multiple dry years and to a greater degree to address supply shortages not accounted for in the 2015 UWMP.

[1] Unimpaired flow represents the water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds. Bay-Delta Plan Amendment, Introduction, p.1-8.

5.2.5 Natural Disasters

Disasters such as earthquakes could threaten water delivery infrastructure. SFPUC and SCVWD are taking steps to ensure water supply reliability. Following San Francisco's experience with the 1989 Loma Pieta 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 will be released in Spring, 2011. 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 most recently 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.

5.2.5.1 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 many 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. 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

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.

5.2.5.2 SCVWD Infrastructure Reliability Project

In 2003, SCVWD initiated the Water Utility Infrastructure Reliability Project (IRP) to determine the current reliability of its water supply infrastructure (pipes, pump stations, treatment plants) and to appropriately balance level of service with cost. The project measured the baseline performance of critical facilities in emergency events and identified system vulnerabilities. The study concluded that 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 SCVWD, with outage times ranging from one to 45 days.

The level of service goal identified for the IRP was "Potable water service at average winter flow rates available to a minimum of one turnout per retailer within seven days, with periodic one day interruptions for repairs." In order to meet this level of service goal, the project developed seven portfolios to mitigate the identified system risks and identified a recommended portfolio for implementation. As a result, SCVWD has been implementing the recommended portfolio of reliability improvement projects (Portfolio 2). The cost to implement Portfolio 2 is estimated to be approximately $175 Million. Portfolio 2 is expected to reduce the post-earthquake outage period from 45-60 days to 7-14 days.

Additionally, SCVWD routinely monitors the conditions of all their ten dams used for both water supply and flood prevention. Seismic safety evaluations on eight dams are planned by 2013.

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 Cal WARN, 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 updated Infrastructure Reliability Plan in June 2016. The goal of the update was to identify a combination of capital and operational improvements that would provide reliable water service to present and future, raw and treated water customers in Santa Clara County during a range of emergency events. The objective of the IRP was to ensure that the District's water supply infrastructure is reliable under a range of hazards. 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 the District currently meet a LOS for providing treated water at minimum demands within approximately 30 days or less, and critical recharge within approximately 75 days or less. This study also evaluated system capabilities with respect to regional redundancies and backup supplies. The study found that most areas of the county have sufficient backup supply or redundancy to withstand a District service outage; however, specific service area vulnerabilities were identified (all outside of the City limits) and 20 projects recommended to improve District resilience and recovery capabilities.

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.

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.

5.2.5.3 Sunnyvale Catastrophic Supply Interruption Planning

In 2004, G&E Engineering conducted a seismic vulnerability study of Sunnyvale’s water system. According to their findings, a magnitude 7.9 earthquake on the San Andreas Fault would cause Sunnyvale’s water system to fail. An earthquake of that magnitude would result in a prolonged loss of water service to over 131,000 people and the calculated loss of function of the water system for up to 60 days. To mitigate the failure of the water system, the City has seismically retrofitted its two (2) 5-million-gallon storage tanks at Wright Avenue and is proposing to retrofit more key water infrastructure components that may be at risk. The City has prioritized seismic vulnerability mitigation projects and included them in its 20-year Capital Improvements Plan. Future projects will be completed according to this plan contingent upon available funding.

5.3 WATER SHORTAGE CONTINGENCY PLANNING

5.3.1. 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, and amended in June 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 June 30, 2016.

The following **Table 5-2** 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.

Table 5-2: Water Shortage Contingency – Rationing Stages to Address Shortages

Stage	% Shortage	Water Supply Conditions
0	None	Supply conditions are adequate. The City continues to encourage water conservation and water use efficiency.
1	Up to 15%	Stage 1 exists when City Council declares a water shortage exists due to supply conditions and calls for up to 15% water reduction.
2	Up to 30%	Stage 2 exists when City Council declares a water shortage emergency exists due to water supply conditions and calls for up to 30% water reduction.
3	Up to 45%	Stage 3 exists when City Council declares that a water shortage emergency exists due to water supply conditions and calls for up to 45% water reduction.
4	Greater than 45%	Stage 4 exists when City Council declares that a water shortage emergency exists and demands water reduction greater than 45% in response to existing water conditions.

Source: Sunnyvale 2015 UWMP Table 8-3

5.3.2. Prohibitions, Penalties, and Consumption Reduction Methods

Table 5-3 details the use restrictions for each stage of reduction.

Table 5-3 Water Shortage Contingency – Mandatory Prohibitions

Stage No.	Action/Prohibition
Stage 0 Normal	Permanent water uses 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 driveways, sidewalks (except for health and safety). • 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. • Irrigation with potable water during and within 48 hours after measurable rainfall is prohibited. • Irrigation with potable water of ornamental turf on public street medians. • Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. • Use of decorative fountains[1] without recirculation
Stage 1 up to 15%	• All of the above • Low level informational outreach • Enforcement of permanent water use restriction Ordinance (Muni Code 12.34.020) • Hydrant flushing (unless for public health or safety)
Stage 2 up to 30%	• All of the above • Stepped up outreach effort • Irrigation of ornamental landscapes with potable water more than two days per week is prohibited.
Stage 3 up to 45%	• All of the above • 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 trees and greens
Stage 4 Greater than 45%	• 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.

Source: Sunnyvale 2015 UWMP Table 8-4

Notes: "Decorative fountains" are considered ornamental water features that are artificially supplied with water and include ponds, lakes, waterfalls, and fountains. These facilities are considered ornamental and not for recreation.

Notes: [1] "Decorative fountains" are considered ornamental water features that are artificially supplied with water and include ponds, lakes, waterfalls, and fountains. These facilities are considered ornamental and not for recreation.

5.3.3. 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 35, 45, or 50 percent or greater 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.

Table 5-4 summarizes the water shortage contingency penalties and charges.

Table 5-4 Water Shortage Contingency – Penalties and Charges

Stage No.	Description	Penalty /Charge
2	First Violation	\$0 – written warning
2	Second Violation	\$0 – written warning
2	Third Violation	\$250
2	Fourth Violation	\$500
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

Source: Sunnyvale 2015 UWMP Table 8-5

5.3.4. 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 notice of a second violation, 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.

5.3.5. 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 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.

5.3.6. 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.

5.4 DROUGHT PLANNING

5.4.1. Average/Normal Water Year

The “normal” year for the purposes of the current UWMP, 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.

5.4.2. 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.

SFPUC modeling and historic hydrological sequence identifies 1978 as the model single dry year. 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.

5.4.3. 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 sub-basins. 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 5-5 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.

Table 5-5 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

Source: Sunnyvale 2015 UWMP Table 7-2

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.

5.4.4. SFPUC

SFPUC historically has met demand in its service area in all year types from its Tuolumne River, Alameda Creek, and San Mateo County watersheds. In general, 85% of the supply comes from the Tuolumne River through Hetch Hetchy Reservoir and the remaining 15% comes from the local watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos and San Andreas Reservoirs. SFPUC's adopted WSIP retains this mix of water supply for all year types. In order to achieve its target of meeting at least 80% of its customer demand during droughts, the SFPUC must successfully implement the dry-year water supply projects included in the WSIP. SFPUC proposes to expand their water supply portfolio by increasing the types of water supply resources to meet future demands. This includes approximately 2,240 AFY of transfers and 8,100 AFY of groundwater from the Westside Basin.

The Tier One and Tier Two Plans, as earlier described, would be implemented as necessary in the event of a shortage of SFPUC supplies.

5.4.5. SCVWD

As a result of the 1987 to 1992 drought, local reservoirs were reduced and wholesalers received only partial entitlement from its imported sources. In response to these circumstances, SCVWD instituted an aggressive water conservation program and augmented imported sources of water with additional water supplies. Since the end of the drought, local reservoir levels have returned to normal, allowing greater flexibility to meet water demands during a short-term dry period.

In the event of a multiple dry year supply scenario occurring between now and 2020, supplies for SCVWD and groundwater are planned to be adequate to continue to meet the increased demands, while supplies from SFPUC will decrease. The City will compensate for temporarily decreased supply from SFPUC by using additional groundwater supply as available. SCVWD has accounted for additional groundwater pumping during a single-dry and multiple-dry years. Subsequent to 2020, implementation of water shortage contingency plan actions would be required to reduce demands by approximately 20-25% in the fifth year and beyond of a multi-year drought.

5.4.6. Supply Availability/Sufficiency

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.

An analysis of the supplies historically available during times of shortage is reflected in **Table 5-6**. This analysis does not account for population and system growth and reflects the amount of supply available to meet the system's demands during the designated years. An analysis of the current supply reliability is reflected in **Table 5-7**.

Table 5-6 Supply Reliability - Historic Conditions (AFY)

Water Source	Normal Water Year (2002)	Single Dry Water Year (1977)	Multiple Dry Years		
			Year 1 (2013)	Year 2 (2014)	Year 3 (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 Normal Year		**88%**	**83%**	**74%**	**63%**

Source: Sunnyvale 2015 UWMP Table 7-3

Table 5-7 Supply Reliability - Current Conditions (AFY)

		Multiple Dry Years		
Source	**Average/Normal Water Year 2002**	**Year 2016**	**Year 2017**	**Year 2018**
SFPUC	10,096	9,331	9,779	10,228
SCVWD	13,094	7,326	8,155	8,984
Groundwater	1,367	197	260	322
Recycled Water	1,296	865	1,013	1,160
Totals	**25,853**	**17,719**	**19,207**	**20,694**

Source: Sunnyvale 2015 UWMP Table 8-6
Notes:
1. Additional groundwater supply will be used to supplement decreases in purchased treated water supply.

Table 5-8 through Table 5-13 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.

Table 5-8 Supply and Demand Comparison – Normal Year and Total Water Sources Available (AFY)

Source	2020	2025	2030	2035
SFPUC[1]	11124	12266	12266	12266
SCVWD [2]	10642	11202	11202	12614
Groundwater [3]	448	336	336	336
Recycled Water [4]	1456	1568	1680	1680
Supply Totals	**23670**	**25372**	**26044**	**26896**
Demand Totals	**23670**	**25372**	**26044**	**26896**
Difference	**0**	**0**	**0**	**0**

[1] The City's SFPUC contract provides for up to 14,100 acre-feet.
[2] The City obtains water from SCVWD through a 3-year requested delivery. The City has obtained a maximum of 13,577 AFY from SCVWD. The 2016-2017 fiscal year allotment is 10,200 AFY.
[3] City's maximum groundwater production is 8,000 acre-feet.
[4] Based on Table 7-4 of the 2015 UWMP.

Table 5-9 Supply and Demand Comparison - Single Dry Year (AFY)

Source	2020	2025	2030	2035
SFPUC	11124	12266	12266	12266
SCVWD [1]	10642	11202	11762	12614
Groundwater [2]	448	336	336	336
Recycled Water	1456	1567	1680	1680
Supply Totals	**23670**	**25371**	**26044**	**26896**
Demand Totals	**23670**	**25372**	**26044**	**26896**
Difference	**0**	**0**	**0**	**0**

[1] The City obtains water from SCVWD through a 3-year requested delivery. The City has obtained a maximum of 13,577 AFY from SCVWD.
Source: Sunnyvale 2015 UWMP Table 7-5

Table 5-10 Supply and Demand Comparison - Multiple Dry Year for 2020 (AFY)

Source	Year 1 2020	Year 2 2021	Year 3 2022
SFPUC	11124	9812	9812
SCVWD	10642	10200	10200
Ground Water	448	2521	2838
Recycled Water [2]	1456	1478	1501
Supply Totals	**23670**	**24011**	**24351**
Demand Totals	**23670**	**24011**	**24351**
Difference	**0**	**0**	**0**

[1] If the existing drought were to continue for an additional three years, it is assumed that the City's current aggressive conservation measures would be maintained, and further reductions would not be necessary.
[2] Assumes City's current project at WWTP is completed and plant is producing recycled water.
Source: Sunnyvale 2015 UWMP Table 7-6

Table 5-11 Supply and Demand Comparison - Multiple Dry Year for 2025 (AFY)

Source	Year 1 2025	Year 2 2026	Year 3 2027
SFPUC	12266	9812	9812
SCVWD	11202	10200	10200
Ground Water	336	3904	4016
Recycled Water	1568	1590	1613
Supply Totals	**25372**	**25506**	**25641**
Demand Totals	**25372**	**25506**	**25641**
Difference	**0**	**0**	**0**

Source: Sunnyvale 2015 UWMP Table 7-7

Table 5-12 Supply and Demand Comparison - Multiple Dry Year for 2030 (AFY)

Source	Year 1 2030	Year 2 2032	Year 3 2032
SFPUC	12266	9812	9812
SCVWD	11762	10200	10200
Ground Water	336	4522	4693
Recycled Water	1680	1680	1680
Supply Totals	**26044**	**26214**	**26385**
Demand Totals	**26044**	**26214**	**26385**
Difference	**0**	**0**	**0**

Source: Sunnyvale 2015 UWMP Table 7-8

Table 5-13 Supply and Demand Comparison - Multiple Dry Year for 2035 (AFY)

Source	Year 1 2035	Year 2 2036	Year 3 2037
SFPUC	12266	9812	9812
SCVWD	12614	10200	10200
Ground Water	336	5227	5249
Recycled Water	1680	1680	1680
Supply Totals	**26896**	**26919**	**26941**
Demand Totals	**26896**	**26919**	**26941**
Difference	**0**	**0**	**0**

Source: Sunnyvale 2015 UWMP Table 7-9

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.

5.5 WATER QUALITY IMPACTS ON RELIABILITY

As described previously, the City has three sources that supply its potable 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.

5.5.1. 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.

5.5.2. SCVWD

Treatment of surface water is necessary to ensure that the quality of water which 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.

5.5.3. 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.

5.5.3.1 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.

Sunnyvale has observed nitrate in excess of 50% of the MCL and conducts monitoring for nitrate more often than is required by regulation.

6.0 CONCLUSION

The City of Sunnyvale optimizes its water resource supply through an integrated resource approach, utilizing available water programs and projects. The City receives its water supplies from groundwater, imported water, and recycled water.

This WSA includes a discussion of the Senate Bill 610 legislation, an overview of the proposed Project, and an analysis of water demands for the City's existing customer known developments and the proposed changes to City's development projects over the 2015 UWMP planning horizon. The WSA also includes an analysis of reliability of the City's water supplies and water quality and concludes with a sufficiency analysis of water supply during normal, single-dry, and multiple dry years through 2035.

The WSA does not evaluate the adequacy of the City's infrastructure to handle the available water supplies nor does it make any recommendations with respect to capital improvements that may be necessary in order to provide an adequate level of service to the proposed development projects.

This WSA identifies a program of options to provide sufficient water supply for the Project through 2035.

The Project will change the current City land use. In total, the growth areas will increase the total number of residential units by 6,900 units, increase approximately 730,000 SF of commercial area within the City limits over the next 6 years. The development potential for the ECR Plan area in the current General Plan is 4,200 residential units and 950,000 SF of commercial area. The ECR Plan allows for 2,700 residential units and 220,000 SF of commercial beyond the limitation of the current General Plan.

The Sunnyvale Horizon 2035 General Plan – Land Use and Transportation Element (Horizon 2035 LUTE) WSA was prepared in November 2015 to specifically address the increased water demand associated with updating and increasing land use within the City limits. The Project's development area was included in the General Plan growth areas as well as the updated growth areas of the Horizon 2035 LUTE growth. The Horizon 2035 LUTE WSA, begun in November 2015, was based on the 2010 UWMP demand estimates. Subsequently, the City has completed the 2015 UWMP, July 2016, which incorporates the expected growth and water demands from the Horizon 2035 LUTE WSA. With the understandings provided above, the Project WSA uses a conservative approach by using the 2015 UWMP as a baseline and adding the Project's expected growth and water demand estimates without consideration for any previous inclusion in the General Plan. The change in water demand estimate for the Project's site will consider the estimated water demand associated with the land use.

The City obtains water from the following primary water sources: groundwater produced via City wells, imported water via SFPUC and SCVWD, and recycled water. For 2015, the City received approximately 1 percent of its water supply from groundwater, 54 percent from SFPUC, 40 percent from SCVWD, and 5 percent from recycled water.

The build-out of the Project is expected increase of City water demands by 600 AFY.

The potable water demand for the Project is estimated to be 967 AFY under normal conditions by the buildout year 2025. To align buildout demands with standard 5-year increment estimates the project development buildout will be assumed to be complete by 2025.

Table 4-11 above shows the projected supply for **a normal year is more than the projected City demand with the Project demand** included. Additionally, the City can meet the 600 AFY demand during drought years by utilizing a combination of groundwater, conservation, recycled water, and the available SFPUC and SCVWD contractual water supply limits. Based on **Table 4-10** above, the maximum contractual limit for SFPUC is 14,100 AFY at present but may be reduced if the Bay-Delta Plan Amendment is implemented. Historically, the maximum water received from SCVWD supply was 13,577 AFY in 1999 and is currently contractually obligated for 10,200 AFY for the 2016-2017 fiscal year. The City groundwater wells have operational limits of 8,000 AFY. While recycled water is expected to increase to 1,456 AFY by 2020 and 1,680 AFY by 2035, it is not accounted for in the table below. The Sunnyvale 2015 UWMP Table 4-1 is an estimate of POTABLE water demand and although the estimated demand for the Project includes non-potable demands it is conservative to remove the non-potable supply source from the equation. Overall, the City can utilize all of these water resources plus conservation efforts, not estimated below, to meet the Project's demands. **Table 6-1** below summarizes the **maximum potable supplies** available to the City of Sunnyvale and the estimated projected potable water demands with the Project included.

Table 6-1 Maximum City Supply and Projected Demand Summary (AFY)

Water Resource	2020	2025	2030	2035
SFPUC[1]	14,100	14,100	14,100	14,100
SCVWD[1]	10,200	10,200	10,200	10,200
Groundwater[1]	8,000	8,000	8,000	8,000
Projected MAXIMUM Supply	**32,300**	**32,300**	**32,300**	**32,300**
Potable Water Demand Totals [2]	22,214	23,804	24,364	25,216
Project Demand Estimate	600	600	600	600
Total Projected Demand	**22,814**	**24,404**	**24,964**	**25,816**
Difference	**9,484**	**7,896**	**7,336**	**6,484**

[1] Source: -Sunnyvale 2015 UWMP, Table 6-2
[2] Source Sunnyvale 2015 UWMP Table 4-1.

The information included in this Water Supply Assessment identifies programs and activities that collectively represent reasonable opportunities to ensure an adequate supply of water for the City, inclusive of the subject Project, now and into the future.

The City can provide an adequate supply of water and has opportunities to increase water resources by the following methods. First, the City has the capability of utilizing additional groundwater capacity from the City existing wells. Second, water conservation efforts and regulations can provide additional water resources. Overall, the City of Sunnyvale has an adequate supply of water to provide the Project throughout 2035 under normal and drought conditions.

CITY OF SUNNYVALE 2015
Urban Water Management Plan





June 2016

Prepared for
The City of Sunnyvale

Prepared By
HydroScience Engineers, Inc
San Jose, CA

HydroScience

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City of Sunnyvale

2015 Urban Water Management Plan

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 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: List of Notified Agencies

<table>
<tr><th colspan="2">AGENCY NAME</th></tr>
<tr><td>ALAMEDA COUNTY WATER DISTRICT</td><td>SANTA CLARA VALLEY WATER DISTRICT</td></tr>
<tr><td>CITY OF HAYWARD</td><td>MID-PENINSULA WATER DISTRICT</td></tr>
<tr><td>CITY OF MILPITAS</td><td>NORTH COAST COUNTY WATER DISTRICT</td></tr>
<tr><td>CITY OF MOUNTAIN VIEW</td><td>CITY OF EAST PALO ALTO</td></tr>
<tr><td>CITY OF PALO ALTO</td><td>WESTBOROUGH WATER DISTRICT</td></tr>
<tr><td>CITY OF SANTA CLARA</td><td>CALIFORNIA WATER SERVICE COMPANY</td></tr>
<tr><td>STANFORD UNIVERSITY</td><td>GREAT OAKS WATER COMPANY</td></tr>
<tr><td>PURISSMA HILLS WATER DISTRICT</td><td>SAN JOSE WATER COMPANY</td></tr>
<tr><td>CITY OF BRISBANE</td><td>CITY OF SAN JOSE</td></tr>
<tr><td>CITY OF BURLINGAME</td><td>CITY OF GILROY</td></tr>
<tr><td>CITY OF DALY CITY</td><td>CITY OF MORGAN HILL</td></tr>
<tr><td>TOWN OF HILSBOROUGH</td><td>COUNTY OF SANTA CLARA</td></tr>
<tr><td>CITY OF MENLO PARK</td><td rowspan="2">SAN JOSE/SANTA CLARA WATER POLLUTION PLANT</td></tr>
<tr><td>CITY OF MILLBRAE</td></tr>
<tr><td>CITY OF REDWOOD CITY</td><td rowspan="2">BAY AREA WATER SUPPLY & CONSERVATION AGENCY</td></tr>
<tr><td>CITY OF SAN BRUNO</td></tr>
<tr><td>COASTSIDE COUNTY WATER DISTRICT</td><td>SAN FRANCISCO PUBLIC UTILITIES COMMISSION</td></tr>
</table>

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: 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 22% in the next 25 years. Population estimates as shown in **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 2035 population estimate is from the updated Land Use and Transportation Element for the Horizon 2035 General Plan for the City of Sunnyvale.

Table 3-2: Population Projections for City of Sunnyvale

	2015	2020	2025	2030	2035	2040
City Population[1]	148,028	154,671	161,314	167,957	174,600	181,243

Notes:
1. Population projections were developed for the updated Land Use and Transportation Element for the Horizon 2035 General Plan for the City of Sunnyvale. Straight line approximation was used to develop projections for 5-year increments.

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 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**).

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.

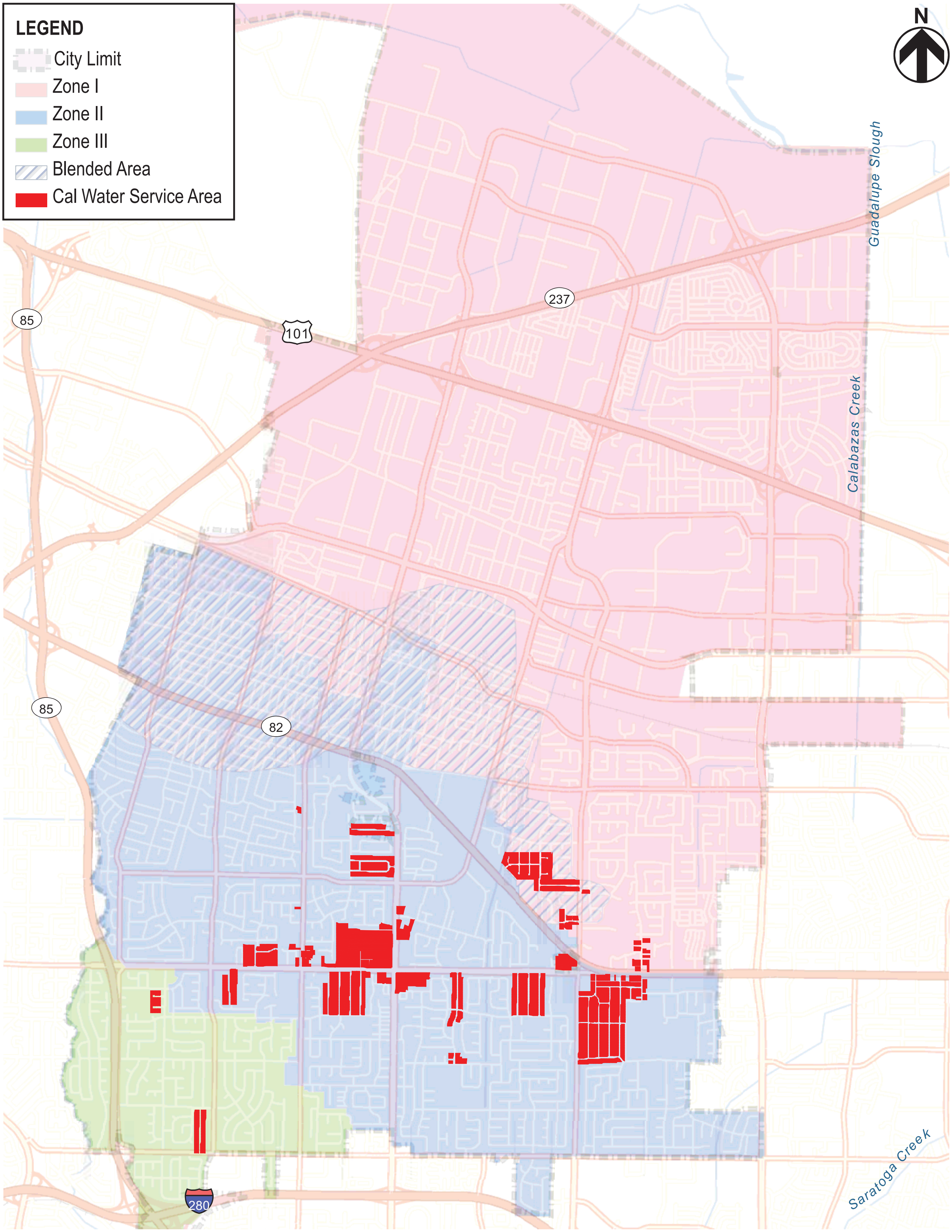

FIGURE 3-1
CITY OF SUNNYVALE
URBAN WATER MANAGEMENT PLAN
WATER SERVICE AREA

HydroScience

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**, and by source in **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.

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	7,619	7,796	7,563	7,351
Multi-family residential	8,309	4,452	5,575	5,705	5,534	5,379
CII	4,261	3,806	6,722	7,952	8,986	10,268
Irrigation (potable)	970	1,374	2,288	2,341	2,271	2,208
Other (Firelines)	911	9	10	10	10	10
Total Potable	**21,474**	**15,090**	**22,214**	**23,804**	**24,364**	**25,216**

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**. 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 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** provides the water use projection for lower income households within the City service area (these demands are already included in **Table 4-1** and **Table 4-2**).

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

Customer Type	2015	2020	2025	2030	2035
Single family residential (BMR Units)	210	280	288	283	282
Multi-family residential (Affordable Housing + BMR Units)	430	1,152	1,540	1,513	1,507
Total Water Use	**639**	**1,432**	**1,828**	**1,797**	**1,789**

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** (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**.

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[1]	10,150	6,497	10,642	11,202	11,762	12,614

Notes:
1. Contractual volumes for SCVWD vary from year to year.

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 99 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

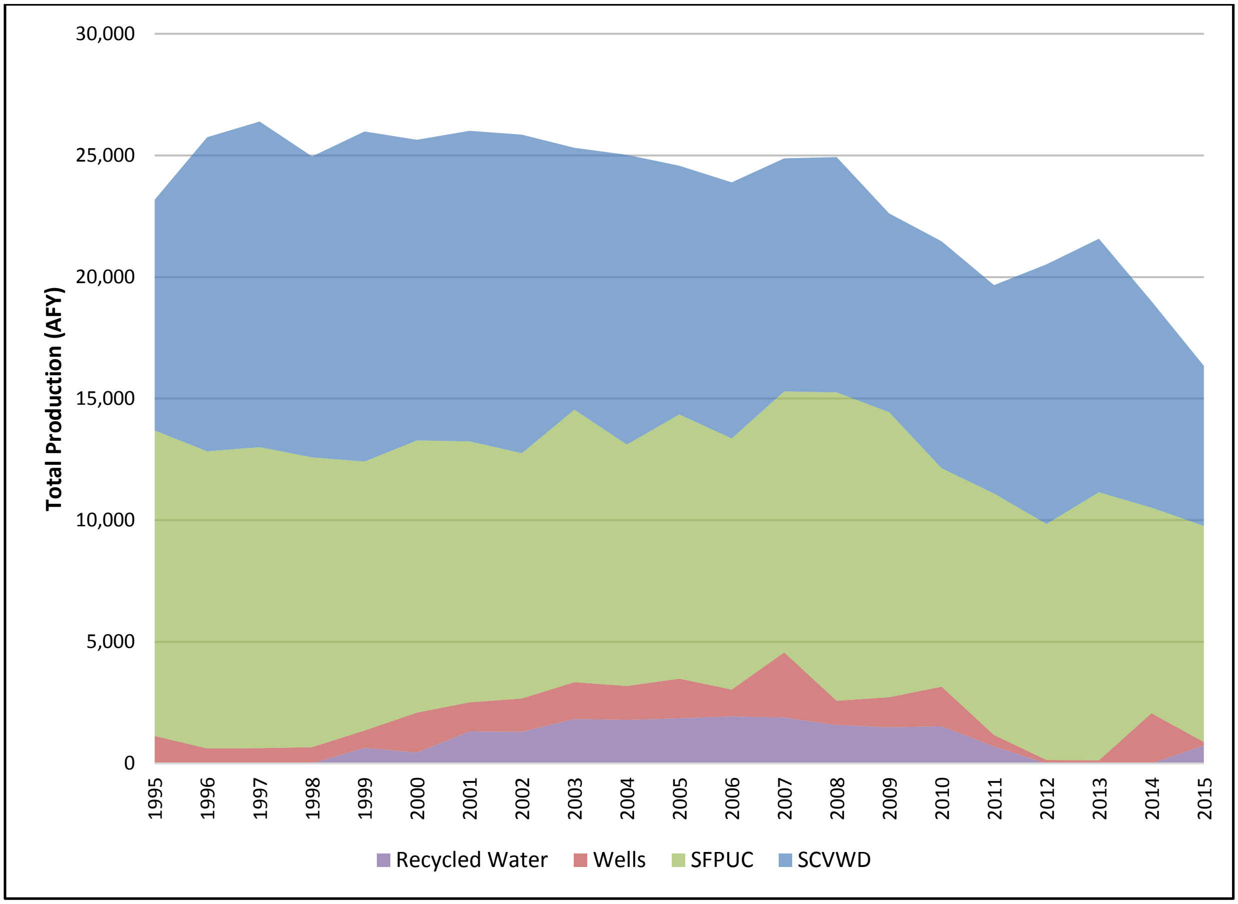
Water use varies throughout the years depending on several natural factors including the weather and the extension of seasons, but is also dependent on other factors such as business climate and the economy. Recognizing long-term general trends in water requirements is valuable in projecting future supply 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** reflects the total annual water production in acre-feet per year (AFY) by the City since 1995.

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

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**. 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**. The period from 2003-2007 was selected for the City's 5-year base.

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 and **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.

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	175
2002	133,424	23.08	173
2003	134,256	22.60	168
2004	135,088	22.34	165
Baseline per capita water use (1995-2004)			**174**

Notes:
2. 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 174 gpcd as shown on **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**. 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).

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: 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)	174
5-year Baseline per capita water use (2003-2007)	167
2020 minimum water use target (95% of 5-year baseline)	158
Method 1 2015 water use target (90% of 10-year baseline)	156
Method 1 2020 water use target (80% of 10-year baseline)	139

The Method 1 2020 target of 139 gpcd is below the minimum water use target of 158 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 99 gpcd, meeting the 2015 target of 156 gpcd. The 2020 projected per capita water use is 128 gpcd, meeting the 2020 target of 139 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 depicts the percentage of water supply from each source for Calendar Year 2015 and **Table 6-1** presents the current water supplies for the City. **Table 6-2** shows the planned water supply as determined by the City.

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

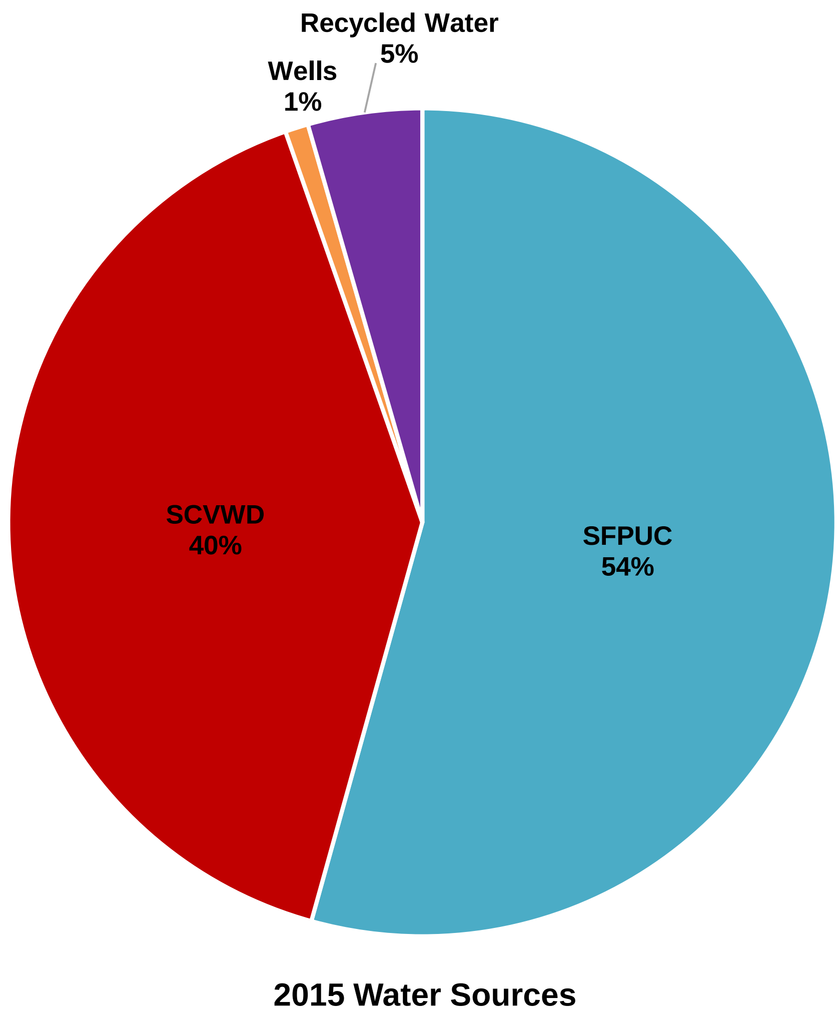


Table 6-1: Water Supplies for 2015 – Actual (AFY)

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	**16,231**

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	10,200	10,642	11,202	11,762	12,614	12,726
Local Groundwater Wells	8,000	448	336	336	336	336
Recycled Water	-	1,456	1,567	1,680	1,680	1,680
Total		**23,670**	**25,373**	**26,045**	**26,898**	**27,009**

Notes:
1. The City has the ability to purchase additional available water from SCVWD during non-dry years when water is available.

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** illustrates the groundwater basin in relationship to the City's groundwater wells. **Table 6-3** shows historic metered groundwater pumping data for the City from 2011 to 2015.

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

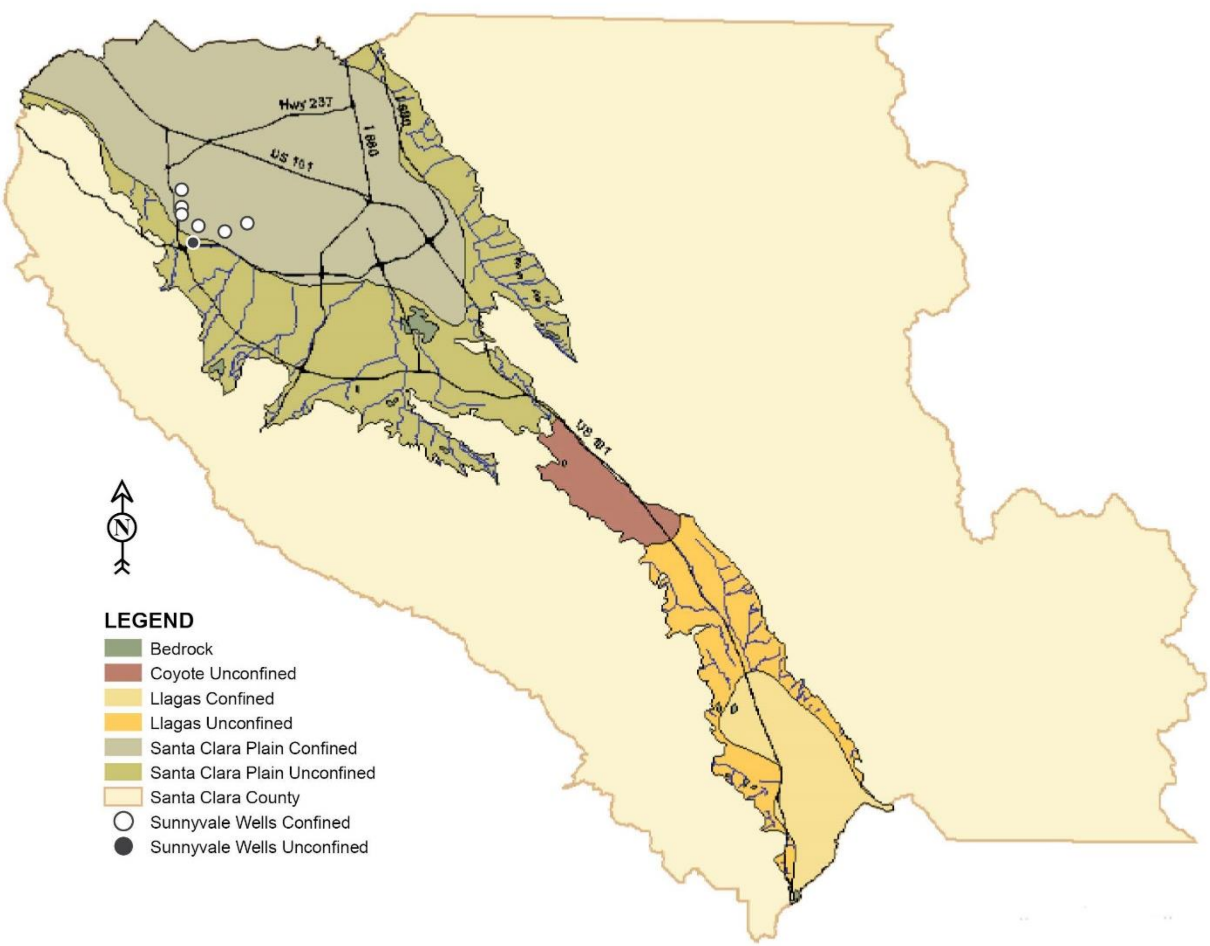


Table 6-3: Groundwater – Volume Pumped (AFY)

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 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: 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 presents the amount of wastewater treated and discharge and the amount of recycled water distributed

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** compares the actual 2010 uses of recycled water to the projected uses in the 2005 UWMP.

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

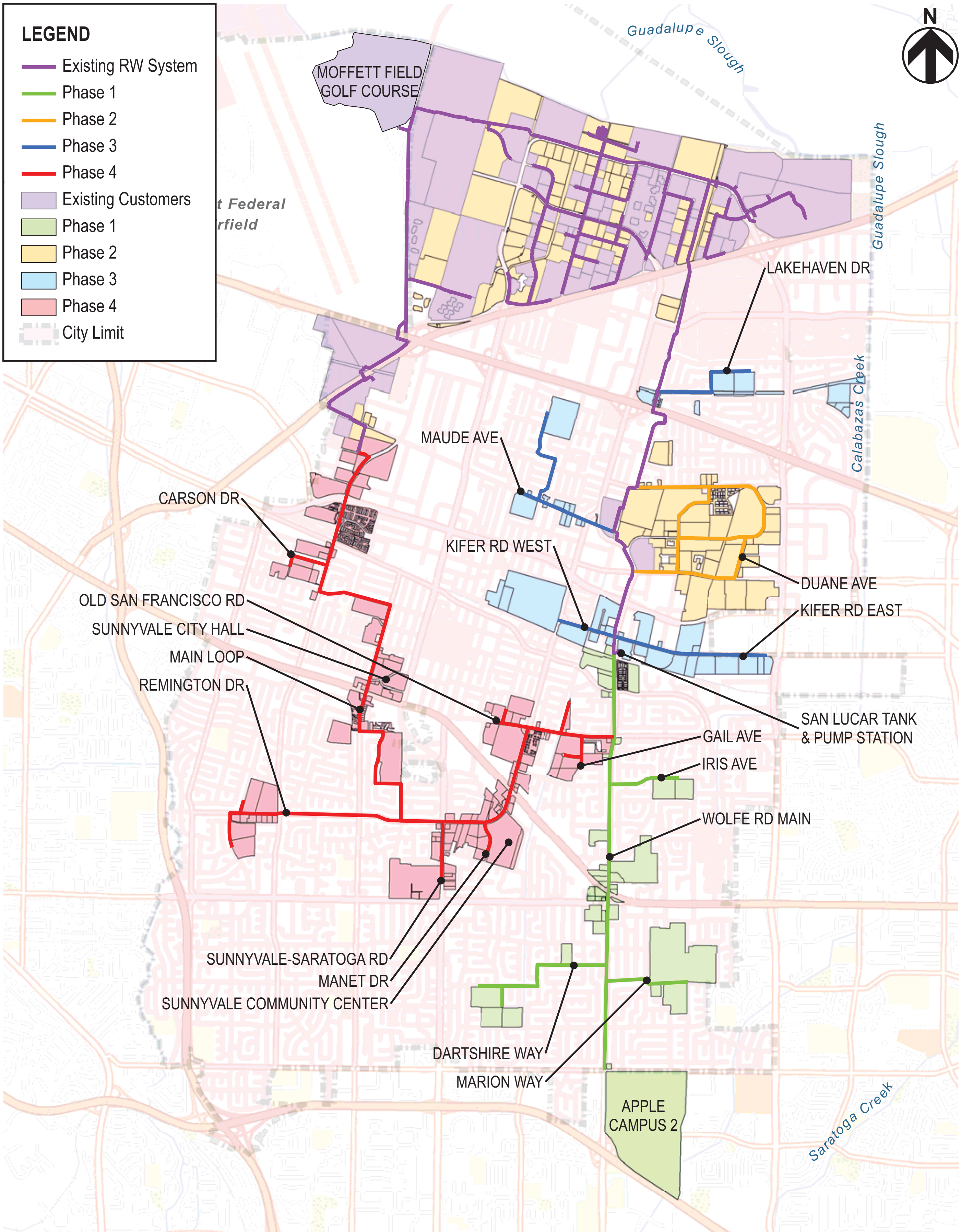
The use of recycled water provides for the following benefits:

- 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.



HydroScience

FIGURE 6-3
CITY OF SUNNYVALE
URBAN WATER MANAGEMENT PLAN
POTENTIAL RECYCLED WATER ALIGNMENTS

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** lists the potential future use of recycled water.

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**	**1,567**	**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 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.

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** 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.

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.
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.

Vulnerability Areas	General Overview of Vulnerabilities
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.
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 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.

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 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.

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 through **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.

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	9,812	9,812
SCVWD	10,642	10,200	10,200
Groundwater	448	2,521	2,838
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	9,812	9,812
SCVWD	11,202	10,200	10,200
Groundwater	336	3,904	4,016
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	9,812	9,812
SCVWD	11,762	10,200	10,200
Groundwater	336	4,522	4,693
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	9,812	9,812
SCVWD	12,614	10,200	10,200
Groundwater	336	5,227	5,249
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 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: 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** below.

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.

SCVWD plans to update its Water Supply and Infrastructure Master Plan (Water Master Plan) in 2017. As part of the planning process, SCVWD 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 SCVWD'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.

SCVWD's Regional Supply Reliability Plans

The Water Master Plan's "Ensure Sustainability" strategy includes securing existing supplies and infrastructure, optimizing the use of existing supplies and infrastructure, and expanding water recycling and long-term water conservation savings. As part of this strategy, the Water Master Plan estimates that water conservation and recycling, combined, will increase from about 15 percent of the county's water supply mix to about 26 percent. Developing these local, drought-proof sources and managing demands reduces reliance on imported water supplies.

SCVWD is working with seven water agencies in the Bay Area (Alameda County Water District, BAWSCA, Contra Costa Water District, East Bay Municipal Utility District, Marin Municipal Water District, SFPUC and Zone 7 Water Agency) to investigate opportunities for regional collaboration. The purpose of this planning effort, known as Bay Area Regional Reliability (BARR), is to identify projects and processes to enhance water supply reliability across the region, leverage existing infrastructure investments, facilitate water transfers during critical shortages, and improve climate change resiliency. Projects to be considered will include interagency interties and pipelines; treatment plant improvements and expansion; groundwater management and recharge; potable reuse; desalination; and water transfers. While no specific capacity or supply has been identified, this program may result in the addition of future supplies that would benefit Santa Clara County.

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.

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** breaks down that allocation share.

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: 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, and scheduled to be amended in June 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 June 30, 2016.

The following **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.

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 to15%	Stage 1 exists when City Council declares a water shortage exists due to supply conditions and calls for up to 15% water reduction.
2	up to 30%	Stage 2 exists when City Council declares a water shortage emergency exists due to water supply conditions and calls for up to 30% water reduction.
3	up to 45%	Stage 3 exists when City Council declares that a water shortage emergency exists due to water supply conditions and calls for up to 45% water reduction.
4	Greater than 45%	Stage 4 exists when City Council declares that a water shortage emergency exists and demands water reduction greater than 45% in response to existing water conditions.

8.3.1 Prohibitions, Penalties, and Consumption Reduction Methods

Table 8-4 details the use restrictions for each stage of reduction declared by the City. 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 45% reduction case.

Table 8-5 outlines the penalties and charges associated with water use violations.

Table 8-4: Water Shortage Contingency – Actions/Prohibitions

Stage No.	Action/Prohibition
Stage 0 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 driveways, sidewalks (except for health and safety). • 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. • Irrigation with potable water during and within 48 hours after measureable rainfall is prohibited. • Irrigation with potable water of ornamental turf on public street medians. • Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. • Use of decorative fountains[1] without recirculation
Stage 1 up to 15%	• All of the above • Low level informational outreach • Enforcement of permanent water use restriction Ordinance (Muni Code 12.34.020) • Hydrant flushing (unless for public health or safety)
Stage 2 up to 30%	• All of the above • Stepped up outreach effort • Irrigation of ornamental landscapes with potable water more than two days per week is prohibited.
Stage 3 up to 45%	• All of the above • 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 45%	• 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.

Notes:
1. "Decorative fountains" are considered ornamental water features that are artificially supplied with water and include ponds, lakes, waterfalls, and fountains. These facilities are considered ornamental and not for recreation.

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

Stage No.	Description	Penalty/Charge
2	First Violation	$0 – written warning
2	Second Violation	$0 – written warning
2	Third Violation	$250
2	Fourth Violation	$500
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

8.4 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 8-6 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 8-6**; 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.

Table 8-6: 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 below lists current and planned program components implemented by the City for each measure and indicates who administers the program.

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

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 for consideration and adoption of the 2015 UWMP by the City Council took place on 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**.

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APPENDIX A

City of Sunnyvale

2015 Urban Water Management Plan

Postings and Notifications for UWMP Preparation

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PUBLIC NOTICE

URBAN WATER MANAGEMENT PLAN

The City of Sunnyvale is in the process of updating the 2010 Urban Water Management Plan (UWMP) for 2015. City Council will consider adoption of the 2015 UWMP at their regularly scheduled meeting on:

Tuesday, June 21, 2016, at 7p.m.
City Council Chambers – Sunnyvale City Hall
456 W. Olive Ave.

Beginning in Mid-May of 2016, copies of the draft 2015 UWMP will be available for review at the Sunnyvale Public Library, 665 W. Olive Ave., and at the One-Stop Permit Center in City Hall, 456 W. Olive Ave. A public outreach meeting will be held with members of City staff on Monday, May 23rd, from 6 p.m. to 7 p.m. in the Boardroom at the City's Community Center, 550 E. Remington Drive, to answer questions and gather ideas from residents and interested stakeholders regarding the contents of the final plan.

An electronic copy of the 2010 UWMP can be downloaded from the City's web site at *www.sunnyvale.ca.gov*.

To request a copy of the 2015 plan upon its completion, or if you have any questions or comments, please contact:

Brendan McCarthy
P.O. Box 3707
Sunnyvale, CA 94088-3707
(408) 730-7565, TDD (408) 730-7501
(408) 730-7697 (FAX)
bmccarthy@sunnyvale.ca.gov

Please note that parties requesting paper copies of the plan, above and beyond those copies already publicly available (see above), may incur associated printing costs.

Mansour Nasser P.E.
Water & Sewer Systems Division Manager

cc: City Council
Department Directors

First Name	Last Name	Title	Organization	Address	City	State	Zip
Robert	Shaver	General Manager	Alameda County Water District	43885 S. Grimmer Blvd	Fremont	CA	94538
Alex	Ameri	Director	City of Hayward Public Works	777 B Street	Hayward	CA	94541
Nina	Hawk	Director	City of Milpitas Public Works	1265 North Milpitas Boulevard	Milpitas	CA	95035
Alison	Turner	Sr. Engineer	City of Mountain View	500 Castro Street, 1st Floort	Mountain View	CA	94041
Valerie	Fong	Director of Utilities	City of Palo Alto	250 Hamilton Avenue	Palo Alto	CA	94301
Christopher	de Groot	Director of Water & Sewer Utilit	City of Santa Clara	1500 Warburton Avenue	Santa Clara	CA	95050
Tom	Zigterman	Director, Water Resources	Stanford University Utilities Services	506 Oak Road	Stanford	CA	94305-8000
Patrick D.	Walter	General Manager	Purissma Hills Water District	26375 Fremont Road	Los Altos Hills	CA	94022
Tammy	Rudock	General Manager	Mid-Peninsula Water District	3 Dairy Lane	Belmont	CA	94002
Cari	Lemke	General Manager	North Coast County Water District	P.O. Box 1039	Pacifica	CA	94044
Daryl	Barrow	General Manager	Westborough Water District	2263 Westborough Boulevard	S. San Francisco	CA	94080
Ron	Richardson	District Manager	California Water Service Company	P.O. Box 940001	San Jose	CA	95194
John	Roeder	Chairman & CEO	Great Oaks Water Company	20 Great Oaks Blvd, Suite 120	San Jose	CA	95119
Andrew	Gere	Chief Operating Officer	San Jose Water Company	110 W. Taylor Street	San Jose	CA	95110
Randy	Breault	Director	City of Brisbane Public Works	50 Park Place	Brisbane	CA	94005
Syed	Murtuza	Director	Burlingame Pubilc Works	501 Primrose Road	Burlingame	CA	94010
Patrick	Sweetland	Director of Water/Wastewater	City of Daly City	153 Lake Merced Blvd.	Daly City	CA	94015
Jeff	Provenzano	Deputy Director	City of San Jose Environmental Services	200 E. Santa Clara St.	San Jose	CA	95113
Richard	Smelser	City Engineer	City of Gilroy	7351 Rosana Street	Gilroy	CA	95020
Anthony	Eulo	Program Administrator	City of Morgan Hill Environmental Services	100 Edes Court	Morgan Hill	CA	95037
Michael	Rhoades	Clean Water Program Manager	Santa Clara County	1553 Berger Drive, Bldg #1, 2nd Floor	San Jose	CA	95112
Joanna	de Sa	Deputy Director Environmental	San Jose/Santa Clara Regional Wastewater Facility	700 Los Esteros Road	San Jose	CA	95134
Paul	Willis	Director	Town of Hillsborough Public Works	1600 Floribunda Ave	Hillsborough	CA	94010
Sally	Salman	Sr. Engineer	Menlo Park Municipal Water District	701 Laurel Street	Menlo Park	CA	94025
Chip	Taylor	Director of Public Works	City of Milbrae	621 Magnolia Avenue	Milbrae	CA	94030
Ramana	Chinnakōtla	Director of Public Works	City of Redwood City	P.O. Box 391	Redwood City	CA	94063
Eunejune	Kim	Deputy Public Works Director	City of San Bruno	567 El Camino Real	San Bruno	CA	94066
David	Dicksen	General Manager	Coastside County Water District	766 Main Street	Half Moon Bay	CA	94019
Jeff	Moneda	Public Works Director	City of Foster City	610 Foster City Blvd	Foster City	CA	94044
Jim	Fiedler	COO, Water Utility Enterprise	Santa Clara Valley Water District	5750 Almaden Expressway	San Jose	CA	95118-3686
Kamal	Fallaha	Public Works Director	City of East Palo Alto	1960 Tate Street	East Palo Alto	CA	94303
Nicole	Sandkulla	General Manager	Bay Area Water Supply and Conservation Agency	155 Bovet Road, Suite 650	San Mateo	CA	94402
Harlan	Kelly	General Manager	San Francisco Public Utilities Commission	525 Golden Gate Avenue	San Francisco	CA	94102

January 4, 2016

Subject: Notice of Preparation of 2015 Urban Water Management Plan

Dear Stakeholder:

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We will make proposed revisions to our Plan available for public review and will hold a public hearing later this year. In the meantime, if you have any questions about our Plan, or the process for updating it, please contact:

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bmccarthy@sunnyvale.ca.gov

Sincerely,

M. Nasser

Mansour Nasser
Water & Sewer Division Manager

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The Urban Water Management Plan Act requires the City of Sunnyvale to update its Urban Water Management Plan by July 1, 2016. We are reviewing our current Plan, which was last updated in 2011, and will be considering revisions to it. We invite your agency's participation in this process.

We will make proposed revisions to our Plan available for public review and will hold a public hearing later this year. In the meantime, if you have any questions about our Plan, or the process for updating it, please contact:

Brendan McCarthy
P.O. Box 3707
Sunnyvale, CA 94088-3707
(408) 730-7565, TDD (408) 730-7501
(408) 736-1611 (FAX)
bmccarthy@sunnyvale.ca.gov

Sincerely,

M. Nasser

Mansour Nasser
Water & Sewer Division Manager

CITY OF SUNNYVALE
CALIFORNIA

January 4, 2016

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For deaf access, call TDD/TTY (408) 730-7501

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APPENDIX B

City of Sunnyvale

2015 Urban Water Management Plan

City of Sunnyvale Detailed Demographic Data

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COMMUNITY FACT SHEET
FOR
SUNNYVALE
SANTA CLARA COUNTY, CALIFORNIA

JUNE 2015

COMMUNITY

Average Temperature (January)	58 degrees
Average Temperature (July)	78 degrees
Average Yearly Rainfall (2014)	11.85 inches
Average Household Size	2.6
Median Single-Family Detached Home Price	$1,218,500
Median Single-Family Attached Home Price (townhouse or condo)	$ 793,300
Average Rental Price (3 bedrooms)	$3,370
Number of golf courses	2
Number of parks	17
Number of tennis courts	51
Number of elementary schools*	14
Number of junior high schools*	4
Number of high schools*	6
Number of private schools	11

*Serving Sunnyvale

BUSINESS AND ECONOMICS

Median Household Income (2011 American Community Survey)	$100,043
Total Number of Businesses**	9,554
Employment Generated by Sunnyvale Businesses**	96,774
Unemployment Rate	3.4%

**Inside City Limits-Business License Database

PEOPLE

Total Population	148,028
Public School Enrollment K-12	14,721
Private School Enrollment K-12	4,118
Median Age	35.6

RACE (2008-2012 American Community Survey 5-Year Estimates-Census)		
Race	**Sunnyvale**	**Santa Clara County**
White	45.7%	49.7%
Black/African American	2%	2.6%
American Indian/Alaska Native	.2%	.5%
Asian	41.8%	32.6%
Hispanic or Latino	18.1%	26.8%
Native Hawaiian/other Pacific Islander	.09%	.3%
Two or more races	3.1%	4.6%

Note: Total does not equal 100% due to more than one race listed under “Hispanic or Latino”.

EDUCATIONAL ATTAINMENT 2011 Census American Community Survey		
	Sunnyvale	**Santa Clara County**
% High School Graduate or higher	91.6%	86.3%
% Bachelor Degree or higher	58.9%	45.3%

Prepared by the
CITY OF SUNNYVALE
www.Sunnyvale.ca.gov

The information contained in this profile was obtained from a variety of sources including the 2010 Census, 2011 and 2013 American Community Survey, the California Employment Development Department, and the City of Sunnyvale. For more detailed information about sources, please contact:

Economic Development: (408) 730-7607
e-mail: econdev@sunnyvale.ca.gov
www.Sunnyvale-Econdev.com

Planning Division: (408) 730-7440
e-mail: planning@sunnyvale.ca.gov

BUSINESS ECONOMIC FACT SHEET
FOR
SUNNYVALE
CALIFORNIA

JUNE 2015

COMMUNITY

HOUSEHOLDS

Population (2015)	148,028
Median Household Income (2014)	$100,043

ECONOMIC BASE (2014)

Issuer Credit Rating	AAA
Property Tax Revenue (in millions)	$50.3
Sales Tax Collected (in millions)	$30.2
Transient Occupancy Tax (in millions)	$10.9

BUSINESS & ECONOMICS

BUSINESS

Total Number of Businesses*	9,554
Employment Generated by Sunnyvale Businesses*	96,774
Business Tax – Minimum	$34.13
Business Tax – Maximum	$10,811

*City of Sunnyvale Business License Database-May 2015 (inside City limits)

EMPLOYMENT BY INDUSTRY – TOP FIVE (PERCENTAGE)

Professional, Scientific and Management, and Administrative and Waste Management Services	25.6%
Manufacturing	22%
Educational Services, Health Care and Social Assistance	14.6%
Retail Trade	9.2%
Recreation/Hospitality	5.6%

Note: Based on 2010 Census American Community Survey

LARGEST EMPLOYERS IN SUNNYVALE (May 2015 – City Business License Database)	
Lockheed Martin Space Systems	Juniper Networks (Headquarters)
Apple, Inc.	HP
Yahoo! Inc. (Headquarters)	A2Z Development Center, Inc. – Lab 126
Google	Intuitive Surgical, Inc. (Headquarters)
Network Appliance, Inc. (Headquarters)	Northrop Grumman Marine

RENTAL LOCATIONS/TYPES	AVERAGE ASKING RATES ($/SF/MONTH)	AVERAGE VACANCY RATES
R&D	$2.28	7%
Industrial	$1.39	4.7%
Warehouse	$1.03	8.4%
Office	$4.61	5.2%

*Rental rates and vacancy information updated 1st Quarter 2015. Information collected by Newmark Grubb Knight Frank – www.newmarkccarey.com; DTZ Cassidy Turley – http://dtz.cassidyturley.com/ and Colliers International – www.colliers.com. If you have any questions, please contact Economic Development at econdev@sunnyvale.ca.gov or (408) 730-7607.

LABOR MARKET (EDD Labor Market Information May 2015)		
	Sunnyvale	**Santa Clara County**
Labor Force	85,500	1,022,400
Unemployment Rate	3.4%	3.8%

PEOPLE

SOCIAL CHARACTERISTICS (2010 Census)		
	Sunnyvale	**Santa Clara County**
Foreign Born Population	43.9%	37%
Naturalized Citizen	39.7%	51.7%
Not a Citizen	60.3%	48.3%

LANGUAGE SPOKEN IN HOUSEHOLD (2010 Census)	
English	47.1%
Spanish	13.7%
Other Indo-European language	11.3%
Asian/Pacific Islander language	26.6%
Other language	1.4%

EDUCATIONAL ATTAINMENT (2010 Census)		
	Sunnyvale	**Santa Clara County**
Population 25 years and older	97,740	1,197,185
Less than High School Diploma	4%	7.3%
% High School Graduate or higher	90.9%	86.3%
% Bachelor Degree or higher	56.1%	45.3%

RACE (2009-2013 American Community Survey 5-Year Estimates-Census)		
Race	**Sunnyvale**	**Santa Clara County**
White	45.7%	49.7%
Black/African American	2%	2.6%
American Indian/Alaska Native	.2%	.5%
Asian	41.8%	32.6%
Hispanic or Latino	18.1%	26.8%
Native Hawaiian/other Pacific Islander	.09%	.3%
Two or more races	3.1%	4.6%

Note: Total does not equal 100% due to more than one race listed under “Hispanic or Latino”.

Part I Crimes 2014	
Violent Crime Total	2,871
Average Emergency Police Response Time	4.40 minutes

Part 1 crimes are listed by the FBI as:

Hierarchy Rule

There is a significance to the order in which the Part I offenses are presented, with criminal homicide being the highest in the hierarchy and arson being the lowest. The Part I offenses are as follows:

1. Criminal Homicide
2. Forcible Rape
3. Robbery (armed)
4. Aggravated Assault
5. Burglary
6. Larceny-theft (except motor vehicle theft)
7. Motor Vehicle Theft
8. Arson

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APPENDIX C

City of Sunnyvale

2015 Urban Water Management Plan

Projected Demands Provided to Wholesale Agencies

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Projection By Source

	2015	2020	2025	2030	2035	2040
SFPUC (mgd)	7.93	9.93	10.95	10.95	10.95	10.95
AF	8,883	11,124	12,266	12,266	12,266	12,266
Wells (mgd)	0.12	0.40	0.30	0.30	0.30	0.30
AF	134	448	336	336	336	336
Recycled Water(mgd)	0.64	1.30	1.40	1.50	1.50	1.50
AF	717	1,456	1,568	1,680	1,680	1,680
SCVWD (mgd)	5.80	9.50	10.00	10.50	11.26	11.36
AF	6,497	10,642	11,202	11,762	12,614	12,726
Conservation (mgd)	5.48	0.75	0.96	1.00	1.03	1.05
AF	6,139	840	1,075	1,120	1,154	1,176
Total (mgd)	**19.97**	**21.88**	**23.61**	**24.25**	**25.04**	**25.16**
AF	**22,371**	**24,510**	**26,448**	**27,165**	**28,050**	**28,185**

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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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CHAPTER 7

ENVIRONMENTAL MANAGEMENT

The Environmental Management chapter contains information on the following topics:

- **Water Supply** — information on various sources of potable and nonpotable water, and policies to ensure adequate supplies, water conservation efforts and water quality.
- **Wastewater Collection and Treatment** — information on the wastewater collection system and the Water Pollution Control Plant and policies for future treatment issues.
- **Urban Runoff** — Information on sources of urban runoff and treatment methods, as well as policies to minimize quantity of urban runoff and improve quality.
- **Air Quality** — information on sources air pollution and policies for addressing this pollution through transportation and land use.
- **Solid Waste** — information on collection, recycling programs and disposal and policies to reduce future waste and increase recycling efforts.

WATER SUPPLY

GOAL EM-1
ADEQUATE WATER SUPPLIES

ACQUIRE AND MANAGE WATER SUPPLIES SO THAT EXISTING AND FUTURE REASONABLE DEMANDS FOR WATER, AS PROJECTED IN THE 20-YEAR FORECAST, ARE RELIABLY MET. *(Previously Water Resources Goal A / Adopted in 2008)*

The City has several sources of potable water to meet expected water demand. These include local groundwater wells, imported supplies from the San Francisco Public Utilities Commission (SFPUC) and Santa Clara Valley Water District (SCVWD), plus interagency connections with other local water suppliers for emergencies. Temporary interruptions of water supply from one source can be readily offset by increasing supply from the other available sources.

In order to further manage supplies, the City uses recycled water for nonpotable use and water conservation efforts. Future challenges will include the possible expansion of the recycled water system and new capital projects to address the aging water infrastructure.

During the last 10 years, on average, SFPUC and SCVWD have together supplied approximately 90 percent of the total potable water used in the City. Of the remaining 10 percent, about six percent of the potable water demand has been supplied by seven City-owned and operated wells. To offset potable water demand for landscape irrigation and other non-potable uses, the remaining four percent has been supplied by recycled water produced by the Sunnyvale Water Pollution Control Plant (WPCP).

Figure 7-1:
Water System Facilities Map

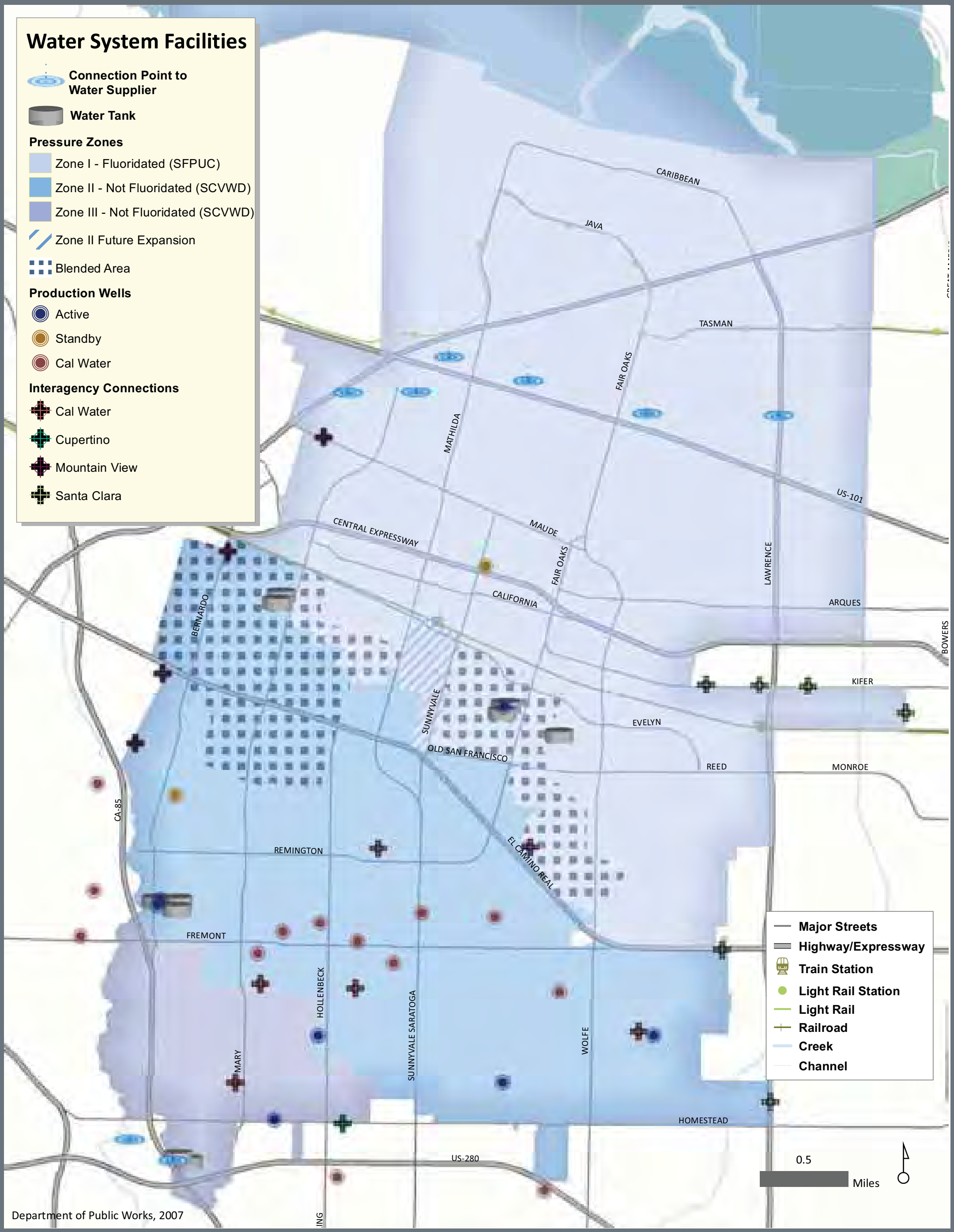
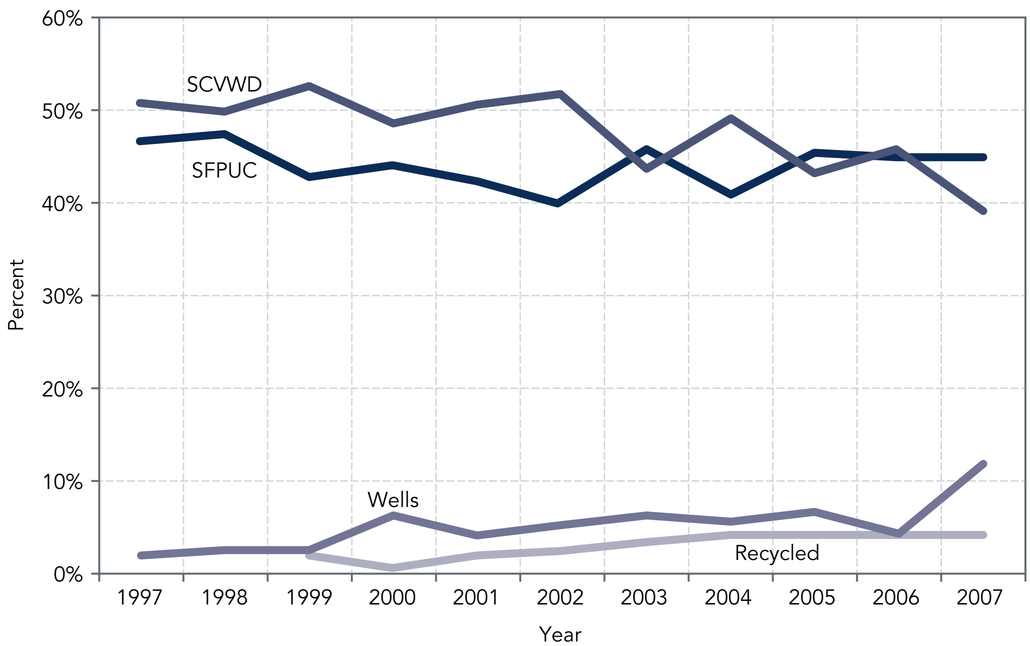


Figure 7-2: Historical Percentage of Annual Water Deliveries by Source



Source: Department of Public Works, 2007

San Francisco Public Utilities Commission (SFPUC)

SFPUC uses the Hetch-Hetchy Reservoir outside of Yosemite Valley as its primary water source. Maximum and minimum usages of water are stipulated in the City's current individual contract with SFPUC. If the overall usage by all suburban retail customers exceeds the maximum available level, the maximum amount of water available to Sunnyvale would be reduced based on the master agreement that covers both the City and other SFPUC wholesale customers. The City would then rely on one of its other water supply sources (Santa Clara Valley Water, City Wells, Recycled Water) to meet the demand.

Under the current contract and barring catastrophic events, the SFPUC believes it can meet the demands of its retail and wholesale customers in years of average and above-average precipitation.

Santa Clara Valley Water District (SCVWD)

The current contract calls for Sunnyvale to submit proposed water delivery schedules to SCVWD for three-year periods, indicating amounts of treated water desired by the City during each of the three years. SCVWD can make reductions to the water requested by Sunnyvale consistent with its ability to deliver water to all its customers.

To maintain water supply reliability and flexibility, SCVWD's water supply is from a variety of sources including local groundwater, imported water, local surface water, and recycled water. The District has a program to optimize the use of groundwater and surface water and prevent groundwater overdraft and land subsidence.

City Wells

Sunnyvale has seven operating wells that are kept in full production capacity and one well maintained in stand-by mode for emergencies. The seven operating wells are used as a supplemental source to the imported SFPUC and SCVWD water supplies. Well water is an important component of the City's water shortage contingency plan, as indicated in the Urban Water Management Plan (UWMP).

Subsidence: Subsidence is the motion of a surface (usually, the Earth's surface) as it shifts downward relative to a fixed point such as sea-level. The opposite of subsidence is uplift, which results in an increase in elevation. Subsidence can occur when too much groundwater is pumped out, causing the land above to sink.

SCVWD, charged with alleviating land surface subsidence and monitoring of groundwater levels and withdrawal rates, has authority over the amount of water that can be extracted from local wells. The allowable withdrawal of groundwater by Sunnyvale depends on a number of factors, including withdrawals by other water agencies, quantity of water recharged and carryover storage from the previous year.

Cal Water provides service from its own wells and facilities to about a dozen service area pockets in Sunnyvale many of which are connected with the City's system.

Recycled Water

The Water Pollution Control Plant (WPCP) produces approximately 13 million gallons per day (mgd) of high-quality advanced secondary-treated wastewater. A portion of this water is further treated to "disinfected tertiary" recycled water standards, and can be used for approved non-potable purposes, such as landscape irrigation, industrial cooling towers and construction. Recycled water is a reliable, drought-resistant, City-controlled supply that helps conserve and augment the potable water supply *(See Figure 7-3, Existing Recycled Water Facilities)*.

See **GOAL EM-7 (Effective Wastewater Treatment)** for discussion and policies relating to the Water Pollution Control Plant and its production of recycled water.

Recycled water is currently delivered to primarily irrigation customers. Most recycled water usage occurs between April and October, with usage demand peaking during the months of July and August.

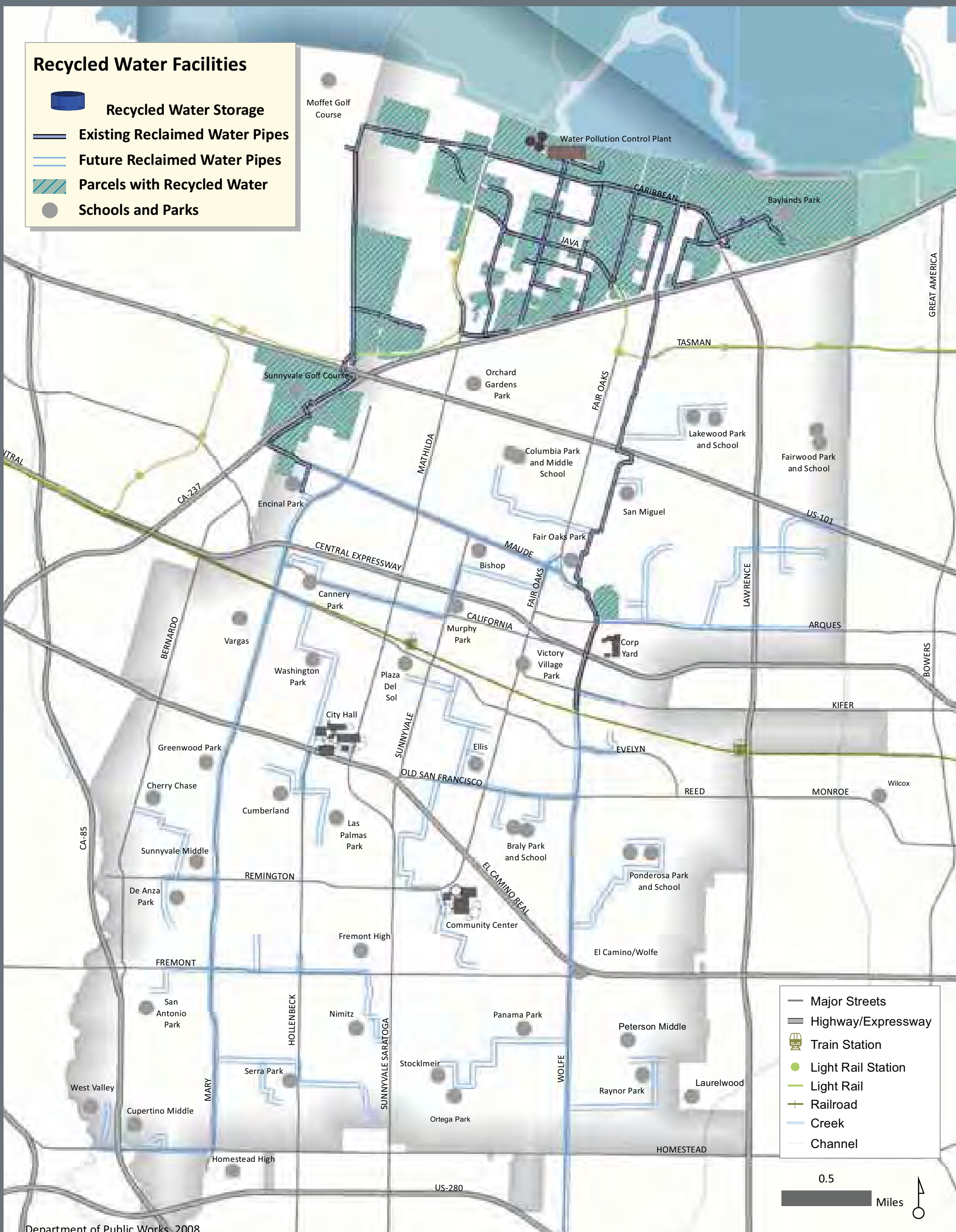
The WPCP can normally meet all recycled water demand, although seasonal changes in the WPCP's oxidation ponds occasionally make it difficult to meet the more stringent water quality requirements for disinfected tertiary recycled water versus discharge to the Bay. Modest increases in demand can be accommodated by the existing production and delivery systems.

Future Water Supply Issues

According to the annually-updated 20-year water forecast, the City has adequate supply commitments and facilities to reliably meet the projected water needs of its residents and businesses for the foreseeable future.

Innovative demand-side influence programs can help balance future supply versus demand. Techniques such as water banking, water transfers, plumbing retrofits, landscaping with low-water using plants, rate structures encouraging conservation, and other more restrictive demand side management options could be put into effect if needed. These measures, together with increased use of recycled water for non-potable purposes, appear adequate to ensure sufficient water supply to meet the foreseeable needs of the future.

Figure 7-3: Recycled Water System Map



The City will also continue to address the following:

- Replacement and repair of City water supply infrastructure and City wells.
- Coordination with SFPUC and SCVWD to ensure their infrastructure is repaired and maintained adequately.
- Planning for the possibility of an earthquake and its effect on the levees and the water system.
- Temporary loss of water supplies from SCVWD, which could be replaced in the short term by a combination of increased production from City wells and an increase in SFPUC supply.
- Increased storage and system capacity for recycled water supply to facilitate significant increases in recycled water production. The WPCP's Strategic Implementation Plan (SIP) will include an evaluation of recycled water production in the context of the overall future needs of the plant.

See **GOAL SN-1 (Acceptable Levels of Risk for Natural and Human-Caused Hazards)** for discussion and policies relating to earthquake hazards and mitigation.

POLICY EM-1.1 MANAGE WATER SUPPLY TO MEET DEMANDS FOR POTABLE WATER THROUGH THE EFFECTIVE USE OF WATER SUPPLY AGREEMENTS. *(Previously Water Resources Policy A.1.)*

- EM-1.1a Investigate possibilities to increase well water sources within the City. (Previously Water Resources Action Statement A.1c)

POLICY EM-1.2 MAXIMIZE RECYCLED WATER USE FOR ALL APPROVED PURPOSES BOTH WITHIN AND IN AREAS ADJACENT TO THE CITY, WHERE FEASIBLE. *(Previously Water Resources Policy A.2.)*

- EM-1.2a Update the 2000 Recycled Water Master Plan to provide a current roadmap for potential expansions to the City's recycled water system. *(Previously Water Resources Action Statement A.2f)*
- EM-1.2b Pursue opportunities for external funding for existing and future recycled water projects by supporting the efforts of regional water quality and recycling organizations such as BARWRP as they seek and apply for funding for expansion and continued support of recycled water and water quality in the region. *(Previously Water Resources Action Statement A.2h)*

See **GOAL EM-7 (Effective Wastewater Treatment)** for policies relating to the production of recycled water.

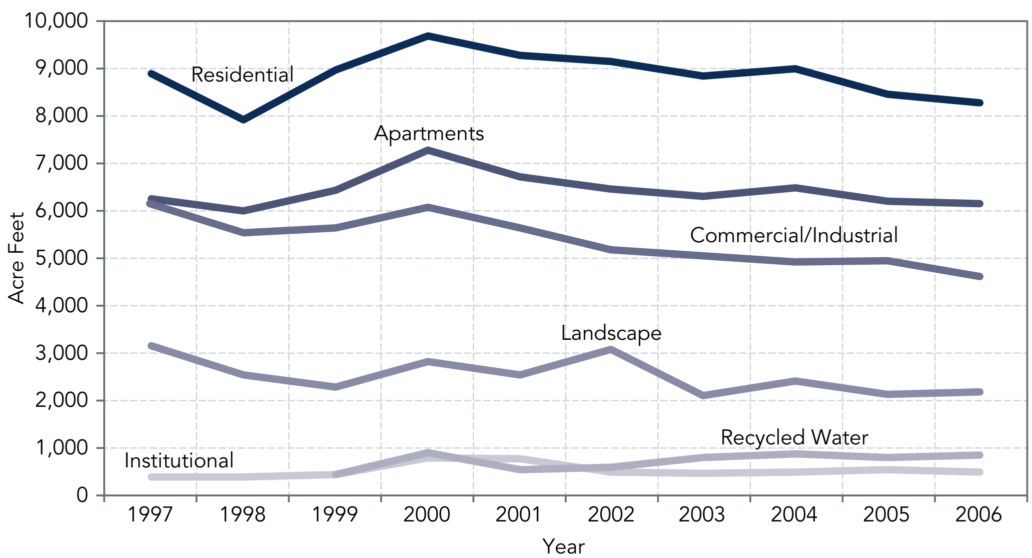
POLICY EM-1.3 PROVIDE ENOUGH REDUNDANCY IN THE WATER SUPPLY SYSTEM SO THAT MINIMUM POTABLE WATER DEMAND AND FIRE SUPPRESSION REQUIREMENTS CAN BE MET UNDER BOTH NORMAL AND EMERGENCY CIRCUMSTANCES. *(Previously Water Resources Policy A.3)*

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. *(Previously Water Resources Goal B / Adopted in 2008)*

The City currently provides water in six broad categories: multi-family residential, single-family residential, institutional, landscape, commercial/industrial (incorporating all non-residential accounts not classified as landscape) and users of recycled water (Figure 7-3).

Figure 7-4: Annual Water Consumption by Use Category



Source: Department of Public Works, 2007

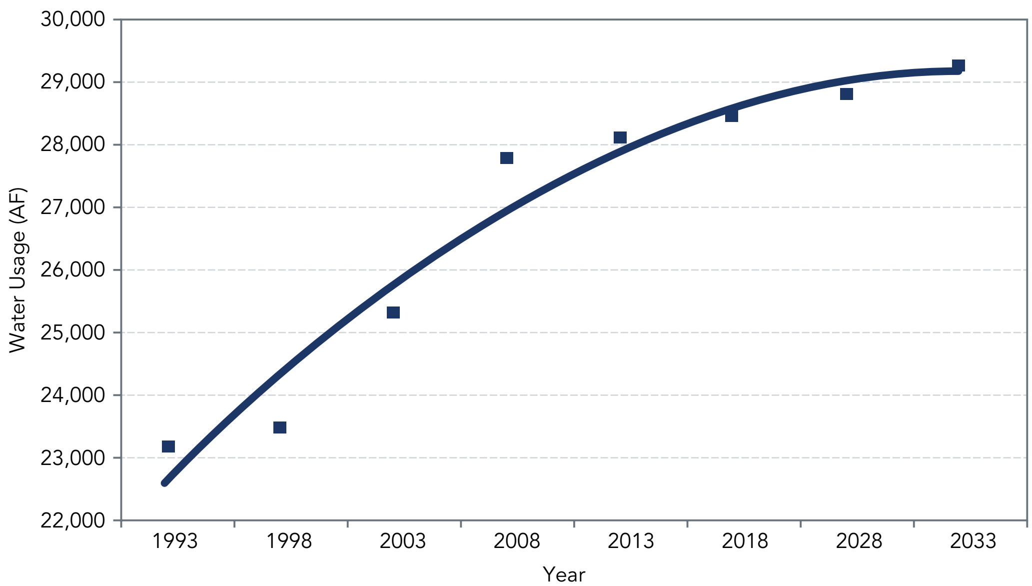
From 1987 to 1992, California experienced a prolonged drought, with severe water shortages and water rationing in Santa Clara County. Through the cooperative efforts of water retailers and their customers, Santa Clara County endured the drought with minimal economic and aesthetic impacts. Between 1984 and 1993, the City experienced a decrease in water consumption, primarily due to water conservation in the residential, commercial, and industrial sectors. Some of the demand management practices that were used to maximize the availability of water supply during the drought, such as

The Sunnyvale 2005 Urban Water Management Plan is available at *GeneralPlan.inSunnyvale.com*

inverted rates and water Best Management Practices, continue to this day. On-going water conservation efforts were able to reduce potable water consumption from 161 gallons per capita per day in 2000 to 139 gallons per capita per day in 2006, a 13.6 percent reduction for residential customers. Demand in the commercial/industrial sector remained flat with a slight decline in 2006.

Water use varies depending on weather, seasonal climatic patterns, business conditions and the economy. Long-term trends in water requirements are valuable in projecting future supply needs. Figure 7-5 illustrates past, current and projected total water usage through 2030. Additional details on the current and planned water supplies to meet these demands are provided in the Sunnyvale Urban Water Management Plan.

Figure 7-5: Historic and Projected Water Demand



Source: Department of Public Works, 2007

The City uses a variety of demand management measures to assist in meeting this projected demand. Many of the Demand Management Measures (DMMs) offered by Sunnyvale are actually programs run by or coordinated through Santa Clara Valley Water District (SCVWD). The programs have been either funded through the wholesale water rates paid by Sunnyvale, or directly reimbursed by the City. The DMMs implemented by the City, water usage restrictions during normal and drought years and other details can be found in the Urban Water Management Plan.

See **Goal EM-1 (Adequate Water Supplies***)* and Goal EM-7 (Effective Wastewater Treatment) for more information about the City's recycled water system.

Conservation measures include the following:

- Inclining block tier rate structure that penalizes excessive water consumption
- Conservation efforts consistent with industry Best Management Practices (BMPs)
- Recycled water program to replace the use of potable water for non-potable uses where possible.

The City also has a drought response based on the Sunnyvale Water Conservation Plan. This plan, adopted in 1977 and updated in 1989, includes mandatory and voluntary water use restrictions associated with different levels of reduction, rate block adjustments for each level, and approaches for enforcement.

The City will continue to plan and coordinate its water needs with regional and local wholesalers and retailers for best management of available water supplies. By 2030 the City expects to save almost 800 acre feet of water per year through conservation measures.

Additional information on water conservation measures and programs can be found in on the SCVWD website. The SFPUC also has corresponding plans for the City and County of San Francisco.

POLICY EM-2.1 LOWER OVERALL WATER DEMAND THROUGH THE EFFECTIVE USE OF WATER CONSERVATION PROGRAMS IN THE RESIDENTIAL, COMMERCIAL, INDUSTRIAL AND LANDSCAPING ARENAS. *(Previously Water Resources Policy B.1)*

One acre foot of water = 325,851 gallons. 800 acre feet of water = approximately 260 million gallons of water.

GOAL EM-3
RELIABLE AND SAFE WATER DISTRIBUTION

PROACTIVELY MAINTAIN THE WATER DISTRIBUTION SYSTEM INFRASTRUCTURE TO ENSURE THE RELIABLE AND SAFE DELIVERY OF WATER UNDER NORMAL AND EMERGENCY CONDITIONS TO BOTH CURRENT AND FUTURE CUSTOMERS. *(Previously Water Resources Goal C / Adopted in 2008)*

The City owns, operates, and maintains a water supply and distribution system that includes connections with City suppliers and neighboring water utilities. Although not obvious, ground elevations in Sunnyvale vary from sea level at the north end of the City to 300 feet above sea level at the southwest corner. Because of this elevation difference, the water system is broken up into a series of three pressure zones (Figure 7-1, Water System Facilities).

Within the City's service area, some pocketed areas adjacent to Fremont Avenue and Sunnyvale-Saratoga Road receive water from Cal Water. These areas were formerly part of the county, but have been annexed by Sunnyvale. Cal Water produces water from its own wells, which meets all federal and state quality requirements. The City has provided six emergency connections to Cal Water service areas to improve fire flows and reliability, and all fire hydrants have been replaced to conform to City standards.

Perhaps the largest water system issue for the City is the need for significant and on-going investment in improvements to the water system infrastructure. A significant portion of the City's investment in water system infrastructure is represented by the transmission and distribution pipelines. Approximately 80 percent of the 330 miles of transmission and distribution pipelines and related facilities were constructed in the 1960s and are potentially approaching the end of their estimated 50 year service life. While actual service life varies depending on site specific factors, utility services provided today are "using up" infrastructure resources which must be replaced to serve future customers.

POLICY EM-3.1 MAINTAIN A PREVENTIVE MAINTENANCE PROGRAM THAT PROVIDES FOR RELIABILITY OF POTABLE AND RECYCLED WATER SYSTEMS. *(Previously Water Resources Policy C.1)*

POLICY EM-3.2 MAINTAIN A PROACTIVE LONG RANGE INFRASTRUCTURE PLAN THAT IDENTIFIES SCHEDULES AND FUNDS AND IMPLEMENTS NEEDED SYSTEM UPGRADES AND REPLACEMENTS BEFORE FACILITIES EXCEED THEIR EFFECTIVE USEFUL LIVES. *(Previously Water Resources Policy C.2)*

POLICY EM-3.3 MAINTAIN AN UP-TO-DATE EMERGENCY WATER OPERATIONS PLAN. *(Previously Water Resources Policy C.3)*

GOAL EM-4
ADEQUATE WATER QUALITY

ENSURE THAT ALL WATER MEETS STATE AND FEDERAL STANDARDS FOR AESTHETICS, QUALITY AND HEALTH. *(Previously Water Resources Goal D/ Adopted In 2008)*

The principal law governing drinking water safety in the United Stated is the Safe Drinking Water Act (SDWA). Enacted in 1974, the SDWA requires the Environmental Protection Agency (EPA) to establish comprehensive national drinking water regulations and to set enforceable standards for health-related drinking water contaminants.

Water delivered in the City originates from different sources and is therefore subject to different water quality conditions. Waters from different sources blend within the distribution system, depending on the daily demand, seasonal quality and relative quantity fluctuations, and temporary interruptions due to maintenance activities, resulting in water quality variances. In all cases the City's water quality meets or exceeds all federal and state requirements.

The City conducts an extensive water quality monitoring program in compliance with all applicable state and federal requirements. Over 2,000 samples are collected each year from the distribution system, imported sources, wells in operation, storage tanks, and/or household taps, depending on the constituent of interest. Samples are analyzed by either the City's state-certified laboratory or an outside state-certified laboratory. The City has been in consistent compliance with the requirements of its water quality monitoring program since it was instituted in 1988.

The California Department of Public Health (CDPH) requires the City to distribute to all customers an Annual Water Quality Report. This report provides information on contaminants that may be present in the three source waters and in the distribution system. Testing has consistently shown that the water provided by the City meets established water quality standards.

The SFPUC completed construction of its new, system-wide fluoridation facility in 2005. Beginning in November 2005, all water delivered from the SFPUC was fluoridated. SCVWD does not currently fluoridate its water, though it is currently studying the feasibility of doing so. The City does not fluoridate its well water. As a result, some areas of Sunnyvale receive fluoridated water (the northern part of the City approximately north of El Camino Real), other areas receive non-fluoridated water (southern portion), and some areas receive a mixture. City staff manages the water system to provide consistent concentrations of fluoride by keeping the SFPUC and SCVWD service areas separated as much a possible.

The SDWA regulations have continued to evolve as more monitoring data have been collected by water systems, monitoring and detection capabilities have improved, and new constituents of concern have been identified. City staff continues to closely track new and proposed regulations and update monitoring and analyses accordingly.

POLICY EM-4.1 MAINTAIN AND UPDATE A COMPREHENSIVE WATER QUALITY-MONITORING PROGRAM THAT MEETS OR EXCEEDS ALL STATE AND FEDERAL REQUIREMENTS, WHILE ALSO MEETING SPECIFIC CITY AND RESIDENTS' NEEDS. *(Previously Water Resources Policy D.1)*

POLICY EM-4.2 MAINTAIN AN AGGRESSIVE INSPECTION AND PREVENTIVE MAINTENANCE PROGRAM THAT ENSURES THAT BACKFLOW FROM POTENTIALLY CONTAMINATED WATER SERVICES IS PREVENTED. *(Previously Water Resources Policy D.2)*

- EM-4.2a Investigate the potential for the City owning all backflow devices, thereby ensuring their proper function and maintenance. *(Previously Water Resources Action Statement D.2d)*

POLICY EM-4.3 PROVIDE APPROPRIATE SECURITY AND PROTECTION OF WATER FACILITIES. *(Previously Water Resources Policy D.3)*

POLICY EM-4.4 MAINTAIN AND UPDATE AN ACTION PLAN THAT RESPONDS TO AND PROTECTS WATER SUPPLIES FROM CONTAMINATION. *(Previously Water Resources Policy D.4)*

WASTEWATER COLLECTION AND TREATMENT

GOAL EM-5
MINIMAL POLLUTION AND QUANTITY OF WASTEWATER

ENSURE THAT THE QUANTITY AND COMPOSITION OF WASTEWATER GENERATED IN THE CITY DOES NOT EXCEED THE CAPABILITIES OF THE WASTEWATER COLLECTION SYSTEM OR AND THE WATER POLLUTION CONTROL PLANT. *(Previously Wastewater Goal 3.3.A / Adopted in 2001)*

GOAL EM-6
EFFECTIVE WASTEWATER COLLECTION SYSTEM

CONTINUE TO OPERATE AND MAINTAIN THE WASTEWATER COLLECTION SYSTEM SO THAT ALL SEWAGE AND INDUSTRIAL WASTES GENERATED WITHIN THE CITY ARE COLLECTED AND CONVEYED UNDER SAFE AND SANITARY CONDITIONS TO THE WATER POLLUTION CONTROL PLANT. *(Previously Wastewater Goal 3.3B / Adopted in 2001)*

GOAL EM-7
EFFECTIVE WASTEWATER TREATMENT

CONTINUE TO OPERATE AND MAINTAIN THE WATER POLLUTION CONTROL PLANT, USING COST EFFECTIVE METHODS, SO THAT ALL SEWAGE AND INDUSTRIAL WASTES GENERATED WITHIN THE CITY RECEIVE SUFFICIENT TREATMENT TO MEET THE EFFLUENT DISCHARGE AND RECEIVING WATER STANDARDS OF REGULATORY AGENCIES. *(Previously Wastewater Goal 3.3C / Adopted in 2001)*

The wastewater from homes and businesses (toilet, shower, kitchen sink, etc.) is carried by sanitary sewer lines to the Sunnyvale Water Pollution Control Plant (WPCP), where it is treated before being discharged to local waterways which flow into the San Francisco Bay. The amount and quality of this effluent is regulated by the San Francisco Bay Water

Quality Control Board. The Board's purpose is to protect beneficial uses of the San Francisco Bay in compliance with the California Water Code and federal Clean Water Act.

WATER COLLECTION SYSTEM

Sunnyvale's wastewater collection system has the capacity to convey all sewage and industrial wastes generated when the City is fully developed in accordance with the land use projections (approximately 55.7 million gallons per day). Five major trunk networks terminate at the Water Pollution Control Plant (WPCP), referred to as the Lawrence, Borregas, Lockheed, Moffett and Cannery trunks. Figure 7-7 is a map showing drainage area boundaries for the areas served by the five collection networks. Capacities of individual networks are:

Figure 7-6: Capacities of Individual Sewer Collection Areas

Collection Area	Capacity in Million Gallons per Day (MGD)
Lawrence	22.0
Borregas	17.0
Cannery	5.5
Lockheed	4.9
Moffett Field	6.3
TOTAL	**55.7**

Based on growth projections in 2001, it is not anticipated that flows will exceed the capacity of the overall collection system. Specific locations within the collection system may require additional capacity in the future.

As sanitary sewers become older, gaps from cracks, joints, aging gaskets and leaking services tend to allow some groundwater or rainwater to enter the system. This process is called infiltration. A certain amount of rainwater may also find its way into the wastewater system as inflow. Inflow can result from direct connections of storm drains or downspouts to the wastewater system, either in the right-of-way or on private property. Components of the system itself, such as piping, manholes, pumps, etc., will also require replacement as they exhaust their life expectancy.

Infiltration and inflow can interfere with the needed capacity of sanitary sewers and the WPCP. Though virtually impossible to eliminate altogether, maintenance crews use closed circuit video inspection to monitor for bad joints and/or broken pipes which allow infiltration. Private industry is also inspected for illegal storm drain cross-connections to ensure that the quantity of rainfall that flows to the WPCP is kept under control. If infiltration and inflow are allowed to continue unmitigated, additional wastewater flows could overwhelm treatment plant capacity and result in increased treatment costs.

City crews maintain the operation of the sewer main lines by regular flushing and performing repairs to the system. Areas of known-grease or dirt accumulation are flushed on an enhanced cleaning schedule. Depending upon the degree of build-up, the frequency may vary from several weeks to several months.

WATER POLLUTION CONTROL PLANT

The WPCP provides treatment of wastewater from residential, commercial, and industrial sources from the City of Sunnyvale, the Rancho Rinconada portion of Cupertino, and Moffett Federal Airfield. The WPCP is designed to treat an average of 29.5 million gallons of wastewater per day and a peak flow of 40 million gallons per day. From 2004 to 2007, the average dry weather effluent flow was 14.2 MGD, well within the plant capacity.

See *wpcp.insunnyvale.com* for more information on the NPDES Permit and related programs and regulations.

The WPCP is designed to combine physical, chemical, and natural biological processes to treat wastewater This unique combination allows the WPCP to consistently produce a high-quality effluent from which more than 85 percent of the pollutants have been removed from the influent. This wastewater treatment process provides both secondary and advanced treatment to produces a high quality effluent, suitable for discharge into San Francisco Bay under a National Pollutant Discharge Elimination System (NPDES) permit and for recycling for irrigation and other uses.

Wastewater is treated at three distinct levels: primary, secondary, and tertiary.

- **Primary Treatment** — The first stage in the treatment process to remove solids.
- **Secondary Treatment** — The second stage in the treatment process where oxygen is added to help remove remaining solids and bionutrients.
- **Tertiary Treatment** — The third stage in the treatment process to remove ammonia, algae, and bacteria.

Potable water is fit for consumption by humans and other animals. Non-potable water is all other water.

Recycled water is tertiary treated wastewater diverted from discharge and treated for reuse in industrial processes, landscape irrigation, and other non-potable uses. It is used by businesses and the City of Sunnyvale for landscape and golf course irrigation, and decorative ponds. By reusing water in this way, valuable potable (drinking) water is conserved. The rest of the tertiary effluent is discharged into the Guadalupe Slough, which flows to the Bay.

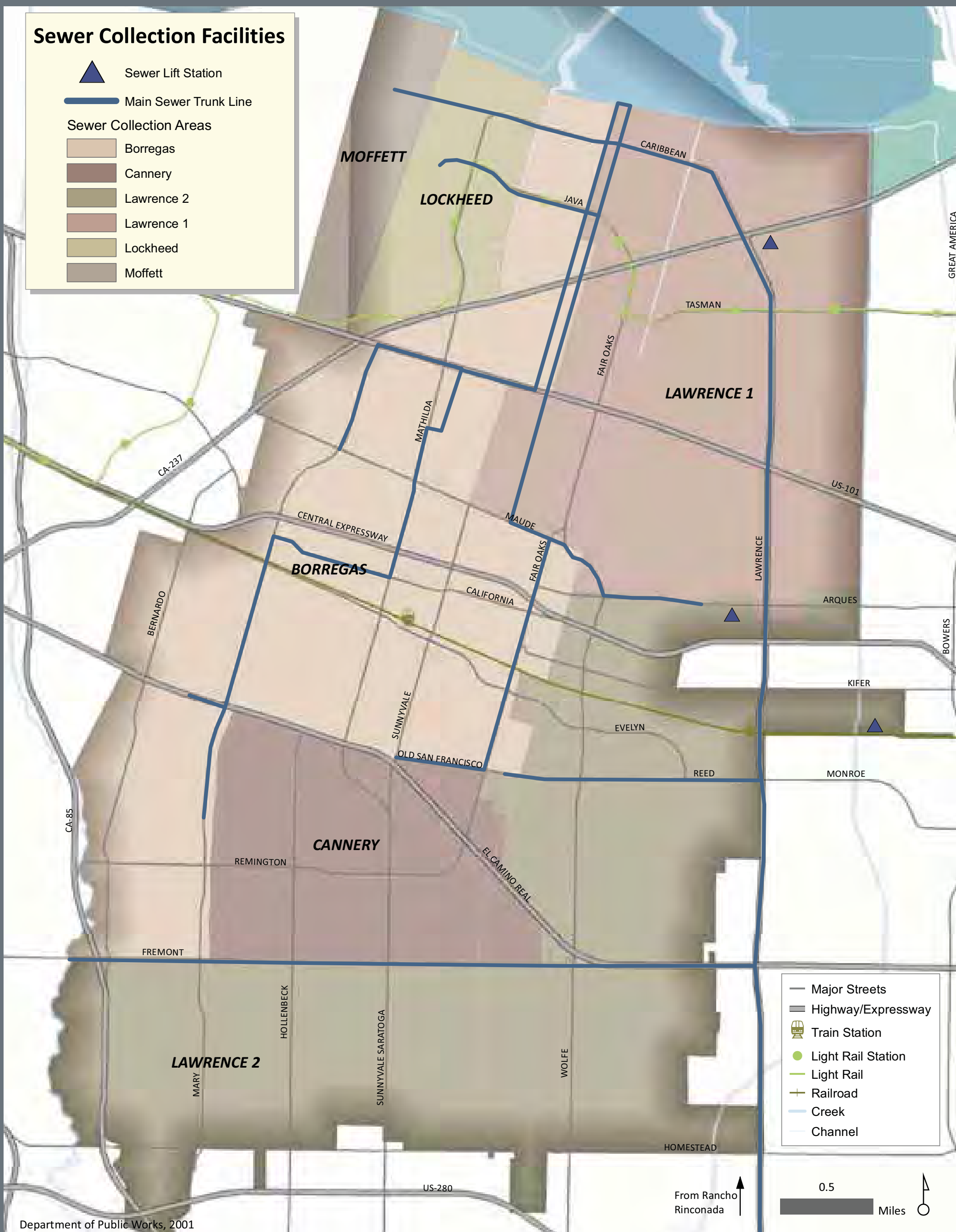
See **Goal EM-1 (Adequate Water Supplies)** for discussion, policies, and a map of the recycled water system.

In 2011, about 10 percent of the daily flow is diverted for reuse. The City of Sunnyvale water recycling program provides a sustainable and drought-resistant supply of water to portions of the City for non-potable uses.

Wastewater Pre-Treatment Program

The Pretreatment Program includes Industrial Waste Inspectors, Laboratory Chemists and Field Technicians, whose primary goal is the protection of the treatment plant and sanitary sewer collection system from industrial waste. By regulating the disposal of industrial wastewater into the sanitary sewer, the Pretreatment Program seeks to prevent the introduction of pollutants that could interfere with the operation of the

Figure 7-7: Sewer Collection Area Maps



Plant, cause damage to the sewer system, compromise public health or worker safety, or pass through the Plant to the Bay.

See *wpcp.inSunnyvale.com* for annual water quality reports and information.

Industrial and commercial facilities are regulated through discharge permits, Best Management Practices (BMPs), and routine inspection and monitoring. Discharge Permits contain specific requirements and limits for the concentration of pollutants in wastewater discharges. On average, the Pretreatment Program has 70 active industrial wastewater discharge permits issued to Significant Industrial Users (SIUs). Additionally, hundreds of commercial facilities are regulated through the application of BMPs tailored to specific activities commonly found in commercial businesses. When implemented, the BMPs reduce or eliminate the introduction of pollutants into the sanitary sewer.

Regulatory Compliance Activities

The WPCP operates under the requirements set for by the Global Warming Solutions Act of 2006, Assembly Bill 32 or AB 32. AB 32 is a California State Law that fights climate change by establishing a comprehensive program to reduce greenhouse gas emissions from all sources throughout the state. AB 32 requires the California Air Resources Board (CARB) to develop regulations and market mechanisms to reduce California's greenhouse gas emissions to 1990 levels by 2020, representing a 25 percent reduction statewide, with mandatory caps beginning in 2012 for significant emissions sources. For the Plant, it sets in motion a series of mandatory reporting, and equipment maintenance requirements that are additional to the "normal" function of maintaining plant effluent compliance.

Future Water Pollution Control Plant Improvements

Plant capacity appears sufficient based on use in 2001 and the updated projections. The Environmental Protection Agency requires that when flows reach 75 percent of design capacity, agencies begin to evaluate future needs and develop plans for expansion, if appropriate. Based on 2001 figures, it is not anticipated that this milestone will be reached in Sunnyvale and it will not be necessary to evaluate ways to provide additional capacity at the WPCP during the next five to ten years. Projections indicate that flows may not continue to increase significantly between 2001 and 2020. This overall projection is attributed to changes in land use, changes in water consumption patterns, and the overall reduced rate of growth.

Portions of the WPCP were first constructed in 1954 and are now nearly 50 years old. In addition, the nature of wastewater treatment itself presents an adverse environment for facilities and equipment. In order to maintain this infrastructure and ensure the ongoing ability to meet effluent and recycled water quality requirements, it is necessary to have in place a strategy for the ongoing refurbishment and replacement of components of the plant.

An asset condition assessment conducted in 2005 identified several critical plant structures as at-risk, and in need of rehabilitation soon. In 2007, a Capital Project Strategic Infrastructure Plan (SIP) was put in place to set future direction of plant process enhancements and physical improvements. Following completion of this effort, SIP implementation is expected to continue for ten to fifteen years for construction of new and/or rehabilitated plant facilities.

Policies supporting Goal EM-5 (Minimal Pollution and Quantity of Wastewater):

POLICY EM-5.1 WATER POLLUTION CONTROL PLANT IMPROVEMENTS SHOULD BE DESIGNED, CONSTRUCTED AND MAINTAINED AND THE QUANTITY OF INDUSTRIAL WASTES SHOULD BE CONTROLLED SO THAT THE PLANT DOES NOT HAVE TO BE EXPANDED IN EXCESS OF ITS CAPACITY OF 29.5 MGD. *(Previously Wastewater Policy 3.3A.1)*

POLICY EM-5.2 ENSURE THAT WASTES DISCHARGED TO THE WASTEWATER COLLECTION SYSTEM CAN BE TREATED BY EXISTING TREATMENT PROCESSES OF THE WATER POLLUTION CONTROL PLANT. *(Previously Wastewater Policy 3.3A.2)*

Policy supporting Goal EM-6 (Effective Wastewater Collection System):

POLICY EM-6.1 INSPECT CRITICAL POINTS IN THE WASTEWATER MANAGEMENT SYSTEM ANNUALLY TO ENSURE THAT THE PROPER LEVEL OF MAINTENANCE IS BEING PROVIDED AND THAT THE FLOW IN SEWERS DOES NOT EXCEED DESIGN CAPACITY. *(Previously Wastewater Management Policy 3.3B.1)*

Policy supporting Goal EM-7 (Effective Wastewater Treatment):

POLICY EM-7.1 MONITOR WATER POLLUTION CONTROL PLANT OPERATIONS AND MAINTENANCE TO MEET REGULATORY STANDARDS. *(Previously Wastewater Management Policy 3.3C.1)*

POLICY EM-7.2 COORDINATE OPERATING PROCEDURES WITH THE CITY ENERGY POLICY TO OPTIMIZE AN ALTERNATIVE ENERGY PROGRAM SO THAT MINIMUM USE AND RELIANCE ARE PLACED ON OUTSIDE ENERGY SOURCES. *(Previously Wastewater Management Policy 3.3C.2)*

POLICY EM-7.3 ACTIVELY PARTICIPATE IN THE WATERSHED MANAGEMENT APPROACH TO SOLVING WATER QUALITY ISSUES OF THE SANTA CLARA BASIN WATERSHED AND THE SOUTH BAY. *(Previously Wastewater Management Policy 3.3C.3)*

POLICY EM-7.4 PRODUCE QUALITY RECYCLED WATER AND SEEK TO MAXIMIZE THE USE OF THIS RESOURCE. *(Previously Wastewater Management Policy 3.3C.4)*

- EM-7.4a Study feasibility of recycled water for restoration and/or enhancement of marshlands.

URBAN RUNOFF

GOAL EM-8
PROTECTION OF CREEKS AND BAY

ASSURE THE REASONABLE PROTECTION OF BENEFICIAL USES OF CREEKS AND SAN FRANCISCO BAY, ESTABLISHED IN THE REGIONAL BOARD'S BASIN PLAN, AND PROTECT ENVIRONMENTALLY SENSITIVE AREAS. *(Previously Surface Runoff Goal A / Adopted in1993)*

GOAL EM-9
ADEQUATE STORM DRAIN SYSTEM

MAINTAIN STORM DRAIN SYSTEM TO PREVENT FLOODING. *(Previously Surface Runoff Goal B / Adopted in 1993)*

GOAL EM-10
REDUCED RUNOFF AND POLLUTANT DISCHARGE

MINIMIZE THE QUANTITY OF RUNOFF AND DISCHARGE OF POLLUTANTS TO THE MAXIMUM EXTENT PRACTICABLE BY INTEGRATING SURFACE RUNOFF CONTROLS INTO NEW DEVELOPMENT AND REDEVELOPMENT LAND USE DECISIONS. *(Previously Surface Runoff Goal D / Adopted in 1993)*

Urban runoff consists of stormwater runoff from rainfall as well as non-stormwater runoff from human activities (e.g. over-irrigation of landscapes, vehicle washing, discharges from pools, spas, or water features, etc.). Urban runoff is collected and transported through the city's storm drain system and ultimately discharged to local waterways. Managing urban runoff minimizes the discharge of pollutants to creeks, waterways, and San Francisco Bay, and prevents or minimizes flooding. The protection of local waterways preserves water quality and maintains the structural integrity of creeks, channels, and shoreline to prevent both potential flooding and the degradation of their natural form and function.

Urbanization increases impervious surfaces associated with development, which increases the amount of urban runoff. Runoff typically collects impurities while passing over rooftops, streets, parking lots, landscaping and gutters. Often this runoff is untreated and deposits impurities in the creeks and the San Francisco Bay after being conveyed through a storm drain system. This increased runoff results in increased erosion and sedimentation in creeks. Conveying runoff through a storm drain system also makes less water available to creeks and groundwater during dry weather.

There are two approaches to managing urban runoff. The first is the conveyance approach, which seeks to "get rid of the water." A conveyance stormwater system collects and concentrates runoff through a network of impervious gutters, drainage structures and underground pipes. Because the system collects water from impermeable surfaces and carries it through impervious pipes, suspended pollutants are concentrated in the rapidly flowing runoff. When the system reaches its outfall, large volumes of polluted water can be emptied, untreated, into a natural water body and the large volume can further erode our natural waterways.

The City, as part of the region, is transitioning from the conveyance approach to a newer infiltration approach often referred to as Low Impact Development (LID). This system seeks to "preserve and restore the hydrologic cycle." An infiltration stormwater system seeks to infiltrate runoff into the soil by allowing its to flow slowly over permeable surfaces. These permeable surfaces can double as recreational and landscape areas during dry weather. Because the infiltration network allows much of the runoff to return to the soil, overall runoff volume is reduced, and more water is available to replenish groundwater and maintain stream base flows. Storm drain systems are designed to transport urban runoff to the San Francisco Bay or nearby creeks or channels. Adequate storm drain systems help prevent or minimize property damage due to flooding. The

Impervious Surfaces: Constructed or modified surfaces that do not effectively allow infiltration of rainfall into the soil below. Impervious surfaces include, but are not limited to building rooftops, asphalt or concrete pavement, sidewalks, and driveways where such surfaces are not constructed with pervious materials. Pervious Surfaces: May include natural or designed landscapes or specially constructed paving materials (e.g. pervious paving) that allow stormwater to infiltrate into sub-surface soils.

City of Sunnyvale owns and operates approximately 150 miles of storm drains, with two pump stations that collect runoff from low-lying urban areas and discharge to creeks and sloughs which are at a higher elevation (see Figure 7-8: Storm Drain System).

To address both the quantity and quality of urban runoff, the City has undertaken a series of programs to both reduce and treat runoff. These programs and actions are collectively described as Urban Runoff Best Management Practices (BMPs). Urban Runoff BMPs are continually changing based on recent studies, practical experience and advancements in construction materials. These new practices include Low Impact Development, source control and pollution prevention. Low Impact Development includes methods to retain and treat runoff onsite through detention and landscape features. Source control measures typically include reducing the amount of impervious surface for new development or large remodeling/additions. Pollution prevention includes installing non-mechanical filters to lessen the volume of runoff, minimizing pesticides, covering areas such trash enclosures or loading docks and requiring drainage of dirty areas to sanitary sewer lines rather than storm drains. Public outreach and information is also an important part of reducing urban runoff.

See *dpw.inSunnyvale.com* for more information about Urban Runoff BMPs and City programs.

Regulations and Permit Requirements

There are a variety of laws and permit requirements regulating the quantity and quality of urban runoff regionally. These agencies include:

- **Federal** — The Federal Clean Water Act, as amended in 1987, requires the City to obtain NPDES permits for discharge of stormwater and develop stormwater management plans and "to reduce the discharge of pollutants to the maximum extent practicable." The San Francisco Bay Regional Water Quality Control Board (Regional Board or RWQCB) issues permits to meet requirements of the Federal Clean Water Act.
- **State** — The Clean Water Act and State of California legislation requires that the beneficial uses of water bodies be protected, and must meet standards set for water quality and to control sources of pollution.
- **City** — The City has an ordinance that addresses stormwater pollution prevention and provides appropriate adequate legal authority to implement provisions of its NPDES Stormwater Discharge Permit, which effectively implement controls on pollutants in urban runoff and meet permit requirements.

Maximum Extent Practicable: A standard for implementation of stormwater management programs under the Clean Water Act to reduce the level of the pollutants in stormwater runoff to the maximum extent possible, taking into account equitable considerations and competing facts including, but not limited to the seriousness of the problem, public health risks, environmental benefits, pollutant removal effectiveness, regulatory compliance, cost, and technical feasibility.

Collaboration with Regional Agencies

Water resource protection at the local and regional level is becoming more complex. A wide variety of regulatory agencies, diverse sources of nonpoint source pollution, and a multitude of stakeholders make it difficult to achieve a consistent, easily understandable strategy for watershed protection. The City continually works with a variety of agencies and stakeholders to facilitate watershed protection and urban runoff management.

The City is a member of the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), an association of 13 south bay cities, the SCVWD, and Santa Clara Country. All members of SCVURPPP have shared a common NPDES stormwater permit for their discharge into local creeks and South San Francisco Bay since 1990 and leverage resources to better facilitate each agency's compliance with the permit.

Through SCVURPPP, the City also participates in the Bay Area Stormwater Management Agencies Association (BASMAA), which was started by local governments to promote regional consistency and to facilitate the efficient use of public resources by sharing information. In addition, BASMAA provides a forum for representing and advocating the common interests of member programs at the regional and state level.

The City also participates in the California Stormwater Quality Association (CASQA), a quasi-governmental organization, which advises the State Water Resources Control Board on matters related to developing stormwater regulations. It assists municipalities and others in compliance with the municipal, construction and industrial NPDES stormwater mandates of the federal Clean Water Act.

Future Trends

Regulatory requirements from both state and federal agencies will continue and likely become more restrictive as each NPDES Permit is re-issued. The City will need to perform periodic updating of the goals and policies associated with urban runoff, the Urban Runoff Management Plan, and sections of the Sunnyvale Municipal Code to address these changes, update data and emerging trends, as well as measure success toward completing urban runoff goals. Annual reports will continue to be made to the Regional Board to demonstrate compliance with NPDES permit provisions and document the City's progress toward meeting the establish goals and policies through the implementation of action statements.

In addition, the storm drain systems will continue to be monitored and maintained to ensure the adequate collection and transfer of urban runoff.

Beneficial Uses: The uses of water of the State of California that are protected against degradation. Examples of beneficial uses include, but are not limited to: domestic, municipal, agricultural and industrial water supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation of fish and wildlife and other aquatic resources or preserves.

Figure 7-8: Storm Drain System

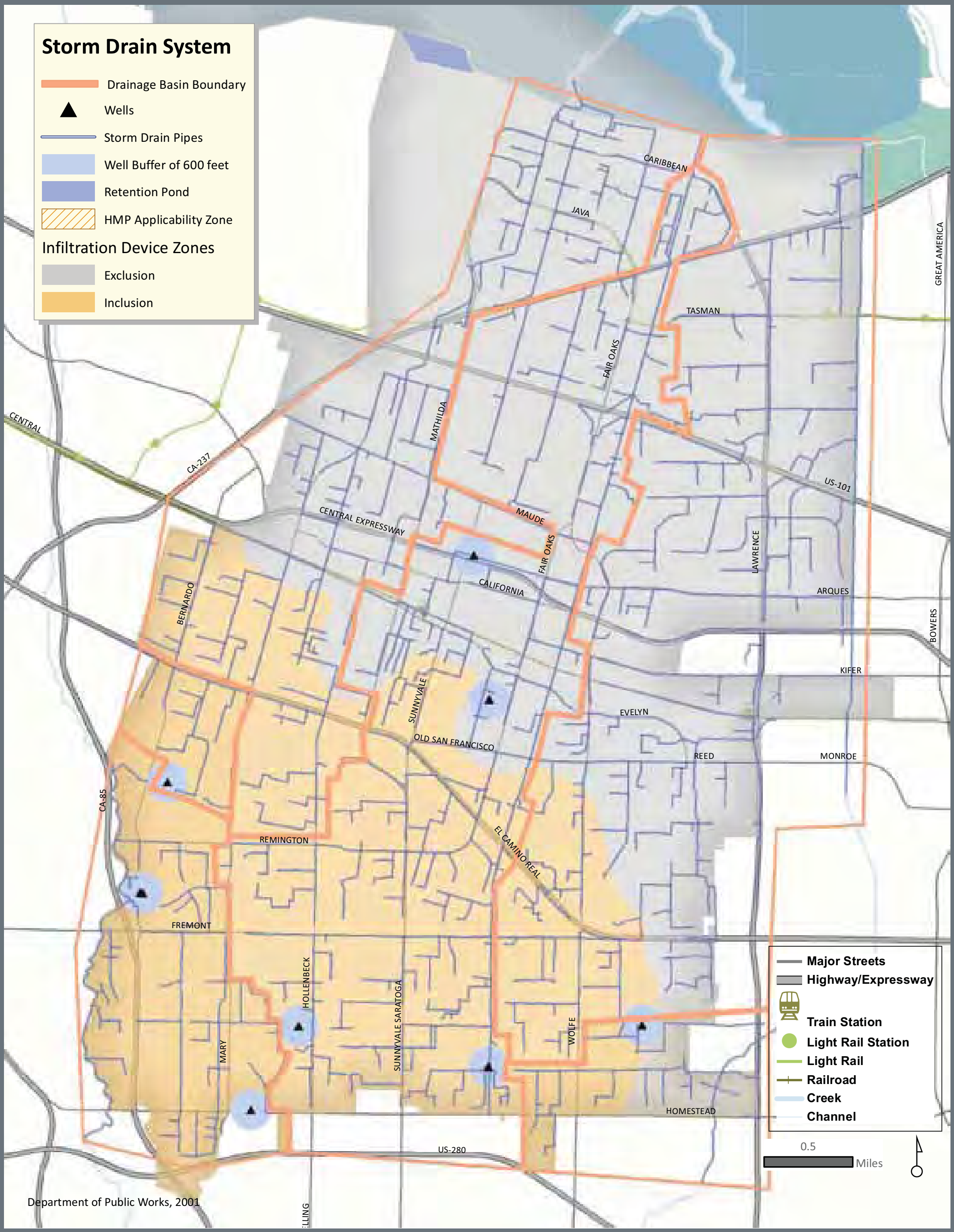


Figure 7-9: Where does it go?

Policies that support Goal EM-8 (Protection of Creeks and Bay):

POLICY EM-8.1 COMPLY WITH REGULATORY REQUIREMENTS AND PARTICIPATE IN PROCESSES WHICH MAY RESULT IN MODIFICATIONS TO REGULATORY REQUIREMENTS. *(Previously Surface Runoff Policy A.1)*

POLICY EM-8.2 CONTINUE TO SUPPORT THE IDENTIFICATION AND DEVELOPMENT OF APPROACHES TO STORMWATER TREATMENT AND BEST MANAGEMENT PRACTICES TO CONTROL SOURCES OF POLLUTANTS THROUGH PARTICIPATION IN LOCAL, REGIONAL, STATEWIDE AND NATIONAL ASSOCIATIONS AND AGENCIES (E.G. SANTA CLARA VALLEY URBAN RUNOFF POLLUTION PREVENTION PROGRAM (SCVRRP), BAY AREA STORMWATER MANAGEMENT AGENCIES ASSOCIATION, STORMWATER QUALITY ASSOCIATION, AND AMERICAN PUBLIC WORKS ASSOCIATION AND SIMILAR ORGANIZATIONS). *(Previously Surface Runoff Policy A.2)*

POLICY EM-8.3 ENSURE THAT STORMWATER CONTROL MEASURES AND BEST MANAGEMENT PRACTICES (BMPS) ARE IMPLEMENTED TO REDUCE THE DISCHARGE OF POLLUTANTS IN STORM WATER TO THE MAXIMUM EXTENT PRACTICABLE. *(Previously Surface Runoff Policy A.3)*

- EM-8.3a Modify Industrial Pretreatment permits to also require BMPs to control the discharge of pollutants to city-owned storm drains. *(Previously Surface Runoff Action Statement A.3b)*
- EM-8.3b Label approximately 1060 municipal storm drainage inlets a year until all inlets are labeled and maintain labels as necessary to educate the public on the fate of material discharged to storm drains. *(Previously Surface Runoff Action Statement A.3e)*

POLICY EM-8.4 EFFECTIVELY PROHIBIT ILLICIT DISCHARGES AND IMPROPER DISPOSAL OF WASTES INTO THE STORM DRAIN SYSTEM. *(Previously Surface Runoff Policy A.4)*

POLICY EM-8.5 PREVENT ACCELERATED SOIL EROSION. CONTINUE IMPLEMENTATION OF A CONSTRUCTION SITE INSPECTION AND CONTROL PROGRAM TO PREVENT DISCHARGES OF SEDIMENT FROM EROSION AND DISCHARGES OF OTHER POLLUTANTS FROM NEW AND REDEVELOPMENT PROJECTS. (PREVIOUSLY SURFACE RUNOFF POLICY A.5)

POLICY EM-8.6 (NEW) MINIMIZE THE IMPACTS FROM STORMWATER AND URBAN RUNOFF ON THE BIOLOGICAL INTEGRITY OF NATURAL DRAINAGE SYSTEMS AND WATER BODIES.

Policies that support Goal EM-9 (Adequate Storm Drain System):

POLICY EM-9.1 MAINTAIN AND OPERATE THE STORM DRAIN SYSTEM SO THAT STORM WATERS ARE DRAINED FROM 95 PERCENT OF THE STREETS WITHIN ONE HOUR AFTER A STORM STOPS. *(Previously Surface Runoff Policy B.1.)*

POLICY EM-9.2 RESPOND TO STORM DRAIN EMERGENCIES. *(Previously Surface Runoff Policy B.2)*

Policies that support Goal EM-10 (Reduced Runoff and Pollutant Discharge):

POLICY EM-10.1 CONSIDER THE IMPACTS OF SURFACE RUNOFF AS PART OF LAND USE AND DEVELOPMENT DECISIONS AND IMPLEMENT BMPS TO MINIMIZE THE TOTAL VOLUME AND RATE OF RUNOFF OF WASTE QUALITY AND QUANTITY (HYDRO MODIFICATION) OF SURFACE RUNOFF AS PART OF LAND USE AND DEVELOPMENT DECISIONS. *(Previously Surface Runoff Policy D.1)*

POLICY EM-10.2 CONSIDER THE ABILITY OF A LAND PARCEL TO DETAIN EXCESS STORM WATER RUNOFF IN FLOOD PRONE AREAS AND REQUIRE INCORPORATION OF APPROPRIATE CONTROLS. REQUIRE THE INCORPORATION OF APPROPRIATE STORMWATER TREATMENT AND CONTROL MEASURES FOR NEW AND REDEVELOPMENT REGULATED PROJECTS AND/OR ANY SITES THAT MAY REASONABLY BE CONSIDERED TO CAUSE OR CONTRIBUTE TO THE POLLUTION OF STORMWATER AND URBAN RUNOFF AS DEFINED IN THE CURRENT VERSION OF THE STORMWATER MUNICIPAL REGIONAL PERMIT. *(Previously Surface Runoff Policy D.2)*

POLICY EM-10.3 REQUIRE THE INCORPORATION OF APPROPRIATE STORMWATER TREATMENT AND CONTROL MEASURES FOR INDUSTRIAL AND COMMERCIAL FACILITIES AS IDENTIFIED IN THE STORMWATER MUNICIPAL REGIONAL PERMIT. *(New)*

POLICY EM-10.4 SUPPORT LEGISLATION AND REGULATIONS THAT WILL REDUCE OR ELIMINATE POLLUTANTS OF CONCERN AT THE SOURCE. *(New)*

POLICY EM-10.5 PROMOTE EDUCATION AND OUTREACH EFFORTS TO SCHOOLS, YOUTH, RESIDENTS, AND BUSINESSES REGARDING URBAN RUNOFF AND STORMWATER POLLUTION PREVENTION ACTIONS. *(New)*

AIR QUALITY

GOAL EM-11
IMPROVED AIR QUALITY

IMPROVE SUNNYVALE'S AIR QUALITY AND REDUCE THE EXPOSURE OF ITS CITIZENS TO AIR POLLUTANTS. *(Previously Air Quality Goal A / Adopted in 1993)*

All major urban areas in California, including Sunnyvale, experience some degree of reduced air quality. The combination of climatic conditions and a multitude of air pollutant sources (particularly the automobile) results in reduced air quality, which can be considered as reducing the quality of life by adversely affecting human health, causing damage to plants or crops, and other effects such as soiling, visibility reduction and accelerated corrosion of materials.

One of the major reasons that air quality continues to be a problem in the Bay Area specifically and California in general, is a relatively high rate of population and economic growth. The major obstacle to improved air quality in the future is increasing population and vehicle use and deteriorating operating conditions on highways and roads.

The major air quality problems in the Bay Area are ozone, carbon monoxide, and PM-10. Ozone and carbon monoxide are primarily released in the air from combustion sources such as automobiles and factories. PM-10 (otherwise known as suspended particulate matter) is a collection of particles of dust, soot, aerosols and other matter which are small enough to remain suspended in the air for a long period of time. Man-made sources of PM-10 include automobile exhausts and road travel, smoke, and factory emissions.

To combat this, the most efficient and cost-effective technological or "hardware" controls have already been implemented. Remaining technological controls, which are increasingly expensive, have been found to be unable to reduce emissions to the point where all air quality standards (glossary in the margin) would be met. Therefore, attention has been focused in recent years on the relationship of land use, community design and transportation as a means of reducing air pollutant generation. For further information on air quality measurements and modeling, see Appendix H, Air Quality Technical Report.

Cooperation with Regional Agencies

Past efforts by federal, state and local governments have resulted in steady, gradual improvement in air quality in Sunnyvale and the greater Bay Area. Sunnyvale is within the Bay Area Air Quality Management District (BAAQMD). The City of Sunnyvale has implemented a number of programs and projects that directly or indirectly reduce air pollutant emissions. Most of these programs are part of a larger regional effort to improve air quality. These projects include:

- Adding high occupancy vehicle (HOV) lanes to U.S. 101, S.R. 85, and S.R. 237. These improvements have expanded their capacity.
- Facilitating regional transportation such as the Tasman Light Rail extension, increases in Caltrain service, and a "Super Express" commuter bus service.
- Constructing high occupancy vehicle (HOV) lanes on Lawrence Expressway.

POLICY EM-11.1 THE CITY SHOULD ACTIVELY PARTICIPATE IN REGIONAL AIR QUALITY PLANNING. *(Previously Air Quality Policy C.1 also Air Quality Goal C)*

Land Use and Air Quality

Future development within Sunnyvale impacts regional air quality. Direct impacts are those related to emissions released on-site from stationary sources. Indirect impacts are related to vehicle trips attracted to or generated by residential, commercial or employment-generating land uses.

Stationary Sources — Industries are required to provide information to the public about emissions of toxic air contaminants (quick description in the margin) and their impact on public health. There are 71 sources of TACs within Sunnyvale. The majority of these sources are microelectronic industries, dry cleaners and auto repair businesses.

Future growth in Sunnyvale may include new stationary sources of pollutants. However, any new stationary sources would be subject to the "no net increase" requirements of the California Clean Air Act, which requires BAAQMD to develop a permitting system that provides new sources, can only be approved if there is an offsetting decrease in emissions elsewhere in the air basin. For any new businesses or facilities that could emit air pollutants, it is important to consider sensitive receptors. The siting of any new sensitive receptors also needs to consider any existing air pollutant sources nearby.

Indirect Sources— Indirect automobile emissions estimated with future buildout are shown to increase slightly in the next 10 years. Reducing emissions from these indirect sources is likely to be an important strategy in regional efforts to attain the state and federal ambient air quality standards in the Bay Area.

There are several methods in which land use regulations can be used to both reduce emissions and alleviate the impact on residents. By locating employment and retail service areas closer to residential areas, vehicle use can be reduced.

In 1993, the Sunnyvale Futures Study examined the effects of revising the General Plan to provide for an improved jobs/housing balance. The study considered potential residential designations of several sites previously designated with commercial and industrial uses and was approved by Council and created a series of Industrial-to-Residential (ITR sites.) Preliminary findings indicated that increased carbon monoxide concentrations will occur at certain intersections. However, predicted air quality would

The Bay Area Air Quality Management District (BAAQMD) is required to prepare and adopt a list of actions, improvements and programs that improve system-wide transportation level of service (LOS) and improve air quality. **See Goal LT-5 (Effective, Safe, Pleasant and Convenient Transportation)** for further discussion and policies on transportation improvements.

California Clean Air Act — A law setting forth a comprehensive program to ensure that all areas within the State of California will attain federal and state ambient air quality standards by the earliest practicable date. The law mandates comprehensive planning and implementation efforts, and empowers local air pollution control districts to adopt transportation control measures and indirect source control measures to achieve and maintain the ambient air quality standards.

fall within the standards. Improvements in the job/housing balance would provide more local housing options, reducing commute lengths and vehicle miles traveled.

Sensitive Receptors — Sensitive populations such as children, athletes, elderly and the sick that are more susceptible to the effects of air pollution than the population at large.

Major progress has been made in the 1980's and 1990's in reducing emissions from stationary sources and mobile sources in the Bay Area, with the result that steady improvement in air quality has been documented despite population growth. Under the California Clean Air Act and Amendments, the state Air Resources Board and BAAQMD will be adopting new and more stringent regulations on existing and future industrial sources, implementing more stringent emission standards for vehicles, developing and implementing transportation control measures (TCMs) to reduce vehicular emissions, and adding new sources to the list of controlled process (e.g. consumer products, fireplaces and wood stoves, etc.). These measures, if implemented expeditiously, should continue the overall improvement in air quality evident over the past 20 years.

See **Goal LT-1 (Coordinated Regional Planning)** and **LT-6 (Supportive Economic Development Environment)** for policies on mixed uses and locating housing closer to employment centers

POLICY EM-11.2 UTILIZE LAND USE STRATEGIES TO REDUCE AIR QUALITY IMPACT, INCLUDING OPPORTUNITIES FOR CITIZENS TO LIVE AND WORK IN CLOSE PROXIMITY. *(Previously Air Quality Policies B.1 and C.2)*

POLICY EM-11.3 REQUIRE ALL NEW DEVELOPMENT TO UTILIZE SITE PLANNING TO PROTECT CITIZENS FROM UNNECESSARY EXPOSURE TO AIR POLLUTANTS. *(Previously Air Quality Policy A.1)*

POLICY EM-11.4 APPLY THE INDIRECT SOURCE RULE TO NEW DEVELOPMENT WITH SIGNIFICANT AIR QUALITY IMPACTS. INDIRECT SOURCE REVIEW WOULD COVER COMMERCIAL AND RESIDENTIAL PROJECTS AS WELL AS OTHER LAND USES THAT PRODUCE OR ATTRACT MOTOR VEHICLE TRAFFIC. *(Previously Air Quality Policy B.3)*

Transportation Improvements and Air Quality

There are two main ways that transportation improvements can positively impact air quality. The first is to reduce congestion that causes increased vehicle emissions (stop-and-go). The second is to enhance and encourage alternative modes of transportation to reduce the total number of car trips. Sunnyvale has undertaken a variety of programs to improve air quality with regards to transportation.

Reduce Congestion

- Traffic signal improvement and synchronization
- Ten-year capital improvements plan
- Preferential parking for carpool vehicles
- Transportation demand management (TDM)

Alternative Transportation Modes

- Continue to require City sidewalks
- Develop requirements for bicycle facilities
- Bicycle and Pedestrian Advisory Committee (BPAC) to review and advise City Council on capital improvement projects involving bicycle and pedestrian facilities as well as educational programs.
- Electric City vehicles

POLICY EM-11.5 REDUCE AUTOMOBILE EMISSIONS THROUGH TRAFFIC AND TRANSPORTATION IMPROVEMENTS. *(Previously Air Quality Policy A.2)*

POLICY EM-11.6 CONTRIBUTE TO A REDUCTION IN REGIONAL VEHICLE MILES TRAVELED. *(Previously Air Quality Policy C.3)*

POLICY EM-11.7 REDUCE EMISSIONS FROM CITY OF SUNNYVALE FLEET VEHICLES. *(Previously Air Quality Policy C.4)*

POLICY EM-11.8 ASSIST EMPLOYERS IN MEETING REQUIREMENTS OF TRANSPORTATION DEMAND MANAGEMENT (TDM) PLANS FOR EXISTING AND FUTURE LARGE EMPLOYERS AND PARTICIPATE IN THE DEVELOPMENT OF TDM PLANS FOR EMPLOYMENT CENTERS IN SUNNYVALE. *(Previously Air Quality Policy B.2)*

See **Goal LT-5 (Effective, Safe, Pleasant and Convenient Transportation)** for policies on transportation improvements.

Transportation Demand Management (TDM) — Strategies that reduce travel demand such as telecommuting, teleshopping, flextime, carpooling, increased use of public transit, and other strategies to reduce the number of trips made in single-occupant vehicles.

SOLID WASTE

Collection Programs

GOAL EM-12
SAFE AND HEALTHY SOLID WASTE COLLECTION
ENSURE THAT MUNICIPAL SOLID WASTE IS COLLECTED AND TRANSPORTED IN A SAFE AND HEALTHY MANNER. *(Previously Solid Waste Goal 3.2A / Adopted in 1993)*

GOAL EM-13
CLEAN NEIGHBORHOODS
ENCOURAGE RESIDENTS TO MAINTAIN CLEAN NEIGHBORHOODS BY PREVENTING UNSIGHTLY ACCUMULATIONS OF DISCARDED MATERIALS AND ILLEGAL DUMPING OF MUNICIPAL SOLID WASTE. *(Previously Solid Waste Goal 3.2B / Adopted in 1996)*

Solid waste consists of virtually all of the materials discarded by residents and businesses in the course of daily life, business activities and manufacturing. It does not include hazardous wastes, radioactive wastes, medical waste, sewage or liquids. Because accumulations of solid waste can present public health problems, the Sunnyvale Municipal Code requires all occupied residence and business premises to subscribe to regular collection services. According to a 2010 study performed for the City by Cascadia Consulting Group, single-family residents generate approximately 34 percent of the solid waste collected, multi-family residents account for 22 percent, and the remaining 44 percent comes from businesses, government agencies, schools and other institutions and construction and demolition projects.

Collection of solid waste in Sunnyvale is performed by a private company under contract with the City. The contract takes the form of a franchise agreement that is "exclusive," that is, no other company is allowed to collect solid waste. Exclusivity minimizes the community and environmental impacts of refuse collection by limiting the number of trucks used for collection. It reduces pavement damage, noise and air pollution from heavy collection trucks compared to an open market approach where multiple companies may serve homes and businesses located near each other. The Sunnyvale franchise agreement also gives the City the ability to enforce community standards for service quality, collection hours, truck and container colors and cleanliness, graffiti removal, use of clean air fuels, etc.

The City periodically provides special disposal programs at discounted or no cost. These programs are designed to discourage illegal dumping of solid waste and to minimize accumulations of discarded material in the community. These programs include:

- **Spring/Fall Extra Dump Weekends —**On four weekends per year (two each for spring and fall), Sunnyvale residents can dispose of extra solid waste at the City-owned Sunnyvale Materials Recovery and Transfer (SMaRT Station®), 301 Carl Road, at no charge. "Extra Dump" Weekends are for residents only, and not for businesses, contractors, non-resident property owners or other commercial establishments. The SMaRT Station permit allows over 1,000 vehicle trips per day on Extra Dump event days.
- **On-Call Collection —** Service to residents of single-family homes includes as many as two on-call collections per calendar year. Residents may schedule these pickups on any of their regular collection days and may set out two cubic yards of extra solid waste and two "bulky" items, such as a couch, refrigerator, or other appliance.
- **Neighborhood Cleanups —** Working with recognized neighborhood associations, the City offers a number of neighborhood cleanup events. During these events, typically held on a weekend, the City arranges for delivery of "roll-off" debris boxes to pre-selected locations. The boxes are emptied and returned throughout the event. These events provide a convenient disposal option for residents who cannot or do not utilize other special disposal options.

POLICY EM-12.1 PROVIDE CONVENIENT AND COMPETITIVELY PRICED SOLID WASTE COLLECTIONS SERVICES. *(Previously Solid Waste Policy 3.2A.1)*

POLICY EM-13.1 PROVIDE PERIODIC OPPORTUNITIES FOR RESIDENTS TO DISPOSE OF REFUSE AT DISCOUNTED OR NO CHARGE. *(Previously Solid waste Policy 3.2C.1)*

Recycling and Source Reduction

GOAL EM-14
RECYCLING AND SOURCE REDUCTION PROGRAMS

REDUCE SOLID WASTE THROUGH RECYCLING, SOURCE REDUCTION, EDUCATION AND SPECIAL PROGRAMS. *(Previously Solid Waste Goal 3.2B/Adopted in 1996)*

Sunnyvale has long been a leader in recycling and in 1982 was one of the first cities in the Bay Area to begin collecting residential recyclables at curbside. In 1990, Sunnyvale became the first city in the state to adopt the Source Reduction and Recycling Element required by the Integrated Waste Management Act of 1989 (AB 939). In 1994 the SMaRT Station materials recovery facility (MRF) began sorting recyclables from solid waste and remains one of the most sophisticated municipal MRFs in the nation.

These and other programs and facilities are reflected in Sunnyvale's state-calculated diversion rate, which has increased from 18 percent in 1990 to 65 percent in 2009. In 2009 the state Disposal Reporting System coordinated by CalRecycle documented disposal of 88,442 tons originating in Sunnyvale. This marks a 60 percent disposal reduction since 1982, when the City disposed of 222,000 tons, even though the City has seen substantial growth in population and business activity over that 27-year period. Milestone dates of major components of the City's diversion effort include:

- Curbside recycling for single-family residences (1982)
- Concrete Recycling lease at Sunnyvale Landfill (1985)
- Household Hazardous Waste drop-off events (1985)
- Cardboard collection for businesses (1991)
- City Facility Recycling (1991)
- Materials Recovery Facility operations at SMaRT Station (1994)
- Yard trimmings collection for single-family residences (1994)
- Recycling collection for multi-family residences (1996)
- New Materials Recovery Facility at SMaRT Station (2009)

Zero Waste Strategic Plan

In 2009, the City Council adopted a Zero Waste Policy that broadly describes a vision for even greater diversion efforts. The first step in implementing the Zero Waste Policy was a 2010 study detailing the composition of Sunnyvale's generated and disposed waste (the latter consisting of the unrecycled residue following materials recovery at the SMaRT Station).

As of 2011, the City had contracted with a consultant to create a Zero Waste Strategic Plan that will define just what "Zero Waste" is and will identify program and facility options for achieving Zero Waste. Potential actions will be both "upstream," as in placing controls on problematic materials that become waste and "downstream," as in technologies such as composting and anaerobic digestion with the potential to extract additional value from SMaRT Station residues that are currently disposed.

Many components of solid waste have economic value when they are separated, handled, packaged or offered for collection in a manner different from solid waste. Other components have been designated by state or federal regulations as hazardous waste that may not be disposed in a landfill. Over the past 30 years, this trend has led to an increasingly fragmented waste stream, with equally fragmented systems for collecting, handling and disposing or recycling individual waste stream components.

This increased regulation and special handling has provided benefits to the environment by minimizing damaging discharges to air, water and land. It has also increased the efficiency of the economy as a whole, by extracting value from products previously disposed. But, while those who manufacture, distribute and retail products profit from their sale, the "end of life" costs associated with achieving these environmental and societal benefits are borne primarily by local agencies, such as the City, and ultimately paid for by local rate payers and taxpayers. This imbalanced approach provides a misleading message to consumers by understating the true cost of their individual purchases, while increasing the refuse disposal bills of the community, regardless of the individual rate payer's level of consumption.

Product Stewardship

One way to restore an appropriate balance of responsibility is the concept of Product Stewardship, an approach that holds producers liable for the costs of responsibly managing their products at end of life. Extending producer responsibility for products from "cradle to cradle" acknowledges that producers have the greatest control over product design and therefore have the greatest ability and responsibility to reduce toxicity and waste. The City of Sunnyvale has a history of supporting product stewardship – on April 16, 2002, Council directed that the City become a member of the national Product Stewardship Institute and passed a product stewardship resolution.

Product Stewardship is more effective at the state and national levels than it is locally, given the flows of people and products throughout the region. Successful examples in California include 2010 legislation that will put the paint industry in charge of collecting waste paint and the carpet industry in charge of recovering and recycling used carpeting. The cost of the stewardship system will be built into the cost paid by consumers of paint and carpet.

Household Hazardous Wastes

By law, hazardous wastes are not to be collected or disposed along with municipal solid waste. Disposal of hazardous wastes generated by businesses is regulated by state and federal laws that require documentation of shipments, including their receipt at the hazardous waste disposal site.

Hazardous waste generated by residential use is termed, “Household Hazardous Waste,” or HHW. Common HHW items include paint, pesticides, lawn care products, home maintenance and cleaning products and automotive products. It is illegal to dispose of HHW with ordinary garbage.

One way to reduce the amount of HHW that is improperly disposed is to provide residents with legal opportunities for disposal of HHW. To this end, the City provides HHW drop off events by way of the Countywide HHW Program, with a portion of the program funding coming from a per-ton fee charged by Santa Clara County on disposed solid waste. The remaining cost is paid by the Solid Waste Program from garbage collection rate revenues.

The City leases to the Countywide HHW Program an event site at 164 Carl Road. As of 2011, this is one of three fixed locations at which the Program holds regular events, eleven a year at the Sunnyvale site. The other locations are in San Martin and in San Jose. Sunnyvale residents are eligible to use events at the three fixed sites or any of the temporary locations used by the Program. Sunnyvale resident participation, measured by the number of vehicles dropping off HHW, equals 7-8 percent of the number of single-family homes in Sunnyvale.

Encouraging resident use of HHW events is not necessarily the best or most cost-effective way to decrease improper disposal of HHW. HHW disposal is costly (about $60 per vehicle on average, in 2010) and unbridled use of HHW events could cause serious cost increases for the Solid Waste Fund and higher rates for Sunnyvale residents and businesses.

As a result, the City encourages reduced generation of HHW and an Extended Producer Responsibility (EPR) approach to handling discarded HHW. Residents are encouraged to reduce generation by:

- Using non-toxic alternatives
- Using up products that would become HHW if discarded
- Sharing products with neighbors and friends

As described above, an EPR approach to items that will become HHW when discarded places more responsibility for end-of-life management with the businesses that manufacture, distribute and sell hazardous materials to consumers. EPR has the potential to reduce the City’s cost of managing HHW material. Materials that adversely affect public health and the environment if improperly disposed and that could be better managed with an EPR approach include pharmaceuticals, sharps (needles and lancets) and household batteries.

POLICY EM-14.1 REDUCE GENERATION OF SOLID WASTE BY PROVIDING SOURCE REDUCTION PROGRAMS AND PROMOTING REDUCTION BEHAVIOR. *(Previously Solid Waste Policy 3.2B.1)*

POLICY EM-14.2 MAXIMIZE DIVERSION OF SOLID WASTE FROM DISPOSAL BY USE OF DEMAND MANAGEMENT TECHNIQUES, PROVIDING AND PROMOTING RECYCLING PROGRAMS AND ENCOURAGING PRIVATE SECTOR RECYCLING. *(Previously Solid Waste Policy 3.2B.2)*

POLICY EM-14.3 MEET OR EXCEED ALL FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS CONCERNING SOLID WASTE DIVERSION AND IMPLEMENTATION OF RECYCLING AND SOURCE REDUCTION PROGRAMS. *(Previously Solid Waste Policy 3.2B.3)*

POLICY EM-14.4 INCREASE DEMAND FOR RECYCLED MATERIALS BY ADVOCATING LOCAL, STATE AND FEDERAL LEGISLATION THAT WILL INCREASE USE OF RECYCLED CONTENT PRODUCTS. *(Previously Solid Waste Policy 3.2B.4)*

Disposal Programs

GOAL EM-15
ENVIRONMENTALLY-SOUND DISPOSAL

DISPOSE OF SOLID WASTE IN AN ENVIRONMENTALLY SOUND, DEPENDABLE AND COST-EFFECTIVE MANNER. *(Previously Solid Waste Goal 3.2D / Adopted in 1996)*

From the City's perspective, the environmental impacts, costs and legal liabilities of solid waste disposal link together the past, the future and the present. The past is important because the City and individual waste generators located in Sunnyvale retain liability for environmental issues related to waste previously disposed, regardless of the location. This calls for responsible management of the closed Sunnyvale Landfill, which served the community's waste disposal needs from the 1920s to 1993. The future is important because it will someday become the past. That is to say, the City's choices of disposal method and location for the waste of the future will someday create liability for actions taken or not taken with regard to that waste. In the present, the City expends money based on past waste disposal decisions and plans its future disposal methods and locations.

The City's choice of disposal method and site is of great importance to the City itself and to waste generators located in Sunnyvale due to the liability associated with disposal. Waste placed in a landfill doesn't go "away" and, under certain circumstances, future environmental cleanup costs at a disposal site may create financial liability for the City. In decades past the City has, in fact, been assessed liability for small percentages of the cleanup cost at two hazardous waste landfills and a waste oil recycling facility. Although the dollar amounts in these cases were relatively small, the experience is instructive.

Closed Sunnyvale Landfill

The Sunnyvale Landfill stopped accepting refuse on September 30, 1993. Final cover placement in compliance with state regulations was completed in 1994. Approximately 93 of the landfill's 100 acres contain waste. An area of about 7 acres is developed for post-closure use as a biosolids monofill disposal site. It is designed to accept biosolids from the WPCP when market conditions or the characteristics of the biosolids make it difficult or expensive to take them elsewhere.

The closed landfill represents one of the largest areas of open space in Sunnyvale. It is especially valued for recreation because portions are adjacent to the Bay Trail. The walking trails and landfill maintenance roads on the South and West Hills are heavily used for lunch time recreation by employees of companies located in the nearby Moffett Park industrial area. Walking, biking, bird watching and the scenic views from the top of the West Hill are especially popular with the public.

Since closure, the landfill has developed increasing biological diversity. Many mammal, reptile and bird species are observed. Most notable is the Western Burrowing Owl (Athene cunicularia hypugaea), a "species of special concern." Burrowing owls nest in old ground squirrel burrows on the landfill surface and are observed seasonally, often at up to four sites. The City manages the landfill surface around these owl sites so as to enhance its value as habitat for the owls (for example, grass is mowed short to enhance visibility of prey and predators). Landfill maintenance activities are scheduled to avoid active burrows and to avoid choice nesting sites in the breeding season. Additionally, leash laws are actively enforced as the presence of loose dogs discourages use of the landfill as owl habitat.

Asphalt and Concrete Recycling Facility

Since 1985, the City has leased space at or near the landfill to a private company that recycles concrete and asphalt. The source of the raw material is typically pavement material generated by roadway and sidewalk repairs or demolition of concrete structures. Because the facility accepts material that would be otherwise disposed of in a landfill, it is an important component of the City's compliance with the 50 percent diversion mandate contained in the California Integrated Waste Management Act of 1989 (AB 939). The City's lease requires the operator to report the jurisdiction of origin of the raw materials, and that information is available to the City and other jurisdictions for preparing AB 939 compliance reports.

Household Hazardous Waste

Another post-closure activity is the Household Hazardous Waste (HHW) event site at 164 Carl Road, which is leased by the City to the Countywide HHW Program. This location is also used as an operations base and storage location for the City's landfill post-closure maintenance staff.

See **Goal EM-13 (Recycling and Source Reduction Programs)** for discussion of Household Hazardous Waste collection.

Kirby Canyon Landfill

Waste is disposed at Kirby Canyon under a 1991 disposal agreement between the City and Waste Management of California, a private company that operates Kirby Canyon, leasing the site from Castle & Cook. The term of the disposal agreement ends in 2021. The agreement requires that the City deliver to the SMaRT Station all municipal solid waste collected by its franchised hauler. It then requires that all municipal solid waste that is not segregated at the SMaRT Station for recycling be delivered to Kirby Canyon for disposal. Although the agreement was drawn up contemplating disposal at Kirby Canyon, it does contain provisions for Waste Management to direct the City's waste elsewhere under specified conditions.

In 1991 Sunnyvale, Mountain View and Palo Alto selected the Kirby Canyon Landfill, operated by Waste Management of California and located in south San Jose, as their site for long term garbage disposal. These three "SMaRT Station" cities, combined, are the largest single customer at Kirby Canyon. Identifiable contributors of the waste, such as large industrial generators located in Sunnyvale, can also be named directly in cleanup actions. As a result, these generators tend to share the City's concern about the integrity of disposal sites. The cities cooperated in the construction and now the operation of the SMaRT Station pursuant to the 1992 Second Memorandum of Understanding (MOU). The MOU spells out each city's operational and financial obligations and benefits with regard to the facility. It places Sunnyvale at the center of the relationship as owner and operator of the SMaRT Station.

The agreement with Waste Management allows the landfill operator to increase City costs due to regulatory changes. Depending on the type of regulation, these cost increases could apply to incoming solid waste as well as "in place" solid waste disposed in prior years. Reducing the amount of solid waste for which the City is responsible in landfills in the future may be the most cost-effective way to manage the cost of complying with future environmental regulations.

The City's decision to enter into a long-term disposal contract with Waste Management was driven in part by the technical qualifications of that company, its proactive approach to regulatory compliance and its practice of keeping up with rapidly changing requirements and standards for landfill construction, operation and monitoring. City staff conducts an annual review and assessment of regulatory documents for Kirby Canyon to verify that the site continues to be operated in a way that minimizes future City liabilities. Future city decisions and policies that affect where Sunnyvale wastes (hazardous and non-hazardous alike) are disposed should likewise consider not just the immediate cost of disposal, but also the potential for long-term environmental cleanup liabilities.

Planning For Future Disposal

The fact that Sunnyvale has landfill disposal capacity under contract until 2021 should not lead to complacency. There were 16 years between the designation of the SMaRT Station site as suitable for a transfer station and the date the facility was ready for operation. It should be assumed that acquiring new disposal capacity will take a minimum of five years—possibly longer if coordination with other cities is required. Thus, the City should begin the process of arranging for post-2021 disposal no later than 2016. The time prior to 2016 should be used to determine a Zero Waste Strategic Plan and investigate potential technologies, partnerships and funding issues, all of which will affect the amount and type of disposal capacity required post-2021.

As 2021 approaches, the City should begin developing its strategy for future transfer and disposal methods, locations and partnerships. This process must be well under way no later than 2016, five years prior to the expiration of the current disposal agreement in order to assure an orderly transition to post-2021 disposal options consistent with the Zero Waste Strategic Plan.

POLICY EM-15.1 ASSURE THAT THE CITY POSSESSES A MINIMUM OF FIVE YEARS OF REFUSE DISPOSAL CAPACITY AT ALL TIMES. *(Previously Solid Waste Policy 3.2D.1)*

- EM-15.1a When available disposal capacity equals 10 years or less, initiate actions to arrange for sufficient capacity to accommodate present and projected City needs. *(Previously Solid Waste Action Statement 3.2D.1b)*

POLICY EM-15.2 REDUCE THE AMOUNT OF REFUSE BEING DISPOSED, GENERATE RECYCLING REVENUES, AND MINIMIZE TRUCK TRAVEL TO THE DISPOSAL SITE THROUGH USE OF THE SUNNYVALE MATERIALS RECOVERY AND TRANSFER (SMART) STATION. *(Previously Solid Waste Policy 3.2D.2)*

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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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Chapter 12.24. WATER SYSTEM REGULATIONS

12.24.010. Rates fixed by resolution.

The city council of Sunnyvale may from time to time hereafter in its discretion, fix the rates for water sold to consumers within or without the corporate limits of the city of Sunnyvale, by resolution of the council. (Prior code § 11-1.06).

12.24.020. Meter reading—Payment of bills—Service discontinuance—Special service charges.

(a) All meters shall be read as nearly as possible once every other month, with the exception of meters with industrial rating, which shall be read monthly. Billing periods shall as nearly as possible be bimonthly for nonindustrial meters, and monthly for industrially rated meters. Billing periods shall be staggered among the customers rather than on a uniform calendar monthly or bimonthly system for all customers. All bills for service are due and payable upon presentation. All bills must be paid to the Finance Department, 650 West Olive Avenue, Sunnyvale, on or before the twenty-fifth day after presentation. The procedure set forth in Chapter 12.50 of this code shall govern any discontinuation of service for failure to pay bills. A special services charge, at the rates hereafter fixed from time to time by resolution of the city council, shall be made for restoring said service.

(b) Remove bills, special bills, bills rendered on vacation of the premises, or bills rendered to persons discontinuing the service, shall be paid on presentation. (Ord. 2211-87 § 1 (part): Ord. 2192-86 § 2: Ord. 955 § 1, 1961: prior code § 11-1.07).

12.24.030. Reading of meters—Computation of bills.

(a) All meters with an industrial rating shall be read as nearly as possible at monthly intervals. Opening and closing bills on meters with industrial ratings for water service for periods of less than thirty days shall be computed in accordance with the rate applicable to that service, but charges for the amount of water consumed shall be measured from the initial reading to the next regular reading or from the previous reading to the final reading, and other charges shall be prorated on the basis of the number of days of service in the billing period in question to the total number of days in that billing period.

(b) All meters not having an industrial rating shall be read as nearly as possible at bimonthly intervals. Opening and closing bills for water service on meters not having an industrial rating for periods of less than sixty days shall be computed in accordance with the rate applicable to that service, but charges for the amount of water consumed shall be measured from the initial reading to the next regular reading or from the previous reading to the final reading, and other charges shall be prorated on the basis of the number of days of service in the billing period in question to the total number of days in that billing period. (Ord. 2211-87 § 1 (part): prior code 11-1.08).

12.24.040. Discontinuance for nonpayment at prior location.

A consumer's water service may be discontinued for nonpayment of a bill for water service rendered him at a previous location, provided said bill is not paid within thirty days after presentation at the new location. (Prior code § 11-1.09).

12.24.050. Rule violation—Service discontinuance.

Every person taking water shall be considered as having expressed his consent to be bound hereby, and whenever any one of the rules and regulations is violated, the right is reserved to shut off the water without notice. (Prior code § 11-1.10).

12.24.060. Dispute over bill.

In case a dispute should arise over the correctness of any bill rendered for water, the matter shall be presented to the city for adjustment pursuant to Chapter 12.50 of this code. (Ord. 2192-86 § 3: prior code § 11-1.11).

12.24.070. Consumer responsible for appliances—Right to refuse service.

(a) The water department shall have the right of refusing to, or ceasing to deliver water to a consumer, if any part of the consumer's service appliances or apparatus shall at any time be unsafe, or if the utilization of water by means thereof shall be prohibited or forbidden under the authority of any law or municipal ordinance or regulation, and may refuse to serve until the consumer shall put such part in good and safe condition and comply with all the laws, ordinances and regulations applicable thereto.

(b) The water department does not assume the duty of inspecting the consumer's service appliances or apparatus or any part thereof and assumes no liability therefor. The owners of premises taking water must keep their service pipe, stopcocks and all apparatus connected therewith on said premises in good repair at their own expense; and no claim shall be made against the city of Sunnyvale by reason of bursting or any other disarrangement of any service pipe or any apparatus or any appliance connected therewith.

(c) The consumer shall at his own risk and expense, furnish, install and keep in good safe condition, all apparatus and appliances which may be required for receiving, controlling, applying and utilizing such water and the water department or city of Sunnyvale shall not be responsible for loss or damage caused by the improper installation of such apparatus or appliances, negligence, want of proper care, or wrongful act of the consumer or any of his agents, employees, or licensees on the part of the consumer in installing, maintaining, using, operating or interfering with any such apparatus or appliances. (Prior code § 11-1.12).

12.24.080. Meters and appliances—Installation—Liability for damages.

(a) All meters shall be installed by or under the supervision of the water department. Such meters, wherever practicable, shall be placed in suitable meter boxes, located in the sidewalk. When it is not practicable to place meters in the sidewalk, or in other words between the curb and property line, the meters shall be installed in some convenient place approved by the water department upon the consumer's premises, and so placed as to be at all times accessible for inspection, reading and testing.

(b) The water department shall, at its own expense, furnish and install service pipe of suitable capacity, from its mains to the meter for service of premises abutting upon a public street, along which it has a water main. The necessity and convenience of constructing new mains and service therefrom shall be determined by the city council.

(c) All meters and appliances installed by the water department at its expense, whether in a public street or upon the consumer's premises, for the purpose of delivering water to the consumer, shall continue to be the property of the water department, and may be repaired, replaced or removed by the water department at any time. The consumer shall exercise reasonable care to prevent the meters and appliances installed upon the premises, from being injured or destroyed, and shall refrain from interfering with same, and in case any defect therein shall be discovered, shall notify the water department thereof.

(d) Any damage occurring to a meter or other appliances or pipes owned by the city, caused by the carelessness or neglect of the consumer, including any damage which may result from hot water or steam from any boiler, or heater on consumer's premises, shall be paid for by the consumer on presentation of a bill therefor.

(e) The consumer shall install that portion of the service from the meter to his premises, the expense of same to be paid by the consumer, and said service shall be provided with a shut-off valve. The materials furnished by the consumer in the construction of such service extension, will, at all times, be and remain the property of the consumer, and when necessary, will be maintained and repaired by the consumer. (Prior code § 11-1.13).

12.24.090. Separate meters required.

(a) In all cases in which water is served to a building occupied by different and independent consumers of water, independent services must be provided for each such independent consumer, unless the owner or other responsible representative of the occupants prefers to have all such independent consumers under one meter, in which case he shall assume the entire account and pay not less than the sum of the minimum rates for all such independent consumers.

(b) All separate premises, even though owned by the same consumer, shall have a separate meter.

(c) When separate houses or buildings are located upon the same premises and occupied by different and independent consumers, a separate meter must be provided for each house or building. (Prior code § 11-1.14).

12.24.100. Employees to connect or disconnect service—Acceptance of gratuities prohibited.

(a) Only duly authorized employees of the water department are allowed to connect the consumer's service to, or disconnect the same from the city water mains, or supply pipes.

(b) All employees of the water department are strictly forbidden to demand or accept any personal compensation or gratuity for services rendered any consumer. (Prior code § 11-1.15).

12.24.110. Tampering with equipment prohibited.

No person or persons shall, without a written permit from the superintendent of the water department, open or in any way tamper with or make any addition or alteration whatever to any street main, service connection, meter, stopcock, valve or aircock connected with the water mains. (Prior code § 11-1.16).

12.24.120. Vacation of premises—Notice to discontinue service.

Each consumer about to vacate any premises supplied with service shall give written notice of his intended removal, at least two days prior thereto, specifying the date desired for service to be discontinued; otherwise he will be held responsible for all water furnished to such premises until the water department shall have notice of such removal. (Prior code § 11-1.17).

12.24.130. Meter tests.

(a) Any consumer may, upon not less than five days notice, require the water department to test his or her water meter. A deposit to cover the reasonable cost of the test will be required as established from time to time by resolution of the city council. The amount of the deposit will be returned to the consumer if the meter is found to register more than two percent fast under conditions of normal operation, otherwise the amount of deposit will be retained by the water department. A consumer shall have the right to require that the meter be tested in his or her presence, or if he or she so desires, in the presence of an expert or other representative appointed by the consumer. The consumer will be notified in advance of the time and place the test will be made.

(b) A report giving the name of the consumer, date of request, location of premises, the type, make, size and number of the meter, the date of removal, the date tested and the result of the test, will be supplied to the consumer within a reasonable time after the completion of the test.

(c) All meters will be tested at the time of installation, and no meter will be placed in service or allowed to remain in service which has an error in registration, in excess of two percent, under conditions of normal operation. (Ord. 2490-94 § 2; Ord. 1822-76 § 1, 1976: prior code 11-1.18).

12.24.140. Meter test—Refund or rebilling.

(a) When a meter is found to be more than two percent fast, the water department shall refund to the consumer the overcharge, based on the corrected meter readings for the period in which the meter was in use, not exceeding six months, unless it can be shown that the error was due to some cause, the date of which can be fixed, in this case, the overcharge shall be computed back to, but not beyond, such date.

(b) If, in the case of domestic or residential use, the meter upon test is found not to register, or to register less than seventy-five percent of the actual consumption, an average bill, or a bill for the water consumed, but not covered by the bill previously rendered for a period not to exceed three months, may be rendered by the water department to the consumer.

(c) If a meter for commercial service, upon test as herein provided, is found to register more than two percent slow, the water department may render a bill for water consumed, but not covered by bills previously rendered for a period not exceeding three months. (Prior code § 11-1.19).

12.24.150. Service failures or shortages—Nonliability of city—Notice of service interruption.

(a) The water department will exercise reasonable care and diligence to furnish and deliver a continuous and sufficient supply of water to the consumer, and to avoid any shortage or interruption of delivery. The city or water department will not be liable for the failure, interruption, shortage or insufficiency of supply, or any loss or damage occasioned thereby, during a fire or at any other time.

(b) The water department, whenever it finds it necessary for the purpose of making repairs or improvements to its system, will have the right to suspend temporarily the delivery of water, but in all cases as reasonable notice thereof as circumstances will permit will be given to the consumers. (Prior code § 11-1.20).

12.24.160. Temporary service.

(a) Water may be sold and supplied on a temporary service basis to consumers. As used in this chapter, temporary service refers to water service for crop irrigation or other agricultural uses, circuses, bazaars, fairs, temporary restaurants, construction works, and similar activities of a temporary nature.

(b) The applicant for such temporary service shall be required to pay to the city of Sunnyvale the actual costs of installing, maintaining, and removing any facilities necessary in connection with the furnishing of such service. The applicant for such temporary service shall not be required to pay the water frontage fees established by resolution of the city council and required to be paid by the owner or developer of property prior to the original connection of the property to the water system of the city of Sunnyvale, or if the uses of the property presently connected to the water system are enlarged, added to, or if further structures are constructed thereon. (Ord. 1456 § 1, 1968: prior code § 11-1.21).

12.24.170. Fire—Water shut-off—Use of hydrants—Right of ingress and egress.

(a) In case of fire or an alarm of fire, the water department shall have the right to shut off water from any consumer or any number of consumers, without notice and to keep it shut off as long as it may be necessary.

(b) In case of fire or an alarm of fire, the use of fountains or yard or street sprinklers or house faucets is prohibited.

(c) No person shall, except in case of fire, use water from or tamper with any city hydrant without a permit from the water department.

(d) Any duly authorized agent or employee of the water department shall at all times have the right of ingress to and egress from the consumer's premises at all reasonable hours for any purpose reasonably connected with the furnishing of water and the exercise of any and all rights secured to the water department by law. (Prior code § 11-1.22).

12.24.180. Turning on water officially shut off deemed misdemeanor.

Only duly authorized employees of the water department are allowed to turn on water to any consumer's premises. It shall constitute a misdemeanor for any person, other than an employee of the water department, to turn on any water service that has been officially shut off for the violation of any of the rules and regulations of the water department. (Prior code § 11-1.23).

12.24.190. Right to limit amount of water.

The department shall have the right to limit the amount of water furnished to any consumer should circumstances seem to warrant such action, although no limit may be stated in the application or permit for such use. (Prior code § 11-1.25).

12.24.200. Attaching wires to plumbing prohibited—Liability for damages.

All persons, firms or corporations are strictly forbidden to attach any ground wire or wires to any plumbing which is or may be connected to any service connection or main, and the city council may hold the owner of the premises liable for any damage to the property of the city occasioned by any such ground wire which is now or may hereafter be attached. (Prior code § 11-1.26).

12.24.210. Fire service connections—Detector meter required.

An applicant for a service larger than two inch in size for fire protection purposes will be required to furnish and install at his own expense a detector meter of a type approved by the National Board of Fire Underwriters, which meter shall be and remain the property of the applicant. Should the detector meter show any consumption of water except that used in time of fire, and for reasonable fire drill and tests of apparatus, the consumer shall pay for such water used at regular meter rates. (Prior code § 11-1.27).

12.24.220. Fire service pipe rules.

In all cases the department shall decide the size of the fire service pipe required, which shall be determined by the size of the street main, the available pressure on the main and the nature and capacity of the fire protection equipment within the building. In all cases where underwriter's pumps are to be installed, a suction pipe of sufficient internal area to deliver a quantity of water equal to the full rated capacity of the service pipe will be allowed, and no enlargement of said suction pipe inside the premises will be permitted. (Prior code § 11-1.28).

12.24.230. Meter removal for non-use—Resetting charge.

Where a service has not been used for a period of six months the meter shall be removed and a charge of one dollar shall be made for resetting the meter. (Prior code § 11-1.29).

12.24.240. Special water contracts.

If any sale of water should be made under conditions such that the rates herein set forth are not applicable, the water department may, with the approval of the city council, enter into a special contract with the consumer. (Prior code § 11-1.30).

12.24.250. Damage to water department property.

If any person destroys or damages any fire hydrant, water main or any other property of the municipal water department, he shall be held responsible for the entire cost of replacing or repairing the same and the bill shall be due and payable on presentation. If said person is a consumer of city water, the bill for such costs may be added to his bill for water service and collected under the same rules and regulations. (Prior code § 11-1.31).

12.24.260. Right to test privately owned meter.

If the water superintendent has any reason to believe that any privately owned meter is not registering correctly he shall have the right to test such meter or require the owner to test the meter in his presence, as may be determined by the owner. (Prior code § 11-1.32).

12.24.270. Meter service charges fixed by resolution.

The city council of the city of Sunnyvale, may, by resolution, from time to time hereafter, in its discretion, fix the rates for meter service charges to be paid by each applicant for water service, within or without the corporate limits of the city of Sunnyvale. (Prior code § 11-1.33).

12.24.280. Water, sewer and utility service—Refusal—Grounds.

The bureau of public works or other proper authority, of the city may, in its discretion, refuse to supply water and sewage service to any applicant therefor, or may refuse to certify any applicant to the Pacific Gas and Electric Company for gas and/or electric service, who has not first obtained any permit, license or other clearance required to be obtained, in connection with the improvement for which service is sought by any ordinance of this city, the county of Santa Clara, or the laws of the state of California. (Prior code § 11-3.01).

Chapter 12.34. WATER CONSERVATION RESTRICTIONS

12.34.010. Purpose and application.

The purpose of this chapter is to identify and restrict nonessential water uses which, if allowed, would constitute wastage of the water supply of the city. The provisions of this chapter shall apply to all persons or entities using water obtained from the city of Sunnyvale both in and outside the city of Sunnyvale and within the city's water service area, and regardless of whether any person or entity using water has a contract for water service with the city. Use of water by the city itself shall be in conformance with a water conservation plan to be presented by the city manager to the city council for approval, and which shall essentially conform to the provisions of this chapter. This chapter is adopted pursuant to the provisions of Water Code Section 350, et seq., the city charter and the common law. (Ord. 2433-93 § 1 (part)).

12.34.020. Nonessential uses prohibited.

The following uses, methods, types or techniques of uses of water are hereby determined and declared nonessential, and except as expressly provided to the contrary, are hereby prohibited:

(a) Allowing or maintaining broken or defective plumbing, sprinklers, watering or irrigation systems which permit the escape or leakage of potable water.

(b) Using potable water in any manner which causes, allows or permits the flooding of any premises, or any portion thereof, or which causes, allows or permits water to escape from any premises or any portion thereof and flow into gutters, streets, or any surface water drainage system.

(c) Using any hose or similar device using potable water for washing automobiles, trucks, buses, boats, trailers, equipment, recreational vehicles, mobilehomes or other vehicles or machinery, unless the hose or device is equipped with a positive automatic shutoff valve.

(d) Using potable water to wash sidewalks, driveways, filling station aprons, patios, parking lots, porches or other paved or hard surfaced areas, unless there is a positive automatic shutoff valve on the outlet end of the hose.

(e) The service of water by any restaurant or other eating or refreshment establishment to any patron, except upon the specific request by a patron for such services.

(f) Installation of any single pass cooling process in new construction.

(g) Any use of nonpotable water not in compliance with all federal, state and local laws, rules and regulations. Use of reclaimed water from the city's water pollution control plant shall be subject to the discretion of the director of public works. (Ord. 2433-93 § 1 (part)).

12.34.030. Exceptions.

(a) The director of public works is hereby authorized to grant to any user an exception to the prohibitions set forth in Section 12.34.020, upon a finding by the director that such exception is necessary to prevent an emergency condition affecting the health, sanitation or fire protection of such user, and that the user to whom such adjustment or exception pertains has adopted or used all practicable water conservation measures.

(b) Exceptions permitted hereunder shall be made only upon written application submitted to the director setting forth a statement of justification for such exception. The director may attach conditions, specifications or other qualifying provisions to any exception granted. (Ord. 2433-93 § 1 (part)).

12.34.040. Penalty—Flow restricting devices.

(a) Upon a determination by the director of public works that a user has continuously or repeatedly violated or failed to comply with one or more provisions of Section 12.34.020, or of any conditions of any exception granted pursuant to the provisions of Section 12.34.030, the director may issue an order to cease and desist from continued or repeated violation, and further order such user to comply forthwith with such provisions or terms of exception, or otherwise to take appropriate remedial or preventive action. If after the issuance of such cease and desist order, such user continues to consume or use, or again consumes or uses water in violation of any such provision or condition of exception, the director may order the installation of a flow restricting device upon the water service line to the premises of such user. Such flow restricting device shall be installed and maintained for a period of not less than three days nor more than ten days for a first violation, and shall be installed and maintained for not less than ten days for each succeeding violation, and may be ordered to remain installed and maintained for a period of up to three months upon a finding by the director that any user is habitually in violation of any of the provisions of this chapter, or the provisions of any exception granted pursuant to Section 12.34.030.

(b) Prior to installation of any such flow restricting device, the director shall give written notice of intent to install such device, including the reasons for the proposed installation. The notice shall specify the date, time and place at which the user or other interested party may appear before the director to present any evidence or reasons why such installation should not occur. Instead of appearing, the user or other interested party may present written material to the director at or before the time specified. The installation of a flow restricting device shall not occur less than twenty-four hours after the time specified in the notice. The written notice shall be delivered personally, or by posting with the United States mail service, first class postage prepaid, certified mail, and addressed to the last known address of the user to whom given. Copies of the notice shall also be delivered personally or by mail as specified above, to the owner of the property on which the flow restrictor is proposed to be installed as shown on the last equalized assessment roll of the county assessor, county of Santa Clara, and to the person or entity shown on the latest city records as being responsible for payment of utility charges on such property, if either or both is different from the user to whom the notice is sent.

(c) There are hereby established, and there shall be imposed and levied charges in the amount of fifty dollars for each installation and fifty dollars for each removal of flow restricting devices under this section. (Ord. 2433-93 § 1 (part)).

12.34.050. Implementation.

The director of public works is authorized to delegate authority granted under this chapter to such deputies, officers, employees or agents of the city as the director shall designate, and to establish such rules, regulations and procedures, and to prepare or furnish such forms as the director deems necessary or appropriate to carry out the provisions of this chapter. (Ord. 2433-93 § 1 (part)).

12.34.060. Notices.

Except as otherwise provided, notices required to be given pursuant to the provisions of this chapter shall be in writing, may be combined with water service bills or other written communication, and shall be delivered personally, or by posting with the United States mail service, first class postage prepaid, and addressed to the last known address of the user to whom given, or to the owner of the premises to which the water service of such user pertains, shown on the last equalized assessment roll of the county assessor, county of Santa Clara. (Ord. 2433-93 § 1 (part)).

12.34.070. Violations.

It is unlawful for any person, firm, partnership, association, corporation or political entity to use water obtained from the water system of the city of Sunnyvale in violation of any provision of this chapter or in violation of the conditions of any exception granted pursuant to Section 12.34.040 of this chapter. Use of water by any user in accordance with the provisions of any exception granted by the director shall not be deemed in violation of this chapter. Violations of this chapter shall be punishable as infractions. (Ord. 2433-93 § 1 (part)).

12.34.080. Remedies cumulative.

The remedies and penalties provided for in this chapter shall be cumulative and not exclusive, and shall be in addition to any or all other remedies available to the city. (Ord. 2433-93 § 1 (part)).

Chapter 19.37. LANDSCAPING, IRRIGATION AND USEABLE OPEN SPACE

19.37.010. Purpose.

The purpose of this chapter is to ensure that adequate landscaped areas and useable open space are provided where applicable for all zoning districts; to promote the conservation and efficient use of water and to prevent the waste of this valuable resource; and to promote water conservation as one component of sustainable building practices. This chapter shall be construed to assure consistency with the requirements of the Water Conservation in Landscaping Act of the California Government Code, or any successor statute, and any applicable implementing regulations, as they exist at the time of enactment or as later amended. In addition to compliance with the provisions in this chapter, projects shall comply with stormwater management requirements set forth in Chapter 12.60. (Ord. 2918-10 § 3).

19.37.020. Applicability.

All provisions of this chapter shall apply to the following landscaping projects:

(a) Individual Single-Family or Duplex Residential Projects. New landscaping installations equal to or greater than one thousand square feet in connection with construction of a new dwelling unit.

(b) All Other Projects. New landscaping installations or landscaping rehabilitation projects equal to or greater than one thousand square feet.

(c) Exemptions. Landscaping and irrigation requirements shall not apply to:

(1) Projects that fall below the square footage thresholds stated in subsections (a) and (b);

(2) Individual single-family or duplex residential projects that are not in connection with construction of a new dwelling unit;

(3) Registered local, state or federal historical sites where landscaping establishes a historical landscaping style, as determined by the Heritage Preservation Commission, planning commission, or by any applicable public board or commission responsible for architectural review or historic preservation;

(4) Ecological restoration or mined-land reclamation projects that do not require a permanent irrigation system; or

(5) Community gardens, plant collections (as part of botanical gardens and arboretums open to the public), non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation), agricultural uses, commercial nurseries and sod farms. (Ord. 2918-10 § 3).

19.37.030. Definitions.

The following terms and definitions pertain to the water efficiency sections of this chapter:

(a) “Applied water” means the portion of water supplied by the irrigation system to the landscaped area.

(b) “Automatic irrigation controller” means an automatic timing device used to remotely control valves that operate an irrigation system. Automatic irrigation controllers schedule irrigation events using either evapotranspiration (weather-based) or soil moisture data.

(c) “Certified professional” means a licensed landscape architect, a licensed landscape contractor, a licensed professional engineer, certified irrigation designer, or any other person authorized by the state to design a landscape or irrigation system, or a certified landscape irrigation auditor.

(d) “Conversion factor (0.62)” means the number that converts acre-inches per acre per year to gallons per square foot per year.

(e) "Drip irrigation" means any non-spray low volume irrigation system utilizing emission devices with a flow rate measured in gallons per hour. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

(f) "Estimated total water use" (ETWU) means the total water used for the landscaped area as described in Section 19.37.050.

(g) "ET adjustment factor" (ETAF) means a factor of 0.7, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscaped area. ETAF for a special landscaped area shall not exceed 1.0.

(h) "Evapotranspiration rate" means the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specified time.

(i) "Hardscape" means any durable material (pervious and non-pervious) in a landscaped area, such as decks, patios or pedestrian walkways, and other non-irrigated elements which may include art work, benches, and bicycle parking.

(j) "Hydrozone" means a portion of the landscaped area having plants with similar water needs. A hydrozone may be irrigated or non-irrigated.

(k) "Irrigation audit" means an in depth evaluation of the performance of an irrigation system. An irrigation audit includes, but is not limited to: inspection, system tune up, system test with distribution uniformity or emission uniformity, correction of any overspray or runoff that causes overland flow, and preparation of an irrigation schedule.

(l) "Irrigation efficiency" (IE) means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. Required irrigation efficiency is described in Section 19.37.110.

(m) "Low water use plant" means a plant species whose water needs are compatible with local climate and soil conditions. Species classified as "very low water use" and "low water use" by WUCOLS, having a regionally adjusted plant factor of 0.0 through 0.3, shall be considered low water use plants.

(n) "Maximum applied water allowance" (MAWA) means the upper limit of annual applied water for the established landscaped area as specified in Section 19.37.050.

(o) "Mulch" means any organic material such as leaves, bark, straw, compost, or inorganic mineral materials such as rocks, gravel, and decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.

(p) "Native plant" means a plant indigenous to a specific area of consideration. For the purposes of these guidelines, the term shall refer to plants indigenous to the coastal ranges of central and northern California, and more specifically to such plants that are suited to the ecology of the present or historic natural community(ies) of the project's vicinity.

(q) "No water using plant" means a plant species with water needs that are compatible with local climate and soil conditions such that regular supplemental irrigation is not required to sustain the plant after it has become established.

(r) "Plant factor" or "plant water use factor" is a factor, when multiplied by ETo (reference evapotranspiration), estimates the amount of water needed by plants. For purpose of calculation of the ETWU, use values from WUCOLS, or equivalent reference subject to approval by the director of community development.

(s) "Precipitation rate" means the rate of application of water measured in inches per hour.

(t) "Recreational area" means areas dedicated to active play such as parks, sports fields, and golf courses where turf provides a playing surface.

(u) "Reference evapotranspiration" or "ETo" means a standard measurement of environmental parameters which affect the water use of plants. For purposes of calculation of the MAWA and ETWU, as described in Section 19.37.050, use current reference evapotranspiration data, such as from the California Irrigation Management Information System (CIMIS), or other equivalent data, or soil moisture sensor data.

(v) "Runoff" means water which is not absorbed by the soil or landscaping to which it is applied and flows from the landscaped area.

(w) "Soil moisture sensing device" or "soil moisture sensor" means a device that measures the amount of water in the soil. The device may also suspend or initiate an irrigation event.

(x) "Special landscaped area" (SLA) means an area of the landscaping dedicated solely to edible plants, areas irrigated with recycled water, water features using recycled water, and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface.

(y) "Turf" means a ground cover surface of mowed grass.

(z) "Water feature" means a design element where open water performs an aesthetic or recreational function. Water features include ponds, lakes, waterfalls, fountains, artificial streams, spas, and swimming pools (where water is artificially supplied).

(aa) "WUCOLS" means the Water Use Classification of Landscape Species published by the University of California Cooperative Extension, the Department of Water Resources and the Bureau of Reclamation, 2000. (Ord. 2918-10 § 3).

19.37.040. Minimum landscaped area and useable open space.

(a) Minimum Landscaped Area. Table 19.37.040 describes the minimum landscaped area and useable open space required by zoning district. In addition to the minimum landscaped area, areas not used for buildings, parking lot areas, driveways or pedestrian walkways shall be landscaped unless the review authority determines that landscaping is not necessary to achieve the purposes of this chapter. For requirements specific to single family uses, see subsection (f).

(b) Landscaped Buffer Required. A landscaped buffer is required for any property with a nonresidential use in a residential zoning district that abuts a residential use. It is also required for properties of any use in a nonresidential zoning district which abuts a residential zoning district. See Section 19.37.080 for buffer landscaping design requirements.

(c) Landscaped Frontage Strip Required. A fifteen-foot wide landscaped frontage strip is required for all properties except those noted below in subsection (f). The frontage strip is measured from the inside edge of the public sidewalk, or if no sidewalk exists, from the curb. See Section 19.37.090 for frontage strip landscaping design requirements.

(d) Useable Open Space Required. Useable open space is required for all duplex and multifamily residential properties as described in Table 19.37.040. Useable open space areas that meet the definition of landscaping may contribute towards the minimum landscaped area of the site. See Section 19.37.100 for useable open space design requirements.

(e) Specific Plan, Precise Plan and Other Specialized Plan Areas. Minimum landscaped area and useable open space for properties within a specialized plan's prescribed area are described in their individual plans.

(f) Allowances and Limitations for Single-Family Uses and Single-Family Zoning Districts.

(1) Allowances for Single-Family Zoning Districts. Yards are not required to be landscaped in single-family zoning districts; however other provisions in Title 19 may apply.

(2) Limitation on Paved Areas in the R-0 and R-1 Zoning Districts. Not more than fifty percent of the required front yard of any lot within an R-0 or R-1 zoning district shall be paved with asphalt, concrete cement, or any other impervious surface, except as may be required to meet off-street parking and access requirements of Chapter 19.46.

(3) Landscaped Frontage Strip for Single-Family Uses. A landscaped frontage strip is not required in any zoning district for single-family residential uses which have a frontage on a public street.

Table 19.37.040

Minimum Landscaped Area and Useable Open Space by Zoning District

<table>
<tr><th>Zoning District</th><th>Useable Open Space</th><th>Other Landscaped Area</th><th>Parking Lot Landscaped Area</th><th>Total Landscaped Area</th></tr>
<tr><td>R-0</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>R-1</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>R-1.5</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>R-1.7/PD</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>R-2</td><td>500 sq. ft./unit[1]</td><td>850 sq. ft./ unit</td><td rowspan="13">20% of the parking lot area</td><td rowspan="13">Total minimum landscaped area is the combination of the minimum parking lot landscaped area and other landscaped area. In no case shall this total be less than 20% of the lot area.</td></tr>
<tr><td>R-3</td><td>400 sq. ft./unit</td><td>425 sq. ft./unit</td></tr>
<tr><td>R-4</td><td>380 sq. ft./unit</td><td>375 sq. ft./unit</td></tr>
<tr><td>R-5</td><td>380 sq. ft./unit</td><td>375 sq. ft./ unit</td></tr>
<tr><td>C-1</td><td>N/A</td><td>12.5% of floor area</td></tr>
<tr><td>C-2</td><td>N/A</td><td>12.5% of floor area</td></tr>
<tr><td>C-3</td><td>N/A</td><td>12.5% of floor area</td></tr>
<tr><td>C-4</td><td>N/A</td><td>12.5% of floor area</td></tr>
<tr><td>O</td><td>N/A</td><td>10% of lot area</td></tr>
<tr><td>P-F</td><td>N/A</td><td>10% of lot area</td></tr>
<tr><td>M-S</td><td>N/A</td><td>10% of floor area</td></tr>
<tr><td>M-3</td><td>N/A</td><td>10% of floor area</td></tr>
</table>

[1] One thousand square feet of useable open space is required for a property with an accessory living unit.

(Ord. 2918-10 § 3).

19.37.050. Water efficiency design requirements.

Water Efficiency in Design. Landscaped areas shall be designed to achieve water efficiency. Landscaping design and plant selection may be based on one of two options. Regardless of which option is selected, all other criteria described in this chapter shall apply. The options include:

(a) Option 1—Turf Limitation and Minimum Area with Water Conserving Plants. Turf area shall not be more than twenty-five percent of the landscaped area, and native, low water use or no water use plants shall be installed in at least eighty percent of all non-turf landscaped areas.

(b) Option 2—Water Budget Calculations. If the turf limitation option is not selected, a water budget calculation shall be prepared and shall adhere to the following requirements:

(1) The plant factor shall be obtained from WUCOLS or an equivalent reference subject to approval by the director of community development. For areas that mix plants with different water uses, the plant factor calculation is based on the proportion of the respective plant factors, or based on the plant factor of the higher water using plant. The plant factor ranges from 0.0 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants.

(2) All water features shall be included in the high water use hydrozone.

(3) All special landscaped areas (SLA) shall be identified and their water use included in the water budget

calculations.

(4) The reference evapotranspiration adjustment factor (ETAF) for SLAs shall not exceed 1.0. The ETAF for all other landscaped areas shall not exceed 0.7.

(5) Maximum applied water allowance (MAWA) shall be calculated using the following equation:

MAWA = (ETo) (0.62) [(0.7 x LA) + (0.3 x SLA)]

Where:

MAWA = Maximum applied water allowance (gallons per year)

ETo = Reference evapotranspiration (inches per year)

0.62 = Conversion factor (to gallons)

0.7 = Reference evapotranspiration adjustment factor (ETAF)

LA = Planted landscaped area including SLA and not including hardscapes (square feet)

0.3 = Additional water allowance for SLA

SLA = Special landscaped area (square feet)

(6) Estimated total water use (ETWU) will be calculated using the equation below. The sum of the ETWU calculated for all hydrozones shall not exceed the MAWA.

$$ETWU = (ETo)(0.62)\left(\frac{PF \times HA}{IE} + SLA\right)$$

Where:

ETWU = Estimated total water use per year (gallons)

ETo = Reference evapotranspiration (inches)

PF = Plant factor from WUCOLS

HA = Hydrozone area [high, medium, and low water use areas] (square feet)

SLA = Special landscaped area (square feet)

0.62 = Conversion factor

IE = Irrigation efficiency (minimum 0.70)

(Ord. 2918-10 § 3).

19.37.060. General planting, soil management and water feature design requirements.

(a) Plant Material. In addition to the requirements below, plant selection and installation shall be done in accordance with accepted horticultural industry practices.

(1) Variety. Landscaping shall include trees, shrubs, vines, flowers, ground covers or a combination thereof.

(2) Size at Time of Planting. Plant materials shall be sized and spaced to achieve immediate effect, in accordance with horticultural industry practices and at the discretion of the director of community development. Trees shall be of minimum fifteen gallon size. Twenty-four or thirty-six inch box trees may be required at the discretion of the director of community development.

(3) Number of Trees. There shall be one tree per one thousand square feet of required landscaped area in addition to required street trees and parking lot trees.

(4) Turf. All turf areas shall be planted with tall fescue or similar turf requiring less water. Turf shall not be planted on slopes greater than ten percent where the toe of the slope is adjacent to an impermeable hardscape.

(b) Grouping of Plants. Plants with similar water needs shall be grouped (also described as a hydrozone). Areas that mix plants with different water uses may be allowed if a water budget is performed.

(c) Soil Management.

(1) Mulch. A minimum two-inch layer of mulch shall be applied on all non-turf soil areas.

(2) Soil Amendments. Soil amendments, such as compost, shall be incorporated according to the soil conditions at the project site and based on what is appropriate for selected plans.

(3) Grading. If the project includes grading, the grading shall be designed to minimize soil erosion, runoff and water waste. The grading shall avoid soil compaction in planted landscaped areas.

(d) Water Features. Recirculating water systems shall be used for water features. Where available, recycled water shall be used for water features. (Ord. 2918-10 § 3).

19.37.070. Parking lot landscaping design requirements.

(a) Parking Lot Shading. Trees shall be planted and maintained throughout the lot to ensure that at least fifty percent of the parking area will be shaded within fifteen years after the establishment of the lot.

(1) Solar Energy Systems as Shading. Up to twenty-five percent of the fifty percent parking lot shading requirement (twelve and one-half percent of the total parking lot area) may be met with installation of solar energy systems rather than trees.

(2) Calculation of Shading. Shading shall be calculated by using the diameter of the tree crown at fifteen years or the dimensions of any roofed area supporting the solar energy system within the parking lot area.

(3) Surfaces Subject to Shading Calculation. All surfacing on which a vehicle can drive is subject to shade calculation, including all parking stalls, vehicular drives within the property regardless of length, drive-through lanes, and all maneuvering areas regardless of depth. The following surface areas are exempt from shading requirements: truck loading areas in front of overhead doors, truck maneuvering and parking areas unconnected to and exclusive of any vehicle parking, surfaced areas not to be used for vehicle parking, driving or maneuvering, provided they are made inaccessible to vehicles by a barrier such as bollards or fencing, display, sales, service, or vehicular storage areas for automobile dealerships (required parking for auto dealerships is still subject to shading requirements), or surfaced areas existing prior to January 1, 2002.

(b) Ground Cover and Shrubs on Parking Islands. Parking islands shall contain living ground cover or shrubs with the trees, unless it can be shown that ground cover is incompatible with the tree. Where living ground cover is unsuitable, the director of community development may allow porous, nonliving ground cover such as pebbles or tanbark.

(c) Drainage Design. Landscaping islands and parking islands shall be designed to integrate parking lot and site drainage in order to reduce storm water runoff velocities and minimize non-point source pollution. When six-inch concrete curbs are installed, they shall have drainage “weep holes.”

(d) Wheel Stops. Concrete wheel stops shall be installed when landscaped areas are not adequately protected. (Ord. 2918-10 § 3).

19.37.080. Buffer landscaping design requirements.

The following is a list of design requirements for buffer landscaping.

(a) Width. The buffer shall maintain a width of at least ten feet.

(b) Landscaping. The buffer shall include a planted screen of approved trees and shrubs which shall be placed along the length of the buffer at intervals not to exceed twenty feet, provided, however, that the director of community development may grant exceptions through a miscellaneous plan permit when warranted by conditions on the property.

(c) Wall Design. The buffer shall include a decorative masonry wall six feet in height measured from the highest adjoining grade. When the adjacent nonresidential building is two stories or more in height, the decorative masonry wall shall be eight feet measured from the highest adjoining grade. Where a residential use is permitted in a nonresidential zoning district, the wall shall be required on the residential property, unless a wall already exists.

(d) Specific Plan, Precise Plan and other specialized plan areas. Properties within a specialized plan's prescribed area may be subject to additional buffer landscaping design requirements, as described in their individual plans. (Ord. 2918-10 § 3).

19.37.090. Frontage strip landscaping design requirements.

(a) Width. The frontage strip shall be fifteen feet wide along the entire street frontage measured from the inside edge of the public sidewalk, or if no sidewalk exists, from the curb.

(b) Landscaping Allowances. Frontage strip landscaping may be crossed by walkways and access drives.

(c) Specific Plan, Precise Plan and Other Specialized Plan Areas. Properties within a specialized plan's prescribed area may vary from these frontage strip design requirements, as described in their individual plans. (Ord. 2918-10 § 3).

19.37.100. Useable open space design requirements.

(a) Function. Useable open space must be designed to be accessible to, and useable for outdoor living, recreation or utility use.

(b) Location. Useable open space may not be located in any required front yard area.

(c) Minimum Useable Open Space Dimensions and Area. Each useable open space area shall have at least a twelve foot dimension in any direction and a minimum area of two hundred square feet except for:

(1) Private balconies must have a minimum of seven feet in any direction and a minimum area of eighty square feet.

(2) Roofs, decks or porches must have a minimum of ten feet in any direction and a total of one hundred twenty square feet.

(d) Private Useable Open Space Required. In the R-4 and R-5 zoning districts, a minimum of eighty square feet per unit shall be designed as private useable open space.

(e) Specific Plan, Precise Plan and Other Specialized Plan Areas. Properties within a specialized plan's prescribed area may vary from these useable open space design requirements, as described in their individual plans. (Ord. 2918-10 § 3).

19.37.110. Irrigation system design requirements.

(a) Irrigation System Required. All landscaped areas shall have a permanent irrigation system, except for single-family detached and duplex dwellings.

(b) Irrigation Efficiency. Irrigation systems shall be designed and maintained to meet or exceed an average landscaping irrigation efficiency of seventy percent.

(c) Water Waste Prohibited. Water waste resulting from an inefficient irrigation system leading to runoff, low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas such as walkways, roadways or structures is prohibited.

(d) Hydrozone Irrigation. Systems shall be designed to meet the individual needs of each plant group. Valves and control circuits shall be separated based on the required rate and quantity of water used.

(1) Valves. Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions and plant materials with similar water use. Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and turf.

(2) Sprinkler Heads. Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone. Sprinkler heads must have matched precipitation rates within each circuit.

(e) Low Volume Irrigation. Bubbler or drip-type irrigation, or other low-flow, non-spray technology shall be provided for:

(1) Trees and shrubs.

(2) Mulched areas.

(3) Areas with slope greater than ten percent, unless it can be demonstrated that no runoff or erosion will occur if other types of irrigation is used.

(4) Areas that are less than eight feet wide in any direction.

(f) Overhead Sprinkler Irrigation. Overhead irrigation systems may be used for clustered shrub plantings. Areas within two feet of a non-permeable surface may not be irrigated using overhead sprinkler irrigation unless it can be demonstrated that no runoff would occur, or the adjacent non-permeable surface is designed and constructed to drain entirely to landscaping.

(g) Irrigation Controllers and Sensors. All irrigation controllers must utilize either evapotranspiration or soil moisture sensor data and be capable of dual or multiple programming. Irrigation systems shall also incorporate sensors (rain, freeze, wind, etc.) that suspend or alter irrigation operation during unfavorable weather conditions.

(h) Screening of Devices. Irrigation controllers and backflow devices shall be screened from public view.

(i) Scheduling. Irrigation must be scheduled between eight p.m. and ten a.m. (Ord. 2918-10 § 3).

19.37.120. Landscaping and irrigation approval.

(a) Permit Required. Except as otherwise provided in this chapter, no person shall install or modify any landscaped area described in Section 19.37.020 without first obtaining a miscellaneous plan permit for each such action, in accordance with the procedure described in Chapter 19.82.

(b) Landscaping and Irrigation Plans Required. Landscaping and irrigation plans shall be required for any modification or installation of new landscaping that falls within the thresholds stated in this chapter. The plans shall meet the information requirements determined by the director of community development to comply with the provisions of this chapter.

(1) Preparation by Certified Professional. Landscaping and irrigation plans shall be prepared by, and bear the signature of, a certified professional, except for new landscaping installations or landscaping rehabilitation projects with less than two thousand five hundred square feet of landscaped area. (Ord. 2918-10 § 3).

19.37.130. Landscaping irrigation audit and maintenance.

(a) Irrigation Audit Required. Prior to approval of occupancy by a building official, a landscaping irrigation audit shall be conducted and an irrigation audit report shall be submitted for projects with landscaping and irrigation plans approved after June 10, 2010.

(1) Audit by Certified Professional. The landscaping irrigation audit shall be conducted and the report shall be prepared by a certified professional, except for new landscaping installations or landscaping rehabilitation projects with less than two thousand five hundred square feet of landscaped area.

(2) Audit Report Content. The irrigation audit report shall include, but not be limited to: inspection, system tune-up, system test with distribution uniformity, correction of any overspray or runoff that causes overland flow, and preparation of an irrigation schedule.

(b) Submittal of Landscaping Maintenance Schedule. Prior to the final inspection by the building official, a regular maintenance schedule shall be submitted to the director of community development for review and approval. The maintenance schedule shall include, but not be limited to, routine inspection; adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning; weeding in all landscaped areas; and removing obstructions to irrigation spray heads or other emission devices. Landscaping shall be maintained in accordance with the approved maintenance schedule.

(c) General Maintenance. Landscaping shall be maintained in compliance with the approved landscaping plan, and shall be maintained in a neat, clean and healthful condition. Removed landscaping shall be replaced with specimen plants to match the approved landscaping plan. (Ord. 2918-10 § 3).

APPENDIX G

City of Sunnyvale

2015 Urban Water Management Plan

Sunnyvale's Fiscal Year 2015/2016 Utility Fee Schedule

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CITY OF SUNNYVALE
FISCAL YEAR 2015/16
PROPOSED UTILITY FEE SCHEDULE

Charge Code	Object Level 3	Title (Obj. Lvl. 3)

Section 1.01 - Water Service Fees — 799918 | 3055 | Water Meter Use Fees

Service Charges: The service charges for each customer class who are billed monthly and bi-monthly shall be based on meter size. In mobile home developments where dwelling units are served by individual public meters, and not by a master meter, the single-family residential water service rate shall apply.

Meter Size	Single-Family		Multi-Family/Mobile Home		Commercial		Landscape		Fire Line	
	Monthly	Bi-monthly	Monthly	Bi-monthly	Monthly	Bi-monthly	Monthly	Bi-monthly	Monthly	Bi-monthly
5/8" x 3/4"	$9.40	$18.80	$10.73	$21.46	$11.04	$22.08	$9.40	$18.80		
3/4"	$11.93	$23.86	$13.91	$27.82	$14.32	$28.64	$11.93	$23.86		
1"	$16.92	$33.84	$20.33	$40.66	$20.90	$41.80	$16.92	$33.84		
1-1/2"	$29.44	$58.88	$36.42	$72.84	$37.46	$74.92	$29.44	$58.88		
2"	$44.45	$88.90	$57.26	$114.52	$57.26	$114.52	$44.45	$88.90		
3"	N/A	N/A	$110.15	$220.30	$110.15	$220.30	$84.46	$168.92		
4"	N/A	N/A	$169.62	$339.24	$169.62	$339.24	$129.46	$258.92		
6"	N/A	N/A	$334.86	$669.72	$334.86	$669.72	$254.50	$509.00		
8"	N/A	N/A	$533.11	$1,066.22	$533.11	$1,066.22	$404.54	$809.08		
10"	N/A	N/A	$764.40	$1,528.80	$764.40	$1,528.80	N/A	N/A		
12"	N/A	N/A	$1,491.31	$2,982.62	$1,449.50	$2,899.00	N/A	N/A		
Under 4"									$10.36	$20.72
4" and Over									$24.19	$48.38

Section 1.02 - Water Within City Limits — 799918 | 3056 | Water Sales - Metered

Water sold to consumers within the corporate limits of the City of Sunnyvale shall be sold at the rates specified. All users shall pay a water charge for each one-hundred cubic feet (equal to 748 gallons), or part thereof, of water as follows. In residential developments where two (2) or more dwelling units are served by a common meter, the upper limit (in cubic feet) of each rate block shall be multiplied by the dwelling units served by the common meter in calculating the rates to be applied to water usage monitored by the common meter. In such case, the lower limit of each rate block shall be one (1) cubic foot over the upper limit of the next lower rate block.

Customer Class	Tiered Rate Thresholds (CCF)				Volume Rates by Tier (per CCF)			
	Tier 1	Tier 2	Tier 3	Tier 4	Tier 1	Tier 2	Tier 3	Tier 4
Residential								
Monthly	0-4	5-15	16-45	46 +	$2.76	$4.87	$7.02	$9.13
Bi-monthly	0-8	9-30	31-90	91 +	$2.76	$4.87	$7.02	$9.13
Commercial								
Monthly	0-6	7-2500	2501 +	N/A	$2.76	$4.87	$7.02	N/A
Bi-Monthly	0-12	13-5000	5001 +	N/A	$2.76	$4.87	$7.02	N/A

	Rate per CCF
Landscape	$5.80
Agricultural	$2.76
Institutional	$2.76
Recycled Water	
Landscape	$5.23
Institutional	$2.48

	Rate per CCF
Water lost due to leaks	$3.35

In the event that the City's wholesale water providers increase their rates during the year, a pass-through surcharge will be assessed. The formula for the surcharge is as follows: Total expected cost increase for wholesale water purchases through the fiscal year end divided by the total budgeted expenditures for the purchase of wholesale water for the remainder of the fiscal year. The percentage determined by this calculation will be applied to each unit of water used for the balance of the fiscal year.

Section 1.03 - Water Outside the City Limits — 799918 | 3056 | Water Sales - Metered

The charges for all water, except reclaimed water, delivered through water meters to consumers outside the corporate limits of the City shall be equal to the charges set forth in Sections 1.01 and 1.02.

CITY OF SUNNYVALE
FISCAL YEAR 2015/16
PROPOSED UTILITY FEE SCHEDULE

	Charge Code	Object Level 3	Title (Obj. Lvl. 3)
Section 1.04 - Residential Wastewater Fees	799921	3066	City Wastewater Fees

The monthly rate for wastewater service for residential users shall be the following charge for each dwelling unit.

Customer Class	Monthly	Bi-monthly
Single-Family	$39.71	$79.42
All other residential	$25.63	$51.26

	Charge Code	Object Level 3	Title (Obj. Lvl. 3)
Section 1.05 - Commercial Wastewater Fees	799921	3066	City Wastewater Fees

The monthly rate for wastewater service for each commercial user shall be the following charge for each one hundred (100) cubic feet or fraction thereof of sanitary sewage and waste discharge from the premises.

Customer Class	Per 100 cubic feet
Low Strength	$3.54
Standard Strength	$3.92
High Strength	$6.70

	Charge Code	Object Level 3	Title (Obj. Lvl. 3)
Section 1.06 - Significant Industrial User Wastewater Charges	799921	3066	City Wastewater Fees

The monthly rate for wastewater service for all significant industrial users for each one hundred (100) cubic feet or fraction thereof, of sanitary sewage and waste discharge from the premises shall be the annual total flow in hundred cubic feet divided into the sum of the following:

Wastewater Characteristics	
Per 1,000,000 gallons of sewage discharged	$3,703.44
Per 1,000 pounds of "suspended solids" discharged	$1,347.81
Per 1,000 pounds of total organic carbon discharged	$1,747.90
Per 1,000 pounds of ammonia nitrogen discharged	$5,318.70

The monthly rate shall not be less than the Standard Strength rate for commercial premises.

	Charge Code	Object Level 3	Title (Obj. Lvl. 3)
Section 1.07 - Wastewater Outside the City Limits	799921	3066	City Wastewater Fees

The charges for all wastewater services provided to consumers outside the corporate limits of the City shall be equal to the charges set forth in Sections 1.04, 1.05 and 1.06.

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

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Resolution No. _

Resolution of the Council of the City of Sunnyvale Adopting the 2015 Urban Water Management Plan to be Submitted to the California Department of Resources

RECITALS

A. The California Legislature has enacted the Urban Water Management Planning Act, California Water Code Sections 10610 -10656, as amended, which requires every urban water supplier providing water to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually to prepare an urban water management plan ("Plan") that has asits primary objective the conservation and efficient use of water.

B. The City of Sunnyvale ("City"), a municipal utility and chartered city, is an urban water supplier providing water to a population over 148,000.

C. The Plan must be reviewed at least once every five years by the City, which must amend the Plan, as necessary, after it has conducted a review.

D. The preparation of the updated Plan has been coordinated with other public agencies to the extent practicable,

E. The Plan must be adopted by July 1, 2016, after it is first made available for public inspection and a public hearing is noticed and held, and it must be filed with the California Department of Water Resources within thirty days of adoption.

F. After reviewing a draft Plan at their May 23, 2016 meeting, the Planning Commission that the Council adopt the Plan as presented; and

G. A noticed public hearing on the revised draft Plan was held by the City Council on June 21, 2016, at which time public comments were heard and considered.

NOW, THEREFORE, the Council of the City of Sunnyvale RESOLVES as follows:

SECTION 1. The Council hereby adopts the 2015 Urban Water Management Plan of the City of Sunnyvale, which shall be filed with the

City Clerk. The City Manager is hereby authorized and directed to file the 2015 Urban Water Management Plan of the City of Sunnyvale with the California Department of Water Resources and the State Library.

SECTION 2. The Council finds and determines that, under the California Water Code Section 10652, the adoption of the Plan and this resolution does not constitute a project under the California Environmental Quality Act, and no environmental assessment is required.

INTRODUCED AND PASSED:

AYES:

NOES:

ABSENT:

ATTEST:

City Clerk	Mayor
APPROVED AS TO FORM:	APPROVED:
City Attorney	City Manager

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

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Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015
4310014 NCRO	City of Sunnyvale	28,912	18,402
	TOTAL	28,912	18,402
NOTES:			

Table 2-2: Plan Identification			
Select Only One	Type of Plan		Name of RUWMP or Regional Alliance *if applicable* *drop down list*
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

Table 2-3: Agency Identification	
Type of Agency (select one or both)	
☐	Agency is a wholesaler
☑	Agency is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables Are in Calendar Years
☐	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Date that the Fiscal Year Begins (mm/dd)	
Units of Measure Used in UWMP (select from Drop down)	
Unit	AF
NOTES:	

Table 2-4 Retail: Water Supplier Information Exchange
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name *(Add additional rows as needed)*
Santa Clara Valley Water District (SCVWD)
San Francisco Public Utilties Commission (SFPUC)
NOTES:

Table 3-1 Retail: Population - Current and Projected						
Population Served	2015	2020	2025	2030	2035	2040*(opt)*
	148,028	154,671	161,314	167,957	174,600	181,243
NOTES:						

Table 4-1 Retail: Demands for Potable and Raw Water - Actual			
Use Type *(Add additional rows as needed)*	2015 Actual		
Drop down list *May select each use multiple times* *These are the only Use Types that will be recognized by the WUEdata online submittal tool*	Additional Description *(as needed)*	Level of Treatment When Delivered *Drop down list*	Volume
Single Family		Drinking Water	5,449
Multi-Family		Drinking Water	4,452
Commercial		Drinking Water	3,806
Landscape		Drinking Water	1,374
Other	Firelines	Drinking Water	9
		TOTAL	15,090

NOTES:

Table 4-2 Retail: Demands for Potable and Raw Water - Projected

Use Type *(Add additional rows as needed)*	Additional Description *(as needed)*	Projected Water Use *Report To the Extent that Records are Available*				
Drop down list *May select each use multiple times* *These are the only Use Types that will be recognized by the WUEdata online submittal tool*		2020	2025	2030	2035	2040-opt
Single Family		7,619	7,796	7,563	7,351	
Multi-Family		5,575	5,705	5,534	5,379	
Commercial		6,722	7,952	8,986	10,268	
Landscape		2,288	2,341	2,271	2,208	
Other	Fire	10	10	10	10	
	TOTAL	22,214	23,804	24,364	25,216	0

NOTES:

Table 4-3 Retail: Total Water Demands						
	2015	2020	2025	2030	2035	2040 *(opt)*
Potable and Raw Water *From Tables 4-1 and 4-2*	15,090	22,214	23,804	24,364	25,216	0
Recycled Water Demand* *From Table 6-4*	717	1,456	1,567	1,680	1,680	0
TOTAL WATER DEMAND	15,807	23,670	25,371	26,044	26,896	0

**Recycled water demand fields will be blank until Table 6-4 is complete.*

NOTES:

Table 4-4 Retail: 12 Month Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss*
01/2015	1

** Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.*

NOTES:

Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *Drop down list (y/n)*	yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, etc... utilized in demand projections are found.	Section 8.3
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	yes
NOTES:	

Table 5-1 Baselines and Targets Summary *Retail Agency or Regional Alliance Only*					
Baseline Period	Start Year	End Year	Average Baseline GPCD*	2015 Interim Target *	Confirmed 2020 Target*
10-15 year	*1995*	*2004*	*174*	*166*	*158*
5 Year	*2004*	*2007*	*167*		
*All values are in Gallons per Capita per Day (GPCD)					
NOTES:					

Table 5-2: 2015 Compliance *Retail Agency or Regional Alliance Only*								
Actual 2015 GPCD*	2015 Interim Target GPCD*	**Optional Adjustments to 2015 GPCD** Enter "0" if no adjustment is made *From Methodology 8*					2015 GPCD* *(Adjusted if applicable)*	Did Supplier Achieve Targeted Reduction for 2015? Y/N
		Extraordinary Events*	Economic Adjustment*	Weather Normalization*	TOTAL Adjustments*	Adjusted 2015 GPCD*		
99	166				0	99	99	Yes
**All values are in Gallons per Capita per Day (GPCD)*								
NOTES:								

Table 6-1 Retail: Groundwater Volume Pumped						
☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2011	2012	2013	2014	2015
Add additional rows as needed						
Alluvial Basin	Santa Clara Plain Subarea	467	142	123	2064	148
	TOTAL	467	142	123	2,064	148
NOTES:						

Table 6-2 Retail: Wastewater Collected Within Service Area in 2015						
☐	There is no wastewater collection system. The supplier will not complete the table below.					
	Percentage of 2015 service area covered by wastewater collection system *(optional)*					
	Percentage of 2015 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected from UWMP Service Area 2015	Name of Wastewater Treatment Agency Receiving	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
Add additional rows as needed						
City of Sunnyvale	Metered	13,476	City of Sunnyvale	Sunnyvale WPCP	Yes	No
Total Wastewater Collected from Service Area in 2015:		13,476				
NOTES:						

Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2015									
☐	No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table below.								
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level *Drop down list*	2015 volumes			
						Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Add additional rows as needed									
Sunnyvale WPCP	Moffett Channel	Discharge via Moffett Channel and Guadalupe Slough	Bay or estuary outfall	No	Secondary, Disinfected - 2.2	13,476	11,300	7,981	0
					Total	13,476	11,300	7,981	0

NOTES:

Table 6-4 Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area								
☐	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.							
Name of Agency Producing (Treating) the Recycled Water:								
Name of Agency Operating the Recycled Water Distribution System:								
Supplemental Water Added in 2015								
Source of 2015 Supplemental Water								
Beneficial Use Type	General Description of 2015 Uses	Level of Treatment *Drop down list*	2015	2020	2025	2030	2035	2040 (opt)
Agricultural irrigation								
Landscape irrigation (excludes golf courses)	Parks, Commercial, School Irrigaiton	Tertiary	428	715	770	825	825	
Golf course irrigation	Fairway Irrigaiton	Tertiary	256	290	312	335	335	
Commercial use	Dual Plumbing	Tertiary	28	331	356	382	382	
Industrial use	Construction	Tertiary	5	120	129	138	138	
Geothermal and other energy production								
Seawater intrusion barrier								
Recreational impoundment								
Wetlands or wildlife habitat								
Groundwater recharge (IPR)*								
Surface water augmentation (IPR)*								
Direct potable reuse								
Other *(Provide General Description)*								
		Total:	717	1,456	1,567	1,680	1,680	0
**IPR - Indirect Potable Reuse*								
NOTES:								

Table 6-5 Retail: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual		
☐	Recycled water was not used in 2010 nor projected for use in 2015. The supplier will not complete the table below.	
Use Type	**2010 Projection for 2015**	**2015 Actual Use**
Agricultural irrigation		
Landscape irrigation (excludes golf courses)	870	428
Golf course irrigation		256
Commercial use		28
Industrial use	2	5
Geothermal and other energy production		
Seawater intrusion barrier	2	
Recreational impoundment		
Wetlands or wildlife habitat		
Groundwater recharge (IPR)		
Surface water augmentation (IPR)		
Direct potable reuse		
Other — *Type of Use*		
Total	874	717
NOTES:		

Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
☐	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Add additional rows as needed			
Reduced Pricing of Recycled water	Recycled water is discounted 10% of potable water cost	On-going	Unknown
Retrofit assistance for irrigation systems	Retrofit of dedicated irrigation meters	On-going	Unknown
Public Education/informaiton	Dual plumb new commercial buildings	On-going	963
Permit Process enhancement	Public outreach and marketing to increase awareness	On-going	Unknown
Dual Plumbing standards	Provide fast-tracked permit processing for recycled water applications	On-going	Unknown
		Total	963
NOTES:			

Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☐	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other agencies?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Agency *This may be a range*
	Drop Down List (y/n)	*If Yes, Agency Name*				
Add additional rows as needed						
Improve Recycled Water Production	Yes	SCVWD	Move away from batch process	2017	Average Year	963

NOTES:

Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2015		
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		Actual Volume	Water Quality *Drop Down List*	Total Right or Safe Yield *(optional)*
Add additional rows as needed				
Purchased or Imported Water	SFPUC	8,883	Drinking Water	
Purchased or Imported Water	SCVWD	6,497	Drinking Water	
Groundwater	Wells	134	Drinking Water	
Recycled Water	Tertiary treated	717	Recycled Water	
	Total	16,231		0
NOTES:				

Table 6-9 Retail: Water Supplies — Projected									
Water Supply	Additional Detail on Water Supply	**Projected Water Supply** *Report To the Extent Practicable*							
		2020		**2025**		**2030**		**2035**	
Drop down list *May use each category multiple times. These are the only water supply categories that will*		Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*
Add additional rows as needed									
Purchased or Imported Water	SFPUC	11,124	14,100	12,266	14,100	12,266	14,100	12,266	14,100
Purchased or Imported Water	SCVWD	10,642		11,202		11,762		12,614	
Groundwater	Wells	448	8,000	336	8,000	336	8,000	336	8,000
Recycled Water	Tertiary	1,456		1,567		1,680		1,680	
	Total	23,670	22,100	25,371	22,100	26,044	22,100	26,896	22,100

NOTES: The City has the ability to purchase additional available water from SCVWD during non-dry years when water is available.

Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 *(Opt)*
Supply totals (*autofill from Table 6-9)*	23,670	25,371	26,044	26,896	0
Demand totals *(autofill from Table 4-3)*	23,670	25,371	26,044	26,896	0
Difference	0	0	0	0	0
NOTES:					

Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals	23,670	25,372	26,044	26,896	
Demand totals	23,670	25,372	26,044	26,896	
Difference	0	0	0	0	0

NOTES:

Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison

		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	23,670	25,372	26,044	26,896	
	Demand totals	23,670	25,372	26,044	26,896	
	Difference	0	0	0	0	0
Second year	Supply totals	24,011	25,506	26,214	26,919	
	Demand totals	24,011	25,506	26,214	26,919	
	Difference	0	0	0	0	0
Third year	Supply totals	24,351	25,641	26,385	26,941	
	Demand totals	24,351	25,641	26,385	26,941	
	Difference	0	0	0	0	0

NOTES:

Table 8-1 Retail
Stages of Water Shortage Contingency Plan

Stage	Complete Both	
	Percent Supply Reduction[1] *Numerical value as a percent*	Water Supply Condition (*Narrative description)*
Add additional rows as needed		
0	0%	Supply conditions are adequate. The City continues to encourage water conservation and water use efficiency
1	up to 15%	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 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 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	45% and over	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.

[1] *One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.*

NOTES:

Table 8-2 Retail Only: Restrictions and Prohibitions on End Uses			
Stage	Restrictions and Prohibitions on End Users ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? *Drop Down List*
Add additional rows as needed			
0	Other - Require automatic shut of hoses		No
0	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner		No
0	Pools - Allow filling of swimming pools only when an appropriate cover is in place.		No
0	CII - Restaurants may only serve water upon request		No
0	CII - Lodging establishment must offer opt out of linen service		No
0	CII - Other CII restriction or prohibition	Prohibit single pass cooling process in new construction	No
0	Other water feature or swimming pool restriction	Must recirculate	No
0	Landscape - Restrict or prohibit runoff from landscape irrigation		No
0	Landscape - Limit landscape irrigation to specific times		No
0	Landscape - Prohibit certain types of landscape irrigation		No
1	Other	Hydrant flushing	No
2	Landscape - Limit landscape irrigation to specific days		Yes
3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water		Yes
3	Landscape - Prohibit certain types of landscape irrigation	Watering of turf	Yes
3	Landscape - Other landscape restriction or prohibition	New lawn installations	Yes
4	Other water feature or swimming pool restriction	No new swimming pools	Yes
4	Landscape - Prohibit all landscape irrigation	No new swimming pools	Yes
4	Other	Filling or refilling swimming pools	Yes
NOTES:			

Table 8-3 Retail Only: Stages of Water Shortage Contingency Plan - Consumption Reduction Methods		
Stage	Consumption Reduction Methods by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*
Add additional rows as needed		
0	Other	
0	Offer Water Use Surveys	
0	Provide Rebates on Plumbing Fixtures and Devices	
0	Provide Rebates for Landscape Irrigation Efficiency	
0	Provide Rebates for Turf Replacement	
1	Decrease Line Flushing	
1	Reduce System Water Loss	
2	Expand Public Information Campaign	
3	Increase Water Waste Patrols	
NOTES:		

Table 8-4 Retail: Minimum Supply Next Three Years			
	2016	2017	2018
Available Water Supply	17,719	19,207	20,694
NOTES:			

Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
ALAMEDA COUNTY WATER DISTRICT	☑	☑
CITY OF HAYWARD	☑	☑
CITY OF MILPITAS	☑	☑
CITY OF MOUNTAIN VIEW	☑	☑
CITY OF PALO ALTO	☑	☑
CITY OF SANTA CLARA	☑	☑
STANFORD UNIVERSITY	☑	☑
PURISSMA HILLS WATER DISTRICT	☑	☑
CITY OF BRISBANE	☑	☑
CITY OF BURLINGAME	☑	☑
CITY OF DALY CITY	☑	☑
TOWN OF HILSBOROUGH	☑	☑
CITY OF MENLO PARK	☑	☑
CITY OF MILLBRAE	☑	☑
CITY OF REDWOOD CITY	☑	☑
CITY OF SAN BRUNO	☑	☑
COASTSIDE COUNTY WATER DISTRICT	☑	☑
SANTA CLARA VALLEY WATER DISTRICT	☑	☑
MID-PENINSULA WATER DISTRICT	☑	☑
NORTH COAST COUNTY WATER DISTRICT	☑	☑
CITY OF EAST PALO ALTO	☑	☑
WESTBOROUGH WATER DISTRICT	☑	☑
CALIFORNIA WATER SERVICE COMPANY	☑	☑
GREAT OAKS WATER COMPANY	☑	☑
SAN JOSE WATER COMPANY	☑	☑
CITY OF SAN JOSE	☑	☑
CITY OF GILROY	☑	☑
CITY OF MORGAN HILL	☑	☑
SAN JOSE/SANTA CLARA WATER POLLUTION PLANT	☑	☑
BAY AREA WATER SUPPLY & CONSERVATION AGENCY	☑	☑
SAN FRANCISCO PUBLIC UTILITIES COMMISSION	☑	☑
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Santa Clara County	☑	☑

SB X7-7 Table 0: Units of Measure Used in UWMP*   *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent with Table 2-3*
NOTES:

SB X7-7 Table-1: Baseline Period Ranges

Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	24932	Acre Feet
	2008 total volume of delivered recycled water	1576	Acre Feet
	2008 recycled water as a percent of total deliveries	6.32%	Percent
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	1995	
	Year ending baseline period range[3]	2004	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2003	
	Year ending baseline period range[4]	2007	

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

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

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

NOTES:

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

SB X7-7 Table 3: Service Area Population		
Year		Population
10 to 15 Year Baseline Population		
Year 1	1995	124,333
Year 2	1996	125,841
Year 3	1996	128,168
Year 4	1996	129,464
Year 5	1996	131,127
Year 6	1996	131,760
Year 7	1996	132,592
Year 8	1996	133,424
Year 9	1996	134,256
Year 10	1996	135,088
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2003	131,769
Year 2	2004	131,647
Year 3	2004	131,853
Year 4	2004	132,630
Year 5	2004	134,232
2015 Compliance Year Population		
2015		148,028
NOTES:		

SB X7-7 Table 4: Annual Gross Water Use *								
Baseline Year *Fm SB X7-7 Table 3*		Volume Into Distribution System *This column will remain blank until SB X7-7 Table 4-A is completed.*	Deductions					Annual Gross Water Use
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water *This column will remain blank until SB X7-7 Table 4-B is completed.*	Water Delivered for Agricultural Use	Process Water *This column will remain blank until SB X7-7 Table 4-D is completed.*	
10 to 15 Year Baseline - Gross Water Use								
Year 1	1995	23,175			-		-	23,175
Year 2	1996	25,747			-		-	25,747
Year 3	1996	26,391			-		-	26,391
Year 4	1996	24,961			-		-	24,961
Year 5	1996	25,987			-		-	25,987
Year 6	1996	25,650			-		-	25,650
Year 7	1996	26,009			-		-	26,009
Year 8	1996	25,853			-		-	25,853
Year 9	1996	25,312			-		-	25,312
Year 10	1996	25,021			-		-	25,021
10 - 15 year baseline average gross water use								**25,411**
5 Year Baseline - Gross Water Use								
Year 1	2003	25,312			-		-	25,312
Year 2	2004	25,021			-		-	25,021
Year 3	2004	24,582			-		-	24,582
Year 4	2004	23,887			-		-	23,887
Year 5	2004	24,880			-		-	24,880
5 year baseline average gross water use								**24,736**
2015 Compliance Year - Gross Water Use								
2015		16,351	-		-		-	**16,351**
* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3								

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)

Complete one table for each source.

Name of Source	Well

This water source is:

☑	The supplier's own water source
☐	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1995	1,132		1,132
Year 2	1996	**616**		616
Year 3	1996	**630**		630
Year 4	1996	**667**		667
Year 5	1996	**713**		713
Year 6	1996	**1,649**		1,649
Year 7	1996	**1,189**		1,189
Year 8	1996	**1,367**		1,367
Year 9	1996	**1,521**		1,521
Year 10	1996	**1,395**		1,395
5 Year Baseline - Water into Distribution System				
Year 1	2003	**1,521**		1,521
Year 2	2004	**1,395**		1,395
Year 3	2004	**1,631**		1,631
Year 4	2004	**1,113**		1,113
Year 5	2004	**2,696**		2,696
2015 Compliance Year - Water into Distribution System				
2015		**148**		148

NOTES:

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source		Recycled Water		
This water source is:				
☑	The supplier's own water source			
☐	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1,995	0		0
Year 2	1,996	**0**		0
Year 3	1,996	**0**		0
Year 4	1,996	**0**		0
Year 5	1,996	**639**		639
Year 6	1,996	**437**		437
Year 7	1,996	**1,317**		1,317
Year 8	1,996	**1,296**		1,296
Year 9	1,996	**1,823**		1,823
Year 10	1,996	**1,783**		1,783
5 Year Baseline - Water into Distribution System				
Year 1	2,003	**1,823**		1,823
Year 2	2,004	**1,783**		1,783
Year 3	2,004	**1,851**		1,851
Year 4	2,004	**1,928**		1,928
Year 5	2,004	**1,874**		1,874
2015 Compliance Year - Water into Distribution System				
2015		**729**		729

NOTES:

SB X7-7 Table 4-A: Volume Entering the Distribution

Name of Source	SFPUC			
This water source is:				
☐	The supplier's own water source			
☑	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional* *(+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1,995	12,552		12,552
Year 2	1,996	12,216		12,216
Year 3	1,996	12,372		12,372
Year 4	1,996	11,916		11,916
Year 5	1,996	11,058		11,058
Year 6	1,996	11,192		11,192
Year 7	1,996	10,730		10,730
Year 8	1,996	10,096		10,096
Year 9	1,996	11,195		11,195
Year 10	1,996	9,927		9,927
5 Year Baseline - Water into Distribution System				
Year 1	2,003	11,195		11,195
Year 2	2,004	9,927		9,927
Year 3	2,004	10,868		10,868
Year 4	2,004	10,322		10,322
Year 5	2,004	10,723		10,723
2015 Compliance Year - Water into Distribution System				
2015		8882		8,882

NOTES:

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source		SCVWD		
This water source is:				
☐	The supplier's own water source			
☑	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional* *(+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1,995	9,491		9,491
Year 2	1,996	12,915		12,915
Year 3	1,996	13,389		13,389
Year 4	1,996	12,378		12,378
Year 5	1,996	13,577		13,577
Year 6	1,996	12,372		12,372
Year 7	1,996	12,773		12,773
Year 8	1,996	13,094		13,094
Year 9	1,996	10,773		10,773
Year 10	1,996	11,916		11,916
5 Year Baseline - Water into Distribution System				
Year 1	2,003	10,773		10,773
Year 2	2,004	11,916		11,916
Year 3	2,004	10,232		10,232
Year 4	2,004	10,524		10,524
Year 5	2,004	9,587		9,587
2015 Compliance Year - Water into Distribution System				
2015		**6592**		6,592
NOTES:				

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)

Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1995	124,333	23,175	166
Year 2	1996	125,841	25,747	183
Year 3	1996	128,168	26,391	184
Year 4	1996	129,464	24,961	172
Year 5	1996	131,127	25,987	177
Year 6	1996	131,760	25,650	174
Year 7	1996	132,592	26,009	175
Year 8	1996	133,424	25,853	173
Year 9	1996	134,256	25,312	168
Year 10	1996	135,088	25,021	165
10-15 Year Average Baseline GPCD				**174**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2003	131,769	25,312	171
Year 2	2004	131,647	25,021	170
Year 3	2004	131,853	24,582	166
Year 4	2004	132,630	23,887	161
Year 5	2004	134,232	24,880	165
5 Year Average Baseline GPCD				**167**
2015 Compliance Year GPCD				
2015		148,028	16,351	**99**

NOTES:

SB X7-7 Table 6: Gallons per Capita per Day *Summary From Table SB X7-7 Table 5*	
10-15 Year Baseline GPCD	174
5 Year Baseline GPCD	167
2015 Compliance Year GPCD	99
NOTES:	

SB X7-7 Table 7: 2020 Target Method
Select Only One

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

NOTES:

SB X7-7 Table 7-A: Target Method 1 20% Reduction	
10-15 Year Baseline GPCD	**2020 Target GPCD**
174	**139**
NOTES:	

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target			
5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target[1]	Calculated 2020 Target[2]	**Confirmed 2020 Target**
167	158		**158**

[1] Maximum 2020 Target is 95% of the 5 Year Baseline GPCD except for suppliers at or below 100 GPCD.

[2] 2020 Target is calculated based on the selected Target Method, see SB X7-7 Table 7 and corresponding tables for agency's calculated target.

NOTES:

SB X7-7 Table 8: 2015 Interim Target GPCD		
Confirmed 2020 Target *Fm SB X7-7 Table 7-F*	10-15 year Baseline GPCD *Fm SB X7-7 Table 5*	**2015 Interim Target GPCD**
158	174	**166**

NOTES:

SB X7-7 Table 9: 2015 Compliance								
Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments *(in GPCD)* Enter "0" if Adjustment Not Used: Extraordinary Events	Weather Normalization	Economic Adjustment	TOTAL Adjustments	Adjusted 2015 GPCD	2015 GPCD *(Adjusted if applicable)*	**Did Supplier Achieve Targeted Reduction for 2015?**
99	166	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	-	99	99	**YES**

NOTES:

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