California Senate Bill 610

Water Supply Assessment

for

Sunnyvale General Plan – Land Use and Transportation Element (LUTE)

Prepared for
The City of Sunnyvale

by:

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INTERNATIONAL

November 2015

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City of Sunnyvale Draft LUTE
Water Supply Assessment

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ACRONYMS and ABBREVIATIONS

AB	Assembly Bill
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
BMP	Best Management Practices
CA	California
CALFED	California and Federal Bay-Delta Program
CALSIM	California Water Allocation and Reservoir Operations Model
CCF	Hundred Cubic Feet
CEQA	California Environmental Quality Act
CII	Commercial, Industrial and Institutional
CIMIS	California Irrigation Management Information System
CIP	Capital Improvement Program
CPTP	Coastal Pumping Transfer Program
CRA	Colorado River Aqueduct
CUWCC	California Urban Water Conservation Council
CDPH	California Department of Public Health
CVP	Central Valley Project
DBP	Disinfection Byproducts
DMM	Demand Management Measure
DU	Dwelling Unit
DWR	Department of Water Resources
DYY	Dry Year Yield
EIR	Environmental Impact Report
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ETo	Evapotranspiration
GP	General Plan
gpd	Gallons Per Day
gpf	Gallons Per Flush
gpm	Gallons Per Minute
I/O/C	Industrial/Office/Commercial
IAWP	Interim Agricultural Water Program
IRP	Integrated Resources Plan
IRWM	Integrated Regional Water Management
ITR	Industrial to Residential
KSF	Thousand Square Feet
LUTE	Land Use and Transportation Element
LSAP	Lawrence Station Area Plan
LRP	Local Resources Program
MAF	Million Acre Feet
Max	Maximum
MCL	Maximum Contaminant Level
MGD	Million Gallons per Day
mg/L	Milligrams Per Liter
Min	Minimum
MOU	Memorandum of Understanding
RP	Regional Plant

RWIP	Recycled Water Implementation Plan
RWQCB	Regional Water Quality Control Board
RWS	Regional Water System
SB	Senate Bill
SCADA	Supervisory Control Data Acquisition System
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
TDS	Total Dissolved Solids
TIN	Total Inorganic Nitrogen
TMDL	Total Maximum Daily Load
USBR	U.S. Bureau of Reclamation
UWMP	Urban Water Management Plan
VOC	Volatile Organic Compounds
WSA	Water Supply Assessment
WSDM	Water Surplus and Drought Management
WTP	Water Treatment Plant
WUMP	Water Utility Master Plan

EXECUTIVE SUMMARY

The City of Sunnyvale consolidated the current General Plan under one cover in July 2011. The consolidation General Plan was assembled from 22 different General Plan elements and sub-elements, each of which had been developed and adopted at different times. The City is currently reviewing and updating the Land Use and Transportation Element (Chapter 3), which was adopted in 1997, to establish goals and policies that will move the City towards a *Complete Community*.

The City's update of the Land Use and Transportation Element (LUTE), currently in draft status, proposes to increase the land use within the City limits from that which is identified in the current General Plan. 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. In this particular case, the LUTE update incorporates multiple development projects and growth areas within the City. 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 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 over a 20+ year planning period, 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 purpose of the LUTE is to help move Sunnyvale towards a complete community, which promotes a sustainable place to live that is encouraging to less automobiles. The LUTE objectives are listed below:

- Complete Community
- Regional Planning Coordination
- Neighborhood and Transit-Oriented Place-Making
- Economic Development
- Multi-Modal Transportation
- Health Living
- Attractive Design
- Special and Unique Land Uses
- Diverse Housing Opportunities
- Neighborhood Preservation

The LUTE also outlines the planned and existing projects. Two Projects that will be significantly affected by the upcoming change to the general plan are the Peery Park Specific Plan (PPSP) and Lawrence Station Area Plan (LSAP). PPSP and LSAP are both in the future plan to develop future plans to guide land use and development to create complete communities.

The PPSP area is an approximately 446 net acre study area composed of existing industrial business park and is delineated as a future specific plan. The project area has roughly 7 million square feet (sf) of existing development and about 0.5 million sf construction and a remaining build out, under current zoning, of roughly 9 million sf. The PPSP, as currently recommended, would allow an additional sf increase (over the existing general plan) of 1.3 sf for a total of 9.7 sf within the district at project build out. The purpose of the project is to guide the proposed project in the location, intensity, and design of industrial and commercial buildings to create a cutting-edge workplace district. The PPSP would allow replacement of some of the existing one and two story buildings with maximum four to six story buildings with functional open space and adequate parking.. The PPSP will also include new streetscape and roadway improvements as well as increased bicycle and pedestrian amenities.

Similar to LSAP is a planned project focused on redeveloping an existing area to into a more usable community. Lawrence Station is currently a Caltrain Station that is infrequently used in comparison to the other Caltrain stations. Lawrence Station is part of a large study area to increase circulation and coordination of systems between land uses and cities. Lawrence station total build out will result in approximately 3,500 residential units, 3.6 million square feet of office/R&D development, approximately 217,000 square feet of retail space, and 26,500 square feet of industrial space. These values include all existing residential which will remain and be protected.

Water Supply

As described in the City's 2010 Urban Water Management Plan (UWMP) update, 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 Regional Water System (SFPUC), imported water from Santa Clara Valley Water District (SCVWD), and recycled water.

- The City of Sunnyvale has groundwater supplied by 6 wells. The groundwater wells are used as a supplemental source to the imported water. Local groundwater from Santa Clara Subbasin supplies about half of the county's water supply during typical years. SCVWD also provides the City with groundwater.

- The City receives water from the City and County of San Francisco's Regional Water System 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" (WSA). 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).

- The City has a 75 year term contract with Santa Clara Valley Water District (SCVWD) which started in 1976. 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.

- In 1991 a wastewater reclamation program was developed to reuse 20% to 30% of the high-quality effluent from the Sunnyvale Water Pollution Plant. This recycled wastewater program serves parks, golf courses, and landscaping needs. The goal of this project is to use the Plant to its full capacity and reuse 10 MGD for treatment of wastewater. The current amount of wastewater that meets recycled water standard is about 811 AFY and the goal in 2035 is about 2,298 AFY.

Water Demand

The City's current estimated average total potable and recycled demand is 21,973 AFY. The City's 2010 UWMP accounted for build-out of the General Plan by year 2030. However the Draft LUTE update is proposing additional development within the City. The Draft LUTE water demand is estimated to add 2,274 AFY to the system by 2035 beyond the existing General Plan and LUTE. Combined with the build-out of the rest of the City, total City water demand is anticipated to increase to 30,701 AFY by 2035 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 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 demonstrate that the City has water supply contracts with SFPUC and SCVWD that can satisfy demand through the year 2035 (LUTE build out).

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.

Prevailing 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. 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 LUTE changes.

1.0 INTRODUCTION

The City of Sunnyvale consolidated the current General Plan under one cover in July 2011. The consolidation General Plan was assembled from 22 different General Plan elements and sub-elements, each of which had been developed and adopted at different times. The City is currently reviewing and updating the Land Use and Transportation Element (Chapter 3), which was adopted in 1997, to establish goals and policies that will move the City towards a *Complete Community*.

The overall focus of the Sunnyvale General Plan is to guide the physical development of the City. The Land Use and Transportation Element (LUTE) establishes the fundamental framework of how the City will be laid out (streets and buildings) and how various land uses, developments and transportation facilities will function together. The LUTE and accompanying policies have been developed to help guide the City's land use and transportation decisions for an approximate 25 year horizon – a timeframe that is referred to as *Horizon 2035*. The framework is based on a concept of a *Complete Community* – an attractive, green, sustainable place that is accessible for all residents.

In general, the transportation policies guide how the roadways and streets will function and how space on the roadways will be utilized by multi-modes of transportation with attention to the pedestrian and bicycle network. Both land use and transportation sections include policies that address preserving the qualities of the community that are favorable to the residents and businesses and contribute to the City's unique identity. Policies also provide guidance on the visual quality and character of new development.

The planning area for Sunnyvale includes all the land within the city limits plus a portion of the Moffett Federal Airfield. The land use policies provide direction for how much the city will change and grow and where the growth will take place. The LUTE presents a long-term growth scenario for Sunnyvale that includes additional mixed use residential/commercial growth in key transit-oriented areas and in transformed Village Centers. Areas for additional business (or industrial) growth are also identified. The plan lays out a new path for the City's future that is responsive to the needs of Sunnyvale's diverse population.

The City's update of the LUTE, currently in draft status, proposes to increase the land use within the City limits from that which is identified in the current General Plan. 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. In this particular case, the draft LUTE incorporates multiple development projects and growth areas within the City. 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 projects.** The proposed location of the changed conditions in the City is shown in **Exhibit 1**.

The specific growth elements contained within the draft LUTE 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 4,362,600 square feet of industrial/office/commercial building space and the addition of 5,525 residential units over build-out under the existing General Plan and LUTE.

The WSA includes a discussion of the Senate Bill 610 legislation, an overview of the proposed land use changes identified in the draft LUTE, 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, 2010 Urban Water Management Plan, June 2011
2. City of Sunnyvale, Water Utility Master Plan, November 2010
3. Peery Park Specific Plan, Final Initial Study
4. Lawrence Station Area Plan, Draft Station Area Plan
5. City of Sunnyvale, General Plan, consolidated July 2011
6. DRAFT Land Use and Transportation Element (LUTE) Update
7. SVWD Drought 2015 Monthly Status Report, August 2015

CHANGING CONDITIONS 2010-2035

EXHIBIT1

CHARACTER OF CHANGE

PRESERVE. *Area is expected to experience minimal infill and upgrades. Fundamental purpose, form and character stay the same.*

ENHANCE. *Area is expected to experience minor infill, improvements and redevelopment. Form may change, but will stay consistent with the current character.*

TRANSFORM. *Area is expected to experience major improvements and redevelopment. Form and character will change significantly through intensification in residential density or non-residential floor area, and/or change in use*

The illustration to the right dentifies the relative amount of change that is expected to occur through 2035. This is a simplified diagram and the boundaries depicted do not coincide with actual property line boundaries.

- **Preserve**
- **Enhance**
- **Transform** - *Residential*
- **Transform** - *Office/Industrial*
- **Transform** - *Mixed-Use*

Sphere of Influence

Baylands

CARIBBEAN

JAVA

CA-237

TASMAN

FAIR OAKS

MATHILDA

US-101

CENTRAL EXPRESSWAY

MAUDE

FAIR OAKS

LAWRENCE

CALIFORNIA

ARQUES

BERNARDO

SUNNYVALE

KIFER

EVELYN

OLD SAN FRANCISCO

REED

MONROE

CA-85

REMINGTON

EL CAMINO REAL

FREMONT

HOLLENBECK

SUNNYVALE SARATOGA

WOLFE

HOMESTEAD

MARY

US-280

- Highway/Expressway
- Major Streets
- Train Station
- Light Rail Station
- Light Rail
- Railroad
- Creek
- Channel

Community Development Department, May 2015

2.0 LEGISLATION

2.1 SB 610 – Costa – Water Supply Planning

Senate Bill (SB) 610 was implemented January 2002. SB 610 requires a development that qualifies as a "Project" under Water Code 10912 to be supported with a Water Supply Assessment report drafted to specifically 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-29-15

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 by 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 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 2010 UWMP.

The Governor issued a State of Emergency and Continued State of Emergency in 2014 in response to the persistent state-wide drought. Most recently, Executive Order B-29-15 was issued by the Governor in April 2015 which essentially increases the water use reduction goal to 25 percent as compared to 2013 usage throughout the State. The EO outlines specific water use reduction orders designed to heighten the urgency to reduce water consumption and facilitate the ability of local agencies to implement and enforce water conservation requirements. It addresses facilitating funding for projects designed to increase local water supplies and improve water supply reliability. It also orders more frequent reporting and modifications to the State's Model Water Efficient Landscape Ordinance; mandates Agricultural water suppliers to prepare their Agricultural Water Management Plans by specific dates; and orders the State to coordinate their water conservation related goals with other State departments like Fish and Wildlife, Forestry and Fire Protection, and the Energy Commission.

Additionally, the State Water Resources Control Board on May 5, 2015, adopted regulations implementing Executive Order B-29-15. A copy of this regulation and other related matters are located at the SWRCB's website here:

http://www.swrcb.ca.gov/waterrights/water_issues/programs/drought/emergency_mandatory_regulations.shtml

Under this SWRCB regulation the City of Sunnyvale is required to reduce its total potable water production by 16 percent for each month as compared to the amount used in the same month in 2013.

3.0 GENERAL PLAN – LAND USE AND TRANSPORTATION ELEMENT (LUTE)

3.1 Project Description

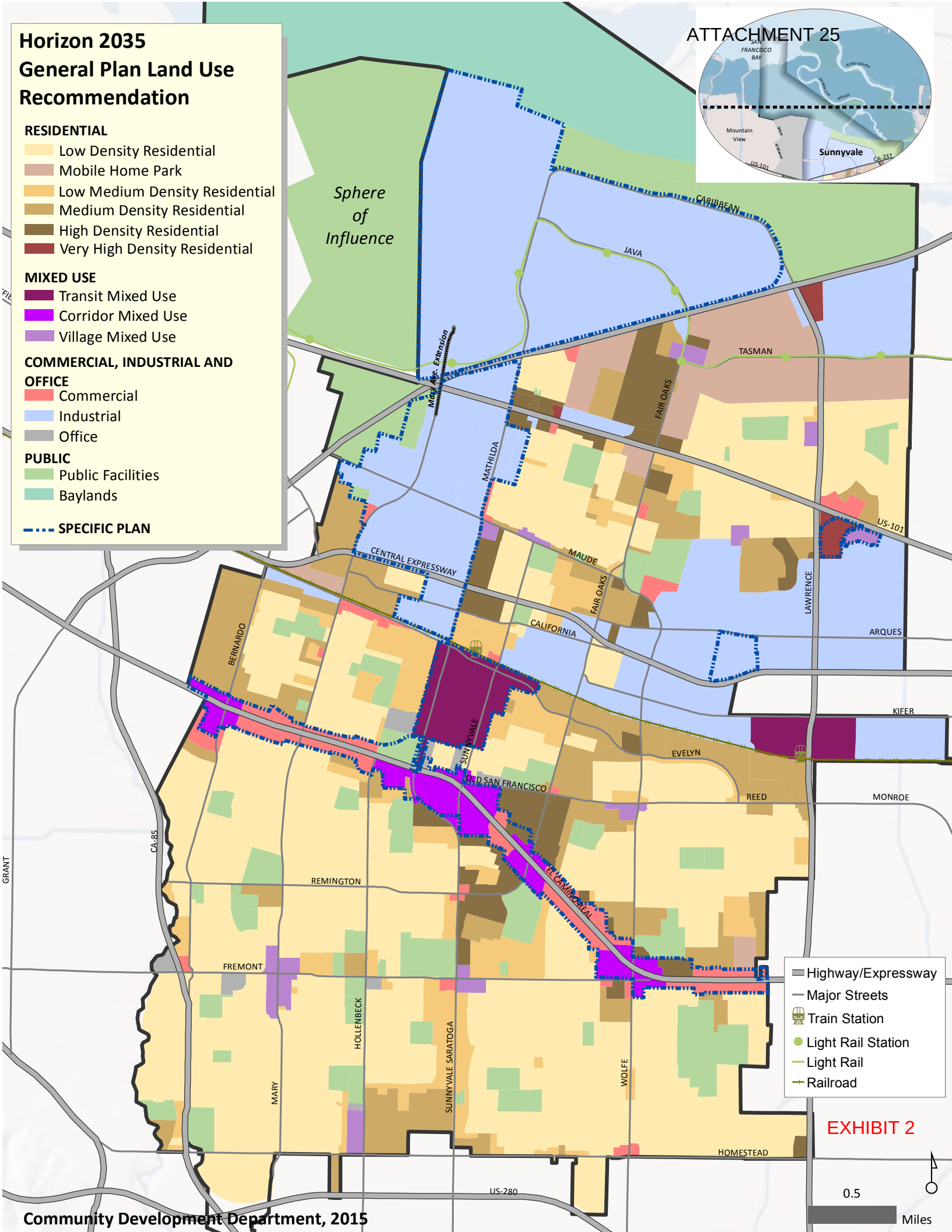
For the purposes of this WSA, the entire draft Land Use and Transportation Element (LUTE) will be referred to as the "Project." The proposed Project includes changes to several growth areas within the City that were previously identified in the adopted General Plan. These growth areas, and their proposed land use changes, are summarized in Table 3-1. In total, the growth areas will increase the I/O/C square footage by 4,362,600 SF and increase the total number of residential units by 5,525 units within the City limits. The Project land uses are summarized in Table 3-1, and shown in **Exhibit 2**.

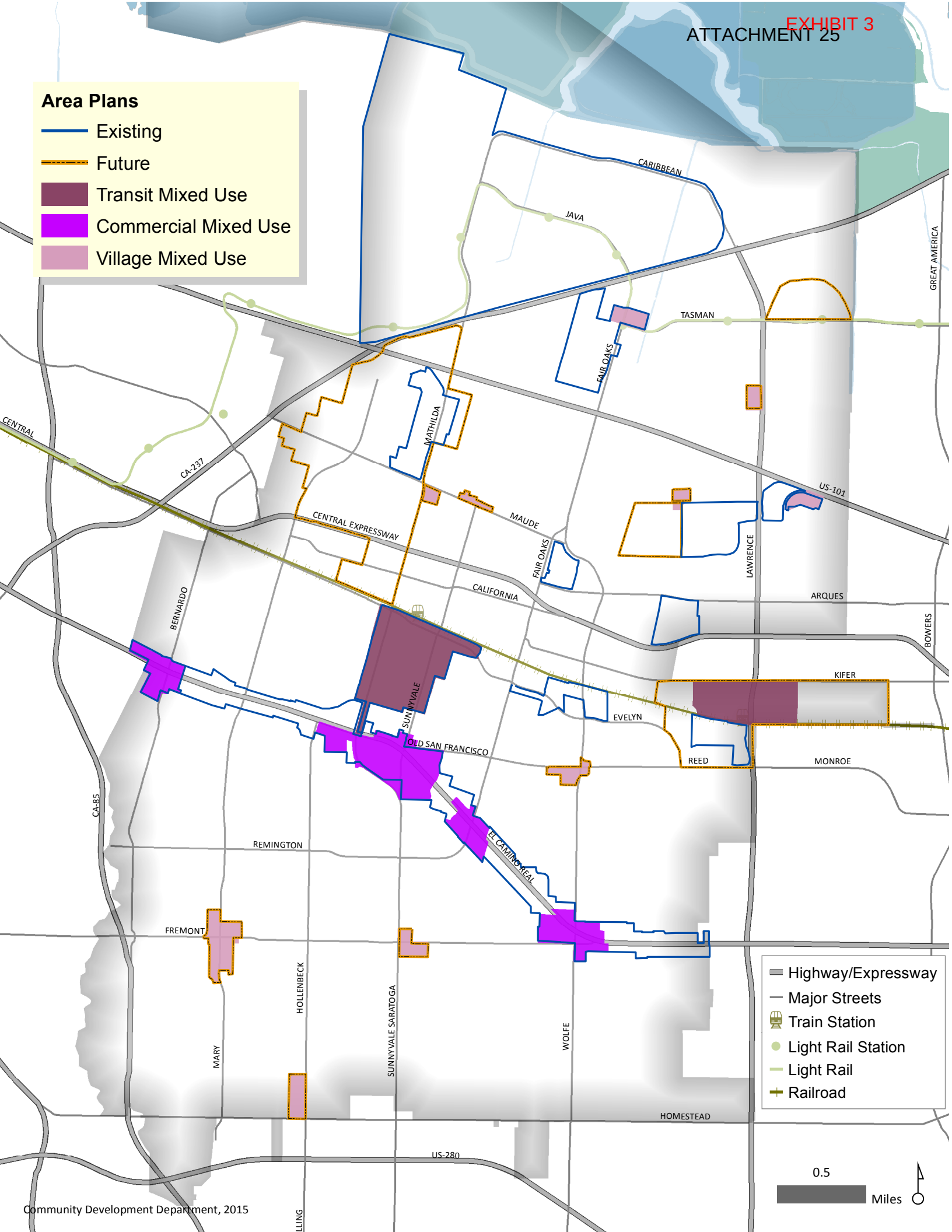
Table 3-1
Summary of Land Use Changes

Horizon 2035 LUTE Growth w/2014 BASELINE						
	Adopted GP Growth		Horizon 2035 Growth		Net Change	
	Housing	I/O/C	Housing	I/O/C	Housing	I/O/C
2014 Existing Condition	*57,000*	*47,300,000*	*57,000*	*47,300,000*	*n/a*	*n/a*
Growth Areas (2014 to 2035)						
Downtown	1,600	600,000	1,600	600,000	0	0
Moffett Park	0	7,600,000	0	7,600,000	0	0
The Woods	0	0	0	308,000	0	308,000
Peery Park	0	1,550,000	215	3,000,000	215	1,450,000
ITR Sites	3,770	0	4,000	1,713,000	230	1,713,000
Neighborhood Villages	0	0	900	-184,000	900	-184,000
Lawrence Station Area	600	150,000	2,450	1,225,600	1,850	1,075,600
El Camino Real	1,500	0	4,200	0	2,700	0
Other Areas	2,100	-1,700,000	1,730	-1,700,000	-370	0
Total Growth (2014 to 2035)	9,570	8,200,000	15,095	12,562,600	5,525	4,362,600
Total at Buildout (2035)	66,570	55,500,000	72,095	59,862,600	**5,525**	**4,362,600**

Two of the larger proposed development (or redevelopment) projects included within the LUTE are the PPSP and LSAP. The project description provided in the PPSP Intial Study identified the proposed land uses to include 4-6 story office building and light industrial structures.

The Lawrence Area Station Plan (LASP) Vision Plan describes the area as a "new urban neighborhood in Sunnyvale with a mix of both employment and residential uses at a variety of densities." The residential densities will vary, however it is assumed that a majority of the growth will contain high-density options, located close to Lawrence Station and employment opportunities. The Area Plans are shown on **Exhibit 3**.


Horizon 2035
General Plan Land Use
Recommendation
RESIDENTIAL
Low Density Residential
Mobile Home Park
Low Medium Density Residential
Medium Density Residential
High Density Residential
Very High Density Residential
MIXED USE
Transit Mixed Use
Corridor Mixed Use
Village Mixed Use
COMMERCIAL, INDUSTRIAL AND OFFICE
Commercial
Industrial
Office
PUBLIC
Public Facilities
Baylands
SPECIFIC PLAN
ATTACHMENT 25
SAN FRANCISCO BAY
Mountain View
Sunnyvale
US-101
CA-237
Sphere of Influence
CARIBBEAN
JAVA
TASMAN
Mary Ave. Extension
MATHILDA
FAIR OAKS
US-101
CENTRAL EXPRESSWAY
MAUDE
FAIR OAKS
LAWRENCE
CALIFORNIA
ARQUES
BERNARDO
KIFER
SUNNYVALE
EVELYN
OLD SAN FRANCISCO
REED
MONROE
CA-85
GRANT
REMINGTON
EL CAMINO REAL
FREMONT
HOLLENBECK
SUNNYVALE SARATOGA
MARY
WOLFE
HOMESTEAD
US-280
Highway/Expressway
Major Streets
Train Station
Light Rail Station
Light Rail
Railroad
EXHIBIT 2
0.5
Miles
Community Development Department, 2015



Community Development Department, 2015

3.2 LUTE (Project) Water Demand Projections

The land use changes proposed as a part of the LUTE update will result in increased water demands. Water demands for the land use changes were calculated based on 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 Draft LUTE update recommends land use designations that vary slightly from those identified in the WUMP. For the purposes of this report, the land use designations identified in the Draft LUTE update will be utilized for consistency. Table 3-2 summarizes the land use designations and the corresponding water duty factors to be used in the demand calculations.

Table 3-2
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 (25-68 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	Public Facilities		270

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

It is noted that the Draft LUTE update includes further land use designations for Mixed-Use areas and specific "Area Plans."

Utilizing the water duty factors from the WUMP, the total project water demand increase was calculated, as shown in Table 3-3. Specific details of the proposed land uses are not yet available, so assumptions were made based on available documents and project descriptions. Unless otherwise noted, residential densities were assumed to be medium and high-densities and non-residential areas were assumed to be commercial (see Table 3-2).

Table 3-3
Water Demand Increase

	Proposed Growth [1]		Water Duty Factors [2]		Demand Increase			
	Housing	I/O/C	Residential	I/O/C	Residential		I/O/C	
Growth Areas	(du)	(sf)	(gpd/du)	(gpd/ksf)	(gpd)	(AFY)	(gpd)	(AFY)
Downtown	0	0	n/a	n/a	0	0	0	0
Moffett Park	0	0	n/a	n/a	0	0	0	0
The Woods	0	308,000	n/a	270	0	0	83,160	93
Peery Park	215	1,450,000	170	210	36,550	41	304,500	341
ITR Sites	230	1,713,000	170	270	39,100	44	462,510	518
Neighborhood Villages	900	-184,000	170	270	153,000	171	-49,680	-56
Lawrence Station Area	1,850	1,075,600	170	270	314,500	352	290,412	325
El Camino Real	2,700	0	170	n/a	459,000	514	0	0
Other Areas	-370	0	170	n/a	-62,900	-70	0	0
Total	5,525	4,362,600	n/a	n/a	939,250	**1,052**	1,090,902	**1,222**

[1] Per Table 3-1.

[2] Per Table 3-2.

[3] Demand factors were assigned if specific land use information was available. In cases where specific land use information was not available, conservative factors were assigned.

Based upon the proposed land use changes, the total average increase in water demand is estimated at approximately 2,030,152 gallons per day (gpd) or 2,274 AFY. The demands are assumed to increase linearly over the 20-year planning horizon, with ultimate buildout in year 2035, as shown on Table 3-4. The calculations do not separate recycled water to be used for outdoor landscape irrigation.

Table 3-4
LUTE Water Demand Growth Projection (AFY)

	2015	2020	2025	2030	2035
LUTE Water Demand	0	568	1,137	1,705	2,274

For comparative purposes, the estimated water demand increase per the population projections are included in Section 4.

4.0 CITY OF SUNNYVALE WATER DEMAND AND SUPPLIES

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

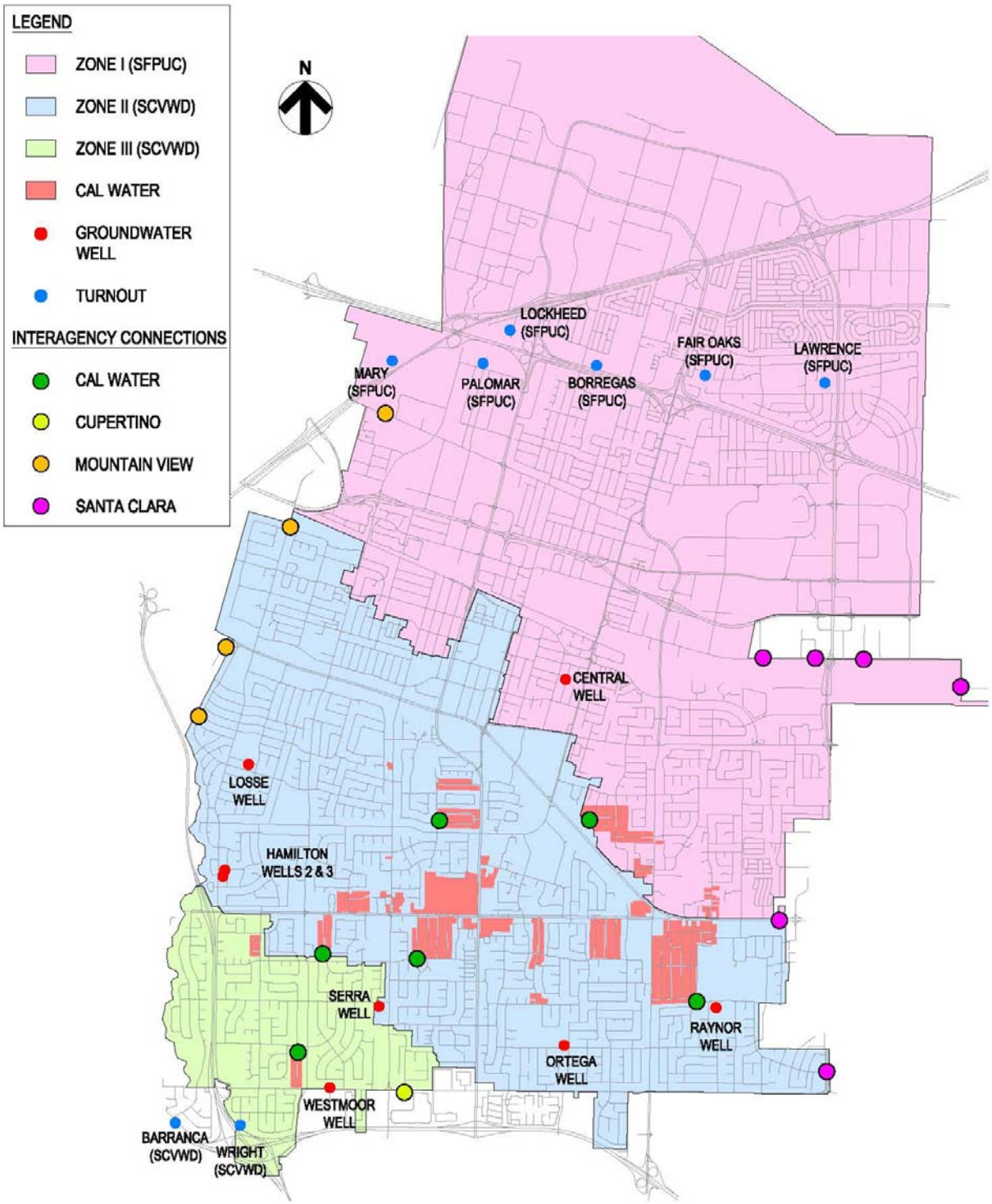
The City has three sources of potable water supply: purchased surface water from the San Francisco Public Utilities Commission (SFPUC), purchased treated surface water from Santa Clara Valley Water District (SCVWD), and groundwater from seven, City-owned and operated wells. One additional well remains 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.

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 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.

There are ten potable water storage reservoirs at five different locations throughout the City with a total storage capacity of 27.5 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 4** 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

Historical and Present Use

Table 4-1 depicts City of Sunnyvale water production for the years 1993 through 2014. 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
1993	8,690	10,866	3,786	0	23,343
1994	11,451	9,360	2,867	0	23,679
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

Years 1993-2010, Source: Sunnyvale 2010 UWMP

Years 2011-2014, Source: City of Sunnyvale staff

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. Past and current 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
Past and Current Potable Water Use by Customer Type (AFY)

Customer Type	2005	2010	2015
Single Family Residential	8,264	7,023	6,555
Multi-Family Residential	6,047	8,309	7,755
Commercial	9,035	4,261	4,507
Irrigation	642	970	905
Other (Firelines)	946	911	850
Total Potable	**24,934**	**21,474**	**20,573**

Source: Sunnyvale 2010 UWMP

Table 4-3
Past and Current Potable Demand by Supply Source

Supply Source	2005	2010	2015	2015 [1]
SFPUC	10,868	8,982	10,003	8,586
SCVWD	10,232	9,331	9,570	7,237
Groundwater Wells	1,631	1,629	1,000	142
Total	**24,582**	**21,464**	**20,573**	**15,965**

Source: Sunnyvale 2010 UWMP

[1] Projection based on trending of actual usage measured through July 2015.

The decrease in demand from 2005 to 2015 can be attributed to the economic downturn as well as demand conservation due to the extended drought in California. It should be noted the 2015 water use listed in Tables 4-2 and 4-3 are projections prepared in 2011. Current water use trends indicate the actual 2015 water use will be approximately 22% below the 2010 UWMP projections.

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 2010 UWMP.

Table 4-4 provides all other water uses and losses that are not accounted for in the past and current 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	2005	2010	2015	2015 [1]
Recycled Water	1,851	1,523	1,400	0
System Losses	1,496	1,288	1,234	1,234
Total	**3,347**	**2,811**	**2,634**	**1,234**

Source: Sunnyvale 2010 UWMP

[1] Projection based on trending of actual usage measured through July 2015.

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 in order 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 2010 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 is calculated to be 165 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). The City's calculated per capita water use target is 157 gpcd.

Demand Projections

Population estimates as shown in Table 4-5 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 the May, 2010 data provided by the State Department of Finance (DOF).

Table 4-5
City Population Projections

Year	2010	2015	2020	2025	2030	2035 [1]
City Population	141,099	141,700	147,300	152,000	157,900	174,600

Source: Sunnyvale 2010 UWMP

[1] Year 2035 is the assumed build-out year under the draft LUTE. This population estimate is based on City projections.

Based on the City's 2015 and 2020 SBx7-7 goal of 157 gpcd, the City's maximum allowable water demand for 2015 and 2020 are 24,916 AFY and 25,901 AFY, respectively. Under the SB x7-7 requirements, the maximum allowable potable water demand generated within the City is 30,701 AFY.

Per the 2010 UWMP and City staff estimates of draft LUTE demands, the present and projected water demands for the City are shown in Table 4-6. It is noted that in Table 4-6, the 2015 projections are referenced from the 2010 UWMP and do not account for any actual 2015 data.

Table 4-6
Current and Projected Potable Water Use by Customer Type (AFY)

Customer Type	2015 [1]	2015	2020	2025	2030
Single Family Residential	n/a	6,555	6,393	6,341	6,378
Multi-Family Residential	n/a	7,755	7,563	7,502	7,545
Commercial	n/a	4,507	5,334	6,485	8,100
Irrigation	n/a	905	883	876	881
Other (Firelines)	n/a	850	829	823	827
Total Potable	**15,965**	**20,573**	**21,002**	**22,026**	**23,731**

Source: Sunnyvale 2010 UWMP

The demand projections per water supply source is identified in Table 4-7. It is noted that the actual 2015 water usage numbers are trending 22% below the 2010 UWMP projections.

Table 4-7
Current and Projected Demand by Supply Source without Draft LUTE

Supply Source	2015 [1]	2015	2020	2025	2030	2035
SFPUC	8,586	10,003	10,003	10,003	10,003	10,003
SCVWD [2]	7,237	9,570	9,999	11,023	12,728	12,728
Groundwater Wells	142	1,000	1,000	1,000	1,000	1,000
Total	**15,965**	**20,573**	**21,002**	**22,026**	**23,731**	**23,731**

Table 4-7
Current and Projected Potable Demand by Supply Source (AFY)

Supply Source	2015 [1]	2015	2020	2025	2030	2035
SFPUC	8,586	10,003	10,003	10,003	10,003	10,003
SCVWD [2]	7,237	9,570	9,999	11,023	12,728	12,728
Groundwater Wells	142	1,000	1,000	1,000	1,000	1,000
Total	**15,965**	**20,573**	**21,002**	**22,026**	**23,731**	**23,731**

Source: Sunnyvale 2010 UWMP

[1] Projection based on trending of actual usage measured through July 2015.

[2] The City obtains water from SCVWD through a requested 3-year delivery. The City has obtained a maximum of 13,577 AFY from SCVWD.

Source: Sunnyvale 2010 UWMP
[1] Projection based on trending of actual usage measured through July 2015.
[2] The City obtains water from SCVWD through a requested 3-year delivery. The City has obtained a maximum of 13,577 AFY from SCVWD.

The additional water uses and expected losses are identified in Table 4-8.

Table 4-8
Current and Projected Additional Water Uses and Loses (AFY)

Water Use	2015 [1]	2015	2020	2025	2030
Recycled Water [2]	0	1,400	1,525	1,650	2,298
System Losses	1,234	1,234	1,260	1,321	1,423
Total	**1,234**	**2,634**	**2,785**	**2,971**	**3,721**

Source: Sunnyvale 2010 UWMP
[1] Projection based on trending of actual water usage measured through July 2015
[2] Based on Table 4-6 of the 2010 UWMP.

Under normal conditions, the potable water demand with the LUTE Update is projected to be 26,005 AFY in year 2035. Including recycled water, the projected water demand is 27,780 AFY. Build out (year 2035) under the draft LUTE would consist of a water demand of 30,701 AFY under normal year conditions, which is close to SCVWD 2010 UWMP estimate of 29,800 acre-feet annually for 2035 for Sunnyvale. See Table 4-9 for the assumed rate of growth in water demand.

Table 4-9
Current and Projected Demand w/ Draft LUTE (AFY)

	2015 [1]	2015	2020	2025	2030	2035[2]
Potable Demand (without Draft LUTE)	15,965	20,573	21,002	22,026	23,208	26,129
Draft LUTE Increase	0	0	568	1,137	1,705	2,274
Sub-Total	15,965	20,573	21,570	23,163	25,436	28,926
Recycled Water [3]	0	1,400	1,525	1,650	2,298	2,298
Total	**15,965**	**21,973**	**23,095**	**24,813**	**27,211**	**30,701**

[1] Projection based on trending of actual water usage measured through July 2015
[2] Based on water duty factors in Table 3-2
[3] Based on Table 4-6 of the 2010 UWMP.

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.

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 4-10.

Table 4-10
Existing Well Information

Well Name			Average Discharge Head	Average Flow	Total HGL (ft)

	Ground Elevation (ft)	Average Well Level (ft)	(psi)	(ft)	Rate (gpm)	
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 basinwide 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 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 District 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.

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.

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 4-11 shows historic metered groundwater pumping data for the City in 2010, 2014 and the current trends for 2015. The table also includes the projected pumping through year 2035 based on the 2010 UWMP.

Table 4-11
Historic and Projected Amount of Groundwater Pumping from the Santa Clara Plain Basin (AFY)

Historic			Projections [1]				
2010	2014	2015 [2]	2015	2020	2025	2030	2035
1,629	2,064	142	1,000	1,000	1,000	1,000	1,000

[1] Source: Sunnyvale 2010 UWMP

[2] Projection based on trending of actual water usage measured through July 2015

Although the City has historically called upon groundwater to meet between 4 and 11 percent of its total demand (approximately 1,000 – 2,700 AFY), the City wells have the production capacity to produce approximately 8,000 AFY.

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). 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 (see Appendix A). 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 are estimated to be 8,586 AFY (based on actual usage through July).

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 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 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 2014 deliveries were 8,491 AFY, and the 2015 deliveries are estimated to be 7,237 AFY (based on actual usage through July).

Per the City's 2010 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 4-12

Current and Projected Recycled Water Use within the City (AFY)

	2015 [2]	2015 [1]	2020 [1]	2025 [1]	2030 [3]	2035 [3]
Total Recycled Water Use	0	1,400	1,525	1,650	2,298	2,298

[1] Source: Sunnyvale 2010 UWMP.

[2] Recycled water production has been halted in recent years due to operational constriants.

[3] Based on 201 UWMP Table 4-6, 2,298 acre-feet of recycled water would be available after 2030.

In recent years, the City has not been producing recycled water due to discharge requirements to the bay, as well as operational limitations. The City is currently undergoing a project at the wastewater treatment plant that will allow the City to regularly produce recycled water again in 2016.

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.

A summary of the city's historical and available water supply are referenced in Table 4-13. The city's water supply projections, as identified in the 2010 UWMP are summarized in Table 4-14.

Table 4-13
Water Supply

	Historical		Actual			Contractual / Operational Limits		
Supply Source	**Minimum**	**Maximum**	**2010**	**2014**	**2015 [1]**	**Minimum**	**Maximum**	
SFPUC	8,454	12,675	8,982	8,454	5,009	10,003	14,100	[2]
SCVWD	8,176	13,577	9,331	8,491	4,221	0	13,577	
Groundwater	123	3,786	1,629	2,064	83	0	8,000	[3]
Recycled Water	0	1,928	1,523	0	0	0	2,298	[4]
Total	**16,753**	**31,966**	**21,465**	**19,008**	**9,313**	**10,003**	**37,975**	

[1] Through July 2015

[2] Per SFPUC contract values.

[3] Per Section 5.3.3 of 2010 Water Utility Master Plan, and updated with recent improvements.

[4] Per Table 4-6 of Sunnyvale UWMP, city will be able to produce recycled water at a maximum of 2,298 AFY by 2030

Table 4-14
Water Supply Projections in a Normal Year (per 2010 UWMP)

	Projections [1]			
Supply Source	**2015**	**2020**	**2025**	**2030**
SFPUC	10,003	10,003	10,003	10,003

SCVWD	9,570	9,999	11,023	12,728
Groundwater	1,000	1,000	1,000	1,000
Recycled Water	1,400	1,525	1,765	1,775
Total	**21,973**	**22,527**	**23,791**	**25,506**

[1] Per Sunnyvale 2010 UWMP.

5.0 WATER SUPPLY RELIABILITY

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.

The District's strategic approach developed in February 2014 continues to support Board's increased call for water use reductions and has been an effective approach to respond to the drought. These actions are still the basis of the drought response. Certain strategies may change or increase in response to the call for a 30% reduction. The drought strategies are implemented by a cross- functional team from across the organization (convened when the Drought Response Strategy was formulated). The District's comprehensive drought response is being implemented through fifteen strategies grouped into four general categories: (A) water supply and operations; (B) water use reduction; (C) drought response opportunities; and (D) administrative and financial management.

Severe to exceptional drought conditions continue throughout California (-92%), even though much of the State has received close to average rainfall to date, including Santa Clara County. The U.S. Drought Monitor (August 11, 2015) reports that most of Santa Clara County continues to be in 'Extreme' drought severity, continued from July 2015.

As of August 1, 2015, the local reservoir combined storage is 77% of normal for this time of year (20-year average). The California Department of Water Resources found no snow during its April 1, 2015, manual survey at 6,800 feet in the Sierra Nevada. This was the first time in 75 years of early- April measurements at the Phillips Snow Course that no snow was found. Reservoir storage levels for the primary reservoirs in the state for the imported water supply are 45% to 61% of normal as of August 1. The initial 2015 Central Valley Project allocation is 25%, the lowest the District has ever received, with approximately 40,000 acre-feet to be delivered. The District's State Water Project allocation increased from 15% to 20% on March 2, 2015, or about 20,000 acre-feet. The combined State and Federal Projects allocation for 2015 is 60,000 acre-feet, which is 14% lower than the 70,000 acre-feet allocation in 2014.

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 from the groundwater storage reserve was used in 2014, causing the storage level to drop to approximately 260,000 acre-feet. Managed groundwater recharge in the Santa Clara Plain is 34% of normal due to limited supplies. The groundwater level in Santa Clara Plain is about one foot higher than July last year and about seven feet lower than the five-year average. 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 District has been working with water retailers, municipalities and the County of Santa Clara (County) to increase water conservation efforts and public outreach, and to implement other actions to reduce water use. Through these efforts, preliminary water use data from February through December 2014 indicate that cumulative countywide savings of slightly higher than13 percent was realized compared to the same period in 2013. 2015 water retailer water use data (January through July 2015) indicates 25% savings compared to 2013 water use in the same period. The month to month comparison from the preliminary data indicates a steady rate of savings of 36% in July 2015 (unchanged from June 2015).

Local water retailers have responded to the District's increased call for savings in various ways. Most retailers are calling for at least 30 percent reductions, and all have activated or adopted water use restrictions. As a result of the call for increased savings, the retailers have geared up to increase their outreach and education efforts further. In addition, water retailers have needed to implement additional actions in response to the Governor's April 1, 2015, Executive Order and the State Water Resources Control Board's expanded drought-related emergency regulations in effect as of May 18, 2015. For instance, the investor owned retailers are implementing water allocation programs. In addition, the Order also ordered the California Energy Commission to establish standards that improve the efficiency of water appliances available for sale and installation in new and existing buildings. As a result, (as of July 2016), showerhead flow rates will be reduced to 2.0 gallons per minute and will be reduced again in July 2018, to 1.8 gallons, and flow rates for faucets will be reduced to 1.2 gallons per minute.

Two summits, one with the retailers, one with elected officials, have been held to facilitate increased water conservation and water use saving efforts and increase coordination to meet the 30 percent reduction target. A common theme between the two summits was that messaging and policy development needs to be consistent and coordinated.

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 we used 79,000 acre-feet 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. The groundwater level in Santa Clara Plain is about one foot higher than July last year and about seven feet lower than the five-year average. 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 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, 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 plans 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.

Tier One Drought Allocations

The Tier One Plan, which allocates water between San Francisco and the wholesale customers collectively, distributes water based on the level of shortage:

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%

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

Tier Two Drought Allocations

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 a sufficient 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

In order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability, and water supply, the SFPUC has undertaken the Water System Improvement Program (WSIP), approved October 31, 2008. The WSIP 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 insure 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 are effective only until December 31,
2018 and do not affect the Supply Assurance or the Individual Supply Guarantees. Sunnyvale's ISA is 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 as 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.

According to the SFPUC (2009), other than the general trends listed above, there is no clear scientific consensus on exactly how climate change will quantitatively affect the state's water supplies, and current models of water systems in California generally do not reflect the potential effects of climate change.

Initial climate change modeling completed by SFPUC indicates that about seven percent of runoff currently draining into Hetch Hetchy Reservoir will shift from the spring and summer seasons to the fall and winter seasons in the Hetch Hetchy basin by 2025. This percentage is within the current inter-annual variation in runoff and is within the range accounted for during normal runoff forecasting and existing reservoir management practices. The predicted shift in runoff timing is similar to the results found by other researchers modeling water resource impacts in the Sierra Nevada due to warming trends associated with climate change.

The SFPUC has stated that based on this preliminary analysis, the potential impacts of climate change are not expected to affect the water supply available from the San Francisco RWS or the overall operation of the RWS through 2030.

SFPUC views the 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. To refine its climate change

analysis and expand the range of climate parameters being evaluated, as well as expand the timeframes being considered, the SFPUC is currently undertaking two additional studies. The first utilizes a newly calibrated hydrologic model of the Hetch Hetchy watershed to explore sensitivities of inflow to different climate change scenarios involving changes in air temperature and precipitation. The second study will seek to utilize state-of-the-art climate modeling techniques in conjunction with water system modeling tools to more fully explore potential effects of climate change on the SFPUC water system as a whole. Both analyses will consider potential effects through the year 2100.

5.2.2. 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 Reliability Report 2009 and associated CALSIM II modeling results, projected imported supplies under climate change conditions from the Delta for average, normal year, dry year and multiple dry years, Delta imports are reduced by three percent on average and four percent over the multiple dry year period compared to the analysis performed without climate change (SCVWD, 2010 UWMP).

5.2.3. 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 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 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.

5.2.3.1 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 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. 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.

<u>Power Outage Preparedness and Response</u>

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.

5.2.3.2 SCVWD Water Utility 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.

5.2.3.3 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

On May 12, 2015, the City of Sunnyvale City Council adopted Resolution No. 693-15, declaring a continued water emergency, increasing the water reduction target to 30 percent, re-implementing Stage 1 water use prohibitions, imposing additional drought restrictions and amending Resolution 650-14 to add administrative fines for violations.

Sunnyvale staff previously developed a water shortage contingency plan that includes mandatory (and voluntary) water use restrictions, rate block adjustment, and approaches for enforcement associated with each stage of anticipated reduction.

As stated above, the following Table 5-2 describes the four levels of supply reductions that were used for development of Sunnyvale's water shortage contingency plan.

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

Stage No.	% Shortage	Water Supply Conditions
1	25%	25% shortage declared by wholesale water agency. Shortage conditions are worsening. Ground water levels continue to decrease.
2	35%	35% shortage declared by wholesale water agency. Signs of multiyear drought.
3	45%	45% shortage declared by wholesale water agency. Continued signs of multiyear drought.
4	50% or greater	Greater than 50% shortage declared by wholesale water agency. Typically meant for immediate crisis such as major infrastructure failure. Water supply reserved for health and safety needs.

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.	Prohibition
Stage 1 25%	-Flooding or runoff on sidewalks, streets or gutters: Cleaning sidewalks, driveways, buildings, patios, parking lots or other paved/hard surfaced areas Using hose for washing cars, buses, boats, trailers without positive automatic shutoff valve on hose -Use of decorative fountains

	-Water waste due to broken/defective plumbing, sprinkler, watering or irrigation systems -Restaurant water service unless requested -Landscape irrigation during daylight hours -Hydrant flushing (unless for public health or safety)
Stage 2 35%	-All of the above -New installations of plants, shrubs, trees, lawns other growing things -Landscape for mounds, hardscape okay but cannot include living plant material -New swimming pool or pond construction -Filling or refilling swimming pools (can replace water loss due evaporation) -Outdoor watering December through March
Stage 3 45%	-All of the above -Watering turf, grass or dichondra lawns (can provide minimal water for sports playing fields) -Gold courses except for tees and greens
Stage 4 50% or greater	-All of the above Landscape irrigation with potable water of any City-owned premises or businesses where recycled water is available for connection -Utilization of potable water for any City operation where recycled water could be used.

In addition, Sunnyvale has adopted a series of water conservation action plans for City departments that correspond to the 25, 35, 45, and 50 percent or greater reduction scenarios. 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 50% reduction case.

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
Water Shortage Contingency – Penalties and Charges

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

Resolution 693-15 implemented maximum 2-day per week watering schedules, limited watering within 2 days of a rain event, placed limitations on hotels and newly constructed homes, and allows the City to implement fines for the following citations:

- 1st Violation: Written warning
- 2nd Violation: Written warning
- 3rd Violation: $250
- 4th Violation and subsequent violations: $500

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 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 selected by the City for analysis is from 1987 through 1990.

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	1985
Single Dry Water Year	1977
Multiple Dry Water Years	1987-1990

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. Based on the SCVWD August 2015 Drought Monthly Status Report, the City has reduced its water use by 26% as compared to 2013 through the month of July and has used a total 9,313 AF of water between January and July 2015. An analysis of the current supply reliability is reflected in Table 5-7.

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

			Multiple Dry Years			
Water Source	**Normal Water Year (1985)**	**Single Dry Water Year (1977)**	**Year 1 (1987)**	**Year 2 (1988)**	**Year 3 (1989)**	**Year 4 (1990)**
SCVWD	9,199	6,636	10,335	12,073	11,503	10,499
SFPUC	13,209	10,956	10,956	9,522	9,522	10,870
Groundwater	8,369	5,104	4,019	4,116	2,509	1,973
Totals	**30,777**	**22,696**	**25,310**	**25,711**	**23,534**	**23,342**
Percent of Normal Year		**75.0%**	**83.6%**	**84.9%**	**77.7%**	**77.1%**

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

		Multiple Dry Years			
Source	**Average/Normal Water Year 2002**	**Year 2012**	**Year 2013**	**Year 2014**	**Year 2015 [1]**
SFPUC	10,096	9,705	11,031	8,454	8,586
SCVWD	13,094	10,672	10,417	8,491	7,237
Groundwater	1,367	143	123	2,064	142
Recycled Water	1,296	0	0	0	0
Totals	**25,852**	**20,519**	**21,571**	**19,008**	**15,965**
Percent of Average/Normal		**79%**	**83%**	**74%**	**62%**

[1] Values projected based on trending of actual water usage through July 2015.

Table 5-8 through Table 5-14 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 identifies total water sources available to the City in comparison to demand under normal year conditions. It should be noted that the City does not expect to make complete use of each of these water sources. For example, the City's groundwater pumping has ranged between 1,629 to 2,064 acre-feet annually between 2010 and 2014 and is not expected to increase groundwater production beyond 1,000 acre-feet except in multiple dry year conditions per the 2010 UWMP.

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

Source	2020	2025	2030	2035
SFPUC[1]	14,100	14,100	14,100	14,100
SCVWD [2]	13,577	13,577	13,577	13,577
Groundwater [3]	8,000	8,000	8,000	8,000
Recycled Water [4]	1,525	1,650	2,298	2,298
Supply Totals	**37,202**	**37,327**	**37,975**	**37,975**
Demand Totals	**23,095**	**24,813**	**27,211**	**30,701**
Difference	+14,107	+12,541	+10,764	+7,274

[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.
[3] City's maximum groundwater production is 8,000 acre-feet.
[4] Based on Table 4-6 of the 2010 UWMP.

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

Source	2020	2025	2030	2035
SFPUC	10,003	10,003	10,003	10,003
SCVWD [1]	4,793	5,957	7,630	10,248
Groundwater [2]	1,000	1,000	1,000	1,000
Recycled Water	1,525	1,650	1,775	1,775
Supply Totals	**17,321**	**18,610**	**20,408**	**23,026**
Demand Totals	**17,321**	**18,610**	**20,408**	**23,026**
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.

Table 5-10
Supply and Demand Comparison - Multiple Dry Year for 2016 (AFY)

Source	Year 1 2016	Year 2 2017	Year 3 2018
SFPUC	9,818	9,818	9,818
SCVWD	4,597	4,714	4,831
Ground Water	150	150	150
Recycled Water [2]	1,400	1,425	1,450
Supply Totals	**15,965**	**16,107**	**16,249**
Demand Totals	**15,965**	**16,107**	**16,249**
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.

Table 5-11
Supply and Demand Comparison - Multiple Dry Year for 2020 (AFY)

Source	Year 1 2020	Year 2 2021	Year 3 2022
SFPUC	10,003	9,818	9,818
SCVWD	7,629	8,186	6,579
Ground Water	150	150	150
Recycled Water	1,525	1,550	1,575
Supply Totals	**19,307**	**19,704**	**18,122**
Demand Totals	**19,307**	**19,704**	**18,122**
Difference	0	0	0

Table 5-12
Supply and Demand Comparison - Multiple Dry Year for 2025 (AFY)

Source	Year 1 2025	Year 2 2026	Year 3 2027
SFPUC	10,003	9,818	9,818
SCVWD	8,941	9,520	7,789
Ground Water	150	150	150
Recycled Water	1,650	1,675	1,700
Supply Totals	**20,744**	**21,163**	**19,457**
Demand Totals	**20,744**	**21,163**	**19,457**
Difference	0	0	0

Table 5-13
Supply and Demand Comparison - Multiple Dry Year for 2030 (AFY)

Source	Year 1 2030	Year 2 2032	Year 3 2032
SFPUC	10,003	9,818	9,818
SCVWD	10,820	11,456	9,577
Ground Water	150	150	150
Recycled Water	1,775	1,775	1,775
Supply Totals	**22,748**	**23,199**	**21,320**
Demand Totals	**22,748**	**23,199**	**21,320**
Difference	0	0	0

Table 5-14
Supply and Demand Comparison - Multiple Dry Year for 2035 (AFY)

Source	Year 1 2035	Year 2 2036	Year 3 2037
SFPUC	10,003	9,818	9,818
SCVWD	11,296	11,940	10,020
Ground Water	150	150	150
Recycled Water	1,775	1,775	1,775
Supply Totals	**23,224**	**23,683**	**21,763**
Demand Totals	**23,224**	**23,683**	**21,763**
Difference	0	0	0

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 imported water supply from SCVWD and implementation of drought conservation programs. The City will be able to address the projected demands without rationing. This multiple dry year analysis also does not factor increased recycled water production of 2,298 acre-feet that would come on-line by the year 2030.

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 47% of Sunnyvale's annual potable water, SFPUC provides approximately 40%, Sunnyvale owned- and operated-wells provide 6% and the remaining 7% 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 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.

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.

The WSA includes a discussion of the Senate Bill 610 legislation, an overview of the proposed LUTE, and analysis of water demands for the City's existing service the proposed changes to City development projects over the 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 for the next 20 years and build out.

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 LUTE over a 20-year planning period as well as build out.

The proposed LUTE includes changes to several growth areas within the City that were previously identified in the adopted General Plan. In total, the growth areas will increase the I/O/C square footage by 4,362,600 SF and increase the total number of residential units by 5,525 units within the City limits over the current LUTE.

The City obtains water from the following primary water sources: groundwater produced via City wells, imported water via SFPUC and SCVWD, and recycled water. The City currently receives approximately 8 percent of its water supply from groundwater, 42 percent from SFPUC, 43 percent from SCVWD, and 7 percent from recycled water.

The build-out of the Project is expected increase of City water demands by 2,274 AFY.

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.