



CITY OF SUNNYVALE

2005 URBAN WATER MANAGEMENT PLAN

Supplying the community with safe and reliable sources of water

December 2005

**CITY OF SUNNYVALE
DEPARTMENT OF PUBLIC WORKS
FIELD SERVICES DIVISION**

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SUMMARY

Overview

The City of Sunnyvale is located at the south end of the San Francisco Bay, in the County of Santa Clara, just minutes from San Jose and about 40 miles south of San Francisco. It enjoys a sunny climate with mild temperatures and low precipitation.

Until 1950, the City's water requirements were met by groundwater. As the population increased, demand for water surpassed the supplies available from groundwater, producing an overdraft of the aquifers and land subsidence. In 1952 the City of Sunnyvale entered into a contractual agreement with the City and County of San Francisco (managed by the San Francisco Public Utilities Commission, SFPUC) for delivery of imported Hetch-Hetchy water. In 1969 the City contracted with the Santa Clara Valley Water District (SCVWD) to deliver water from the District's West Pipeline. In the 1990s Sunnyvale began making recycled water at the City's Water Pollution Control Plant (WPCP). Currently, Sunnyvale has four water supply sources: SFPUC (Hetch-Hetchy) providing approximately 40 percent of Sunnyvale's water, SCVWD (47 percent), city-owned wells (6 percent), and recycled water (7 percent).

Purpose of the 2005 UWMP

This 2005 Urban Water Management Plan (UWMP) was prepared to comply with the California Urban Water Management Planning Act (Act) law established in 1983 (Water Code Division 6, Part 2.6, Sections 10610 through 10656). The Act requires any urban water supplier that provides water directly or indirectly to more than 3,000 customers, or delivers more than 3,000 acre feet on an annual basis to prepare and formally adopt an urban water management plan, and to update it every five years. The 2005 update incorporates several State and Federal legislative mandates that have been enacted over the past five years, in particular SB 610 (Costa) and SB 221 (Kuehl), intended to improve the link between water supply availability and land use decisions made by cities and counties.

Among other information, the 2005 UWMP must include a description and evaluation of the supplier's sources of water supply, efficient uses of water, demand management measures, implementation strategy and schedule, and other relevant information and programs. The California State Department of Water Resources (DWR) has the responsibility for the review and certification process pursuant to the Act.

The goals of the 2005 UWMP for the City of Sunnyvale include:

- Providing a valuable resource tool to be used by policy-makers at the city, county, and local government levels to facilitate in making sound and consistent decisions relating to water management and regional growth in the area.
- Meeting all federal and state regulatory requirements.
- Redefining a comprehensive water conservation plan.
- Opening communications between key departments at both the City and County levels to strengthen ties to address water-supply and land-use planning.
- Continuing relationships with other retailers and our wholesalers to better address issues concerning water supply and demand.

The 2005 UWMP builds and incorporates relevant water management issues, and addresses supply and demand projections for the next 25 years within our community.

Water Demand Forecast

DEMOGRAPHICS

Sunnyvale is a diverse community, with a highly-educated population, currently estimated at 133,000. Sunnyvale, with its Silicon Valley location, has a solid high-tech presence. Transitioning from agricultural to defense to the current high tech economy, Sunnyvale has remained on the cutting edge of Silicon Valley's innovation. The top industries in the City include information/high tech (25 percent), retail trade (13.5 percent), and construction (18 percent). The City is home to growing clusters of emerging technology companies in high-tech and biotechnology. Leading research facilities and national labs in and near the City attract residents from around the world, including Stanford University, NASA Ames Research Center, Santa Clara University, and San Jose State University.

Current and Projected Water Demand

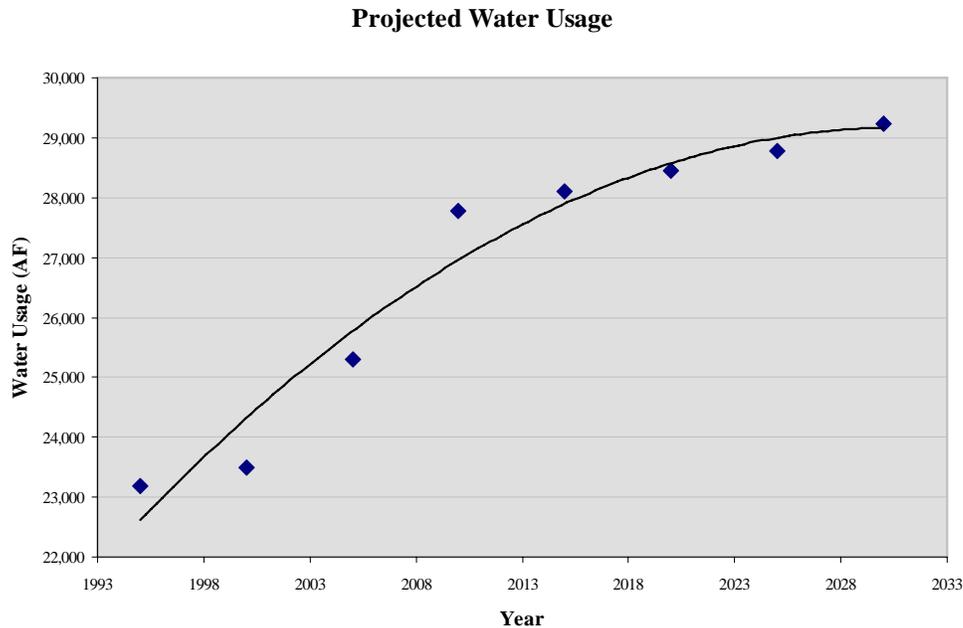
The City of Sunnyvale provides water to four broad customer categories: Single-family, multi-family, commercial (incorporating all non-residential accounts not classified as landscape) and landscape.

Prior to 2001 water consumption in all categories was on an upward trend. Between 2001 and 2003 demand went down for all categories in general except landscaping, with the highest decrease being in the commercial/industrial category. In 2004 demand from the residential sector went up slightly, but demand in the commercial/industrial sector continued its downturn. ABAG projections show an increase in jobs in 2010 that would, at that time, increase

the amount of water the commercial sector would require. Given the almost complete build-out of land in the City, we expect multi-family water demand to increase in the future when older low-density housing is replaced by high-density home developments.

Figure S-1 below illustrates past, current and projected total water usage.

Figure S-1



Water use varies depending on weather, duration of seasons, business climate and economy. Long-term general trends in water requirements are valuable in projecting future supply needs.

Demand Management Measures

The City of Sunnyvale has a commitment to water conservation, and to that end has taken several steps. These include an inclining block tier rate structure that penalizes excessive water consumption; a number of conservation efforts consistent with industry Best Management Practices (BMPs); and a recycled water program to replace the use of potable water for non-potable uses where possible. Many of the Demand Management Measures (DMMs) offered by Sunnyvale are actually programs run by or coordinated through the SCVWD, one of the wholesalers from which the City buys water. The programs are either funded through the wholesale water rates paid by Sunnyvale, or directly reimbursed by the City. The DMMs implemented by the City include:

1. Water survey programs for residential customers
2. Residential plumbing retrofit
3. System water audits, leak detection, and repair
4. Metering with commodity rates
5. Large landscape conservation
6. High-efficiency washing machine
7. Public information
8. School education
9. Conservation programs for commercial and industrial customers
10. Wholesale agency programs
11. Conservation pricing
12. Conservation coordinator
13. Water waste prohibitions
14. Residential ultra-low-flush toilet replacement

By 2030 the City expects to save almost 800 acre feet of water a year through conservation measures, and almost 1,700 acre feet of water through the recycled water program.

Water Supply

IMPORTED WATER SUPPLIES

The City of Sunnyvale purchases the majority of its potable water from two wholesale providers of treated surface water: San Francisco Water Department (SFWD) and Santa Clara Valley Water District (SCVWD).

The City currently has an agreement with San Francisco Water Department that expires in 2009, at which time it will be renewed. Based on this agreement, Sunnyvale has a maximum entitlement of 16,800 acre feet of water per year and a minimum purchase of 10,529 acre feet per year.

The SCVWD supplies the City an entitlement of imported Central Valley Project (CVP) water and State Project Water. The contractual agreement between the City and the District sunsets in 2051. The amount of water provided by the District to Sunnyvale is reviewed every year, but is currently 10,032 acre feet.

GROUNDWATER

The City of Sunnyvale overlies the Santa Clara Valley groundwater sub-basin, which has a maximum operational storage estimated at 350,000 acre feet, located in the northern portion of the County. This sub-basin is the primary source of underground water supply for Sunnyvale, with a current use of approximately 1,560 acre feet per year.

Sunnyvale has seven operating wells that have full capacity, two wells in stand-by for emergencies, and two wells that have been abandoned and sealed. The seven operating wells are used as a supplemental source to the imported SFPUC and SCVWD water supply.

The Santa Clara Valley Water District is charged with alleviating land surface subsidence in and around San Jose through artificial recharging of the groundwater and monitoring of groundwater levels and withdrawal rates. The District is currently using projected supply, carryover capacity and anticipated demand to predict potential water shortages. The July 2001 Santa Clara Valley Water District Groundwater Management Plan, included as Appendix A, describes the groundwater recharge program in detail.

RECYCLED WATER

The City of Sunnyvale has developed a recycled water program that serves parks, golf courses and some industrial areas in the northern part of the City. A two-million-gallon storage tank built in 2000 allows 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. Possible extensions to serve the south end of Sunnyvale and also some neighboring communities may be evaluated in the future, depending on availability, demand and economic conditions.

STORAGE

There are ten potable water storage reservoirs throughout the City with a total storage capacity of 27.5 million gallons (mg). This amount of water is sufficient to provide one day's average demand on the potable water system (19.7 mg/day). As referenced above, the recycled water reservoir has a storage capacity of two million gallons.

INTERTIES WITH NEIGHBORING COMMUNITIES

The City has the added ability to connect to the cities of Cupertino, Mountain View and Santa Clara and to California Water Service Company through service connections located within Sunnyvale during emergency situations.

OTHER PROVIDERS

Several pocketed areas within the City of Sunnyvale receive water from the California Water Service Company (Cal Water). These areas, at one time part of unincorporated Santa Clara County, were served by Cal Water prior to being annexed by the City of Sunnyvale. Cal Water produces its own water from wells the company owns exclusively. The City, through a cooperative effort, provides emergency connections to the Cal Water system to improve fire flows when needed.

WATER SUPPLY RELIABILITY

The City of Sunnyvale cannot contract for water transfers from outside the county, but inter-ties have been constructed for emergency transfers with the cities of Cupertino, Mountain View and Santa Clara, and with the California Water Service Company. These inter-ties (two automatic and 14 manual connections) are intended only for water supply emergencies, and are not intended for long-term water transfers. Mostly, Sunnyvale relies on the San Francisco Public Utilities Commission (SFPUC) and Santa Clara Valley Water District (SCVWD) to ensure the reliability of their water sources to supply Sunnyvale adequately.

SFPUC SUPPLY RELIABILITY

The San Francisco Public Utilities Commission has recently identified serious concerns about portions of the Hetch-Hetchy system that are aging and in need of repair or replacement, and are sensitive to damage from seismic events.

In response to these concerns, the SFPUC is undertaking a Water System Improvement Program (WSIP) that will enhance the ability of its water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability and water supply.

The business relationship between San Francisco and its wholesale customers is largely defined by the "Settlement Agreement and Master Water Sales Contract" (Master Contract) executed in 1984. The Master Contract addresses water supply and water shortages for the regional water system through June 30, 2009.

Under this contract, the SFPUC can meet the demands of its retail and wholesale customers in years of average and above-average precipitation. The Master Contract allows the SFPUC to reduce water deliveries to wholesale customers during periods of water shortage.

SFPUC and its wholesale customers adopted an Interim Water Shortage Allocation Plan (IWSAP) in calendar 2000. This IWSAP applies to water shortages up to 20% on a system-wide basis and will remain in effect through the contract expiration of June 2009. During times of drought and subsequent reduced water supply, the IWSAP allows for water shortage allocations for SFPUC wholesale customer agencies.

Negotiations will soon begin on the next water contract to replace the one expiring in 2009. The Bay Area Water Supply and Conservation Agency (BAWSCA) will negotiate in behalf of Sunnyvale and 27 other agencies covered by the Master Contract. SFWD is expected to be a reliable source of water to the City into the foreseeable future.

SCVWD SUPPLY RELIABILITY

To maintain water supply reliability and flexibility, Santa Clara Valley Water District's water supply includes a variety of sources including local groundwater, imported water, local surface water, and recycled water. The District has an active conjunctive use program to optimize the use of groundwater and surface water, and to prevent groundwater overdraft and land subsidence.

Long-term planning and modeling analysis performed by the District as part of its Integrated Water Resources Planning Study (IWRP) and 2005 UWMP indicates that if additional investments are made, future countywide demands can reliably be met.

In addition, SCVWD completed an infrastructure reliability study that assessed the vulnerability of its regional raw- and treated-water delivery systems. The District's screening process identified earthquakes, unusual flood years and regional electric power outages as hazards that pose the most significant risk to its system functionality.

Another vulnerability that could affect the SCVWD supply has to do with the levees protecting the Sacramento-San Joaquin Delta area that supplies water to the District being vulnerable to catastrophic failure. Under certain conditions, levee failure could interrupt pumping of treatable water provided to the District. Temporary loss of this source can be dealt with by the District through shifting to other active sources, such as the CVP.

WELL WATER SUPPLY RELIABILITY

The local groundwater basins supply nearly half of the water used annually in Santa Clara County, and also provide emergency reserve for droughts or outages.

The Santa Clara Valley Water District's Groundwater Management Plan ensures that local groundwater resources are sustained and protected. The plan identifies and mitigates contamination threats to the groundwater basin, replenishes and recharges groundwater supplies, prevents groundwater overdraft and land subsidence and sustains storage reserves.

Drought Response

Drought response is based on the City's Water Conservation Plan developed in case of drought and water shortages. The plan, adopted in 1977 and updated in 1989, includes mandatory and voluntary water use restrictions associated

with different levels of reduction, rate block adjustments for each level, and approaches for enforcement.

The following table presents the types of mandatory water use prohibitions and the supply reduction stage when the prohibitions go into effect.

Table S-1
Mandatory Prohibitions at Each Supply Reduction Stage

Mandatory Prohibitions	Supply Reduction Stage
Flooding or runoff on sidewalks, streets or gutters	25%
Cleaning sidewalks, driveways, buildings, patios, parking lots or other paved/hard surfaced areas	25%
Using hose for washing cars, buses, boats, trailers without positive automatic shutoff valve on hose	25%
Use of decorative fountains	25%
Water for construction (unless no reclaimed water available),	25%
Water waste due to broken/defective plumbing, sprinkler, watering or irrigation systems	25%
Restaurant water service unless requested	25%
Landscape irrigation during daylight hours	25%
Hydrant flushing (unless for public health or safety)	25%
New installations of plants, shrubs, trees, lawns other growing things	35%
Landscape for mounds, hardscape okay but cannot include living plant materials	35%
New swimming pool or pond construction	35%
Filling or refilling swimming pools (can replace water loss due to evaporation)	35%
Outdoor watering December through March.	35%
Watering turf, grass or dichondra lawns (can provide minimal water for sports playing fields)	45%
Golf courses except for tees and greens	45%
Landscape irrigation with potable water of any City-owned premises or businesses where recycled water is available for connection.	50%
Utilization of potable water for any City operation where recycled water could be used.	50%

Conclusion

The City has several potable water supply sources, a flexible water management system, and a plan to meet demands during normal and drought years. The City's projections indicate that water demand is expected to increase to almost 27,000 acre feet by the year 2030.

Temporary interruptions of water supply from one source can be easily offset by increasing supply from the other available sources. Longer disruptions can also be ameliorated in the same way, though it would take more effort from City staff to maintain adequate water supply. The City has budgeted a capital project to connect one or more of the City wells to a transmission main that can provide well water throughout the city if water supply from SFPUC or SCVWD (or both) is interrupted.

Sunnyvale will also continue to plan and coordinate its water needs with regional and local wholesalers and retailers for best management of available water supplies.

In conclusion, the City of Sunnyvale is in a good position to meet the water needs of its residents and businesses for the next twenty-five years.

SECTION 1 – AGENCY COORDINATION

1.1 Introduction

The City of Sunnyvale is located in the County of Santa Clara, just minutes from San Jose and about 40 miles south of San Francisco Bay. When the City was incorporated in 1912, its population was approximately 1,500 and the entire municipal water system relied exclusively on groundwater for its potable water supply source. The original water supply source was from a privately-owned well at the Joshua Hendy Iron Works Factory in Sunnyvale. By 1926 a total of three wells were operational, none of which is in use today. During World War II the federal government awarded several war contracts that led to the development of the Central water plant and well.

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

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

The City also expanded its interconnections with surrounding water utilities in the immediate area to ensure a sustainable water supply during times of emergencies, thus adding to the systems reliability.

The City has at the present time connections to Mountain View, Cupertino, Santa Clara, and California Water Service Company. The water demand

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

1.2 Coordination with Other Agencies

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

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

Sunnyvale published its intention to adopt, and invited public comments for, an UWMP on the City's Web page. It also published a notice of intention in the San Jose Mercury News, and sent a copy of it to the following agencies:

- Bay Area Water Supply & Conservation Agency
- Santa Clara Valley Water District
- County of Santa Clara
- Alameda County Water District
- City of Brisbane
- City of Burlingame
- Coastside County Water District
- City of Daly City
- Estero Mun. Improvement Dist.
- City of East Palo Alto
- City of Hayward
- Town of Hillsborough
- City of Menlo Park

- Mid-Peninsula Water District
- City of Millbrae
- City of Milpitas
- City of Mountain View
- North Coast County Water Dist.
- City of Palo Alto
- Purissima Hills Water District
- City of Redwood City
- City of San Bruno
- City of San Jose
- City of Santa Clara
- Stanford University
- Westborough Water District
- ESA Consultants
- California Water Service Company

The City of Sunnyvale has adopted several management strategies to minimize imported water use and maximize resources. Fiscally, the City has instituted an inclining block tier rate structure where higher water consumption is penalized. Separate metering systems have been set up for fire and landscape uses, with potable water utilized for landscaping purposes at a higher rate than domestic water.

Sunnyvale has also invested in a recycled water production and distribution system that makes recycled water available for non-potable purposes in parts of the city. Recycled water used for landscaping reduces demand for potable water, thus reducing dependence on imported water sources and groundwater. Recycled water is also utilized in the Water Pollution Control Plant for internal wash and process use.

The City of Sunnyvale's usage of imported treated water in fairly predictable amounts based on contracts with our providers allows for a controlled use of imported water, with ground water utilized to meet variable demands (seasonal and emergency).

The Santa Clara Valley Water District provides management of local groundwater resources and contracts for imported water other than the one supplied by SFPUC. More information on the topic is available in the section on groundwater basin management.

SECTION 2 – CONTENTS OF PLAN

2.1 Service Area Information and Projections

The City of Sunnyvale became incorporated in 1912 and 38 years later became an official charter city. It has a 24-square-mile city limit radius and its current (2005) population is estimated at 133,000. According to the Association of Bay Area Governments (ABAG), Sunnyvale’s population is projected to be as follows:

Year 2005:	133,000
Year 2010:	135,800
Year 2015:	140,600
Year 2020:	146,900
Year 2025:	152,500
Year 2030:	159,100

Sunnyvale is a diverse community with a residential population of approximately 133,000, of which approximately 118,000 are estimated to be of working age. Residents are well educated, with forty-six percent holding at least an associate’s degree.

Nationally, Sunnyvale has one of the highest incomes per household, coupled with one of the lowest crime rates for a city of its size. Sunnyvale has a solid economic base, and poverty levels in the City have remained consistently lower than those of Santa Clara County or the state. Sunnyvale, with its Silicon Valley location, has a solid high-tech presence. Transitioning from agricultural to defense to the current high tech economy, Sunnyvale has remained on the cutting edge of Silicon Valley’s innovation. The top industries in the City include information (25 percent), retail trade (13.5 percent), and construction (18 percent). The City is home to growing clusters of emerging technology companies in high-tech and biotechnology. Table 2.1.1 shows a distribution of employment by industry.

Table 2.1.1

EMPLOYMENT BY INDUSTRY	PERCENTAGE	EMPLOYMENT BY INDUSTRY	PERCENTAGE
Information Services	25.000	Services	.090
Retail Trade	13.500	Recreation/Hospitality	.080
Wholesale Trade	.090	Public Administration	.005
Manufacturing	.100	Misc./Undefined	43.130
Construction	18.000		

CLIMATE

The City of Sunnyvale enjoys a sunny climate with mild temperatures and low precipitation. Climate information for the area is illustrated in Table 2.1.2 below.

TABLE 2.1.2
Climate

	Jan	Feb	Mar	Apr	May	June
Standard Monthly Average ETo ¹	1.35	1.87	3.45	5.03	5.93	6.71
Average Rainfall (inches)	2.12	2.07	1.93	0.93	0.05	0.08
Average Max Temperature (Fahrenheit)	59.0	62.4	65.8	68.7	75.9	79.3
Average Min Temperature (Fahrenheit)	39.3	41.6	43.6	44.1	48.4	51.6

TABLE 2.1.2 (cont.)
Climate

	July	Aug	Sep	Oct	Nov	Dec	Annual
Standard Monthly Average ETo	7.11	6.29	4.84	3.61	1.80	1.36	49.35
Average Rainfall (inches)	0.05	0.14	0.25	1.14	2.09	1.71	12.56
Average Max Temperature (Fahrenheit)	81.7	81.9	79.3	72.4	60.1	57.0	70.5
Average Min Temperature (Fahrenheit)	54.6	54.5	53.2	48.2	41.2	38.7	46.7

The following are some other demographic factors provided by ABAG:

- Total current employment is estimated to be 74,560.
- The mean household income is about \$99,000.
- There are about 55,000 housing units. With a complete build-out of housing units per Sunnyvale's General Plan, the housing units would increase to 63,580 units. In 20 years, it is expected that net new housing units would increase by between 5,500 and 6,700 units.
- Existing commercial and industrial development is at 35.4 million square feet. With a complete build-out of commercial and industrial property, according to the General Plan, the square footage would increase to 49 million. The average annual net new development is expected to be 215,000 square feet for an 81 percent build-out in 20 years.

2.2 Water Sources

The City of Sunnyvale has three sources that supply its potable water: San Francisco Public Utilities Commission (SFPUC), Santa Clara Valley Water

¹ ETo = Evapo Transpiration, is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues).

District (SCVWD), and Sunnyvale’s local groundwater from seven operating wells. Two additional wells remain in stand-by for emergencies, and two others have been destroyed. An additional source for non-potable water comes from Sunnyvale’s Water Recycling Program. The City also has the added ability to connect to the cities of Cupertino, Mountain View and Santa Clara and to California Water Service Company through service connections located within Sunnyvale during emergency situations.

Figure 2.2.1 shows the percentage of water provided to Sunnyvale by each source of water during Fiscal Year 04/05.

Figure 2.2.1

Water Sources FY 04/05

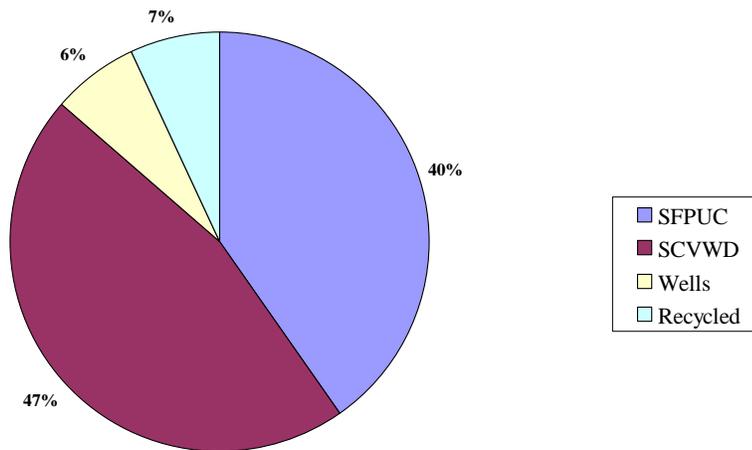


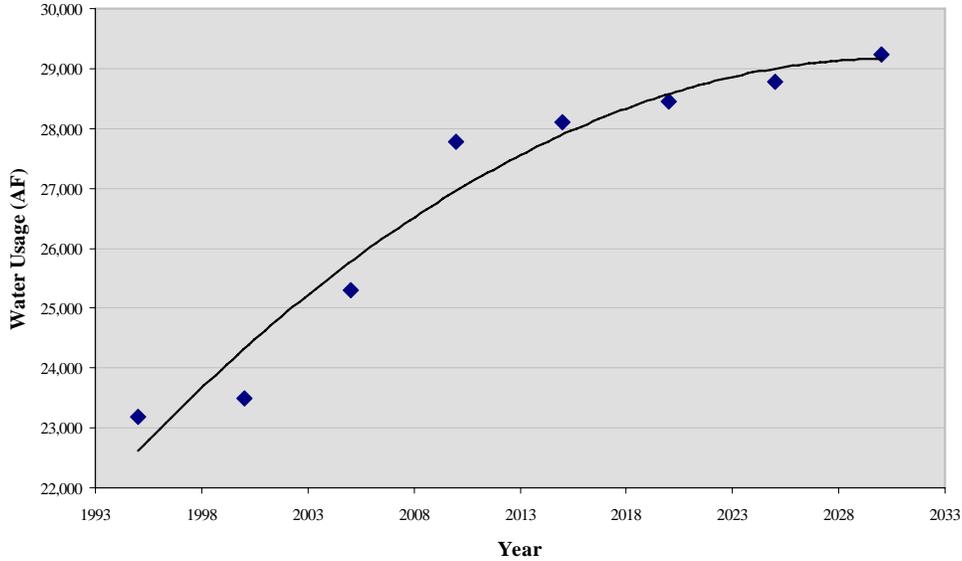
Table 2.2.1 and Figure 2.2.2 below describe the City of Sunnyvale’s existing and planned water supply sources and current and planned quantities of water available to the City.

TABLE 2.2.1
Current and Planned Water Supplies (AF/Y)

Water Supply Sources	2005	2010	2015	2020	2025	2030
Wholesale Water Providers						
SFPUC	11,204	11,762	12,210	12,658	13,106	13,554
SCVWD	10,600	11,537	11,427	11,313	11,201	11,089
Groundwater	1,600	2,800	2,800	2,800	2,800	2,912
Recycled Water	1,800	1,674	1,674	1,674	1,674	1,674
TOTAL WATER	25,204	27,773	28,111	28,445	28,781	29,229

FIGURE 2.2.2

Projected Water Usage



SFPUC SUPPLY

The Hetch-Hetchy water system gets its water supply from reservoirs located near Yosemite National Park. The water flows from the Sierra across the Central Valley, where it is blended with local reservoir water. It then crosses over the Hayward fault line through the conveyance system and finally passes through the Irvington Tunnel.

From the Irvington Tunnel, San Francisco Bay Division Numbers 1 and 2 pipelines cross the Bay and Numbers 3 and 4 pipelines pass around the south end of the Bay. Sunnyvale's six connections are to the Numbers 3 and 4 pipelines conveyance system, which runs alongside Highway 101 and delivers water from that point.

Water from the San Francisco Hetch-Hetchy supply is of very high quality. The resulting blend of water provided to residents and businesses is approximately 85 % from Hetch-Hetchy and 15 % from local reservoirs.

The City of Sunnyvale entered into a contract agreement in 1952 with the City and County of San Francisco. The agreement was renewed in 1984 and expires in 2009, at which time another renewal is anticipated. The City of Sunnyvale has a maximum entitlement of 16,800 acre-feet per year based on the contractual agreement with SFPUC, which delivered 9,781 acre feet during fiscal year 2004-2005.

SCVWD SUPPLY

The SCVWD supplies the City of Sunnyvale an entitlement of imported Central Valley Project (CVP) water and State Project Water. The contractual agreement between the City and the District sunsets in 2051. Approximately 60% of this water supply is from the Federal CVP water project, which originates in the Sierra and is imported from the Sacramento-San Joaquin Delta through a conveyance system. It is then blended with local reservoir water and finally delivered and finished at the Rinconada Treatment Plant in Los Gatos. The other 40% of the supply derives from the State Project Water system, a water storage and delivery system of reservoirs, aqueducts, power plants and pumping plants stretching more than 600 miles from Lake Oroville in the north to Lake Perris in the south. Santa Clara Valley Water District delivered 11,283 acre-feet of water to the City in fiscal year 2004-2005.

WELL SUPPLY

The City of Sunnyvale has seven operating wells that have full capacity, two wells in stand-by for emergencies, and two wells that have been destroyed and sealed. In fiscal year 2004-2005 the wells pumped a total of 1,158 acre-feet. The seven wells are used by the City as a supplemental source to the imported SFPUC and SCVWD water supplies.

RECYCLED WATER SUPPLY

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 percent of high-quality effluent from the Sunnyvale Water Pollution Control Plant (WPCP). The long-term goal of the City is to reuse 100 percent of all wastewater (12.5 mgd) generated from the plant to reduce all flows to the bay, as stated on the Recycled Water Master Plan and the City's Water Pollution Control Plant's National Pollutant Discharge Elimination System (NPDES) Permit requirements. This goal, if attained, would involve export of water outside the City limits. The system has a design flow capacity of 29 mgd for treatment of wastewater from the City of Sunnyvale.

The City has completed Phases I and II of the program, 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 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. Possible extensions to serve the south end of Sunnyvale and also Cupertino and Los Altos may be evaluated in the future.

DESALINATION

The City does not have access to ocean water and thus cannot participate in ocean desalination as a source of supply. Additionally, the aquifer it overlies does not contain brackish groundwater and thus Sunnyvale cannot participate in brackish groundwater desalination as a source of supply.

WATER SUPPLY AND DISTRIBUTION SYSTEM

The City of Sunnyvale owns, operates, and maintains a water supply and distribution system worth in excess of \$200 million. The system is a closed network consisting of three different pressure zones, since 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 Hetch-Hetchy 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 Hetch-Hetchy, City well water, and SCVWD treated water. Zone III serves the southwest section of town with Hollenbeck Avenue on the east side and Fremont Avenue on the northern side and is served by a combination of SCVWD treated water and City well water. The conveyance system extends over 280 miles in length, with pipe diameters ranging from 4 inches to 30 inches.

Water pressure within the distribution system is maintained within a range of 40 p.s.i. to 105 p.s.i. throughout all three zones. A Supervisory Control and Data Acquisition (SCADA) system allows the City to maintain a balanced system, never dropping below the 40 p.s.i. mark and not exceeding 105 p.s.i. Through the use of pressure-regulating valves equipped to do a reverse flow when sensing differential pressure flows, the system adjusts to maintain the preset pressures.

Zone I receives direct downstream pressure from the Hetch-Hetchy pipeline system with an operating pressure in the neighborhood of 130 p.s.i. Booster pumps are sometimes required for Zones II and III to maintain the desired pressure due to the difference in elevation with Zone I.

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

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 amount of water could provide one day's average demand on the system.

2.3 Groundwater

GEOLOGY

Santa Clara Valley is situated on an alluvial plain consisting of alternating layers of sand, gravel, and clay extending in some areas to a depth of more than 1,000 feet. This geology is the perfect condition for enabling a massive underground water bank within the basin.

HYDROLOGY

Three major sub-basins make up Santa Clara Valley's basin. They are the Santa Clara sub-basin, the Coyote sub-basin and the Llagas sub-basin. The three groundwater sub-basins have a maximum approximate operational storage of 350,000 acre feet, 25,000 acre feet, and 150,000 acre feet respectively (Santa Clara Valley Water District UWMP, 2005).

The Santa Clara Valley sub-basin, located in the northern portion of the County, is by far the largest of the three sub-basins. This sub-basin is the primary source of underground water supply for Sunnyvale. The Coyote and Llagas sub-basins serve the southern portion of the county.

Development and agricultural needs in the early 1900s increased the demand on the water systems within the Santa Clara Valley and ground levels started showing signs of subsidence. Subsidence occurs when underground water levels drop and land clay layers compact. Once an aquifer is compacted, its storage capacity can be substantially reduced; once lost, the capacity cannot be regained. The Santa Clara Valley Water Conservation District (currently Santa Clara Valley Water District), formed in 1929, was charged with alleviating land surface subsidence in and around San Jose through artificial recharging of the groundwater.

The rapid development of Santa Clara County in the 1960s, with its corresponding increase in demand on the existing water supply, resulted in a new overdraft of the groundwater basin and a significant lowering of the groundwater table. Significant subsidence of the land in the northern portion of the valley and compaction of several aquifers followed. In order to avoid any further subsidence and loss of aquifer capacity, SCVWD has attempted to

maintain the basin at equilibrium by augmenting natural percolation of rainfall and local stream runoff with imported water. The District is currently using projected supply, carryover capacity and anticipated demand to predict potential water shortages. The July 2001 Santa Clara Valley Water District Groundwater Management Plan, the district's most recent formally-adopted plan, describes the groundwater recharge program in detail. The plan is included as Appendix A. A revised Santa Clara Valley Water District Groundwater Management Plan will not be available before this UWMP is completed.

In April of each year, when the quantity of imported water available to SCVWD by contract and the local water yield can be estimated fairly accurately, the District estimates the carryover storage. Based on the calculated carryover capacity and anticipated customer demand, the District reviews and modifies its groundwater management strategy in order to maintain adequate water in the basin and avoid subsidence (Santa Clara Valley Water District UWMP, January 2001).

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 of Sunnyvale depends on a number of factors, including withdrawals by other water agencies, quantity of water recharged and carry-over storage from the previous year. Table 2.3.1 shows some historic groundwater pumping data.

TABLE 2.3.1
Amount of Groundwater Pumped (AF/Y)

Basin Name	2000	2001	2002	2003	2004
Santa Clara	1,649	1,189	1,366	1,521	1,395
% of Total Water Supply	6.54	4.81	5.56	6.48	6.00

Sunnyvale has seven active and two stand-by wells distributed throughout the city. This increases system reliability and minimizes localized subsidence from over-drafting.

Projected groundwater to be pumped by the City of Sunnyvale is shown on Table 2.2.1.

2.4 Reliability of Supply

The City of Sunnyvale cannot contract for water transfers from outside the county. However, as previously indicated in Section 1, several inter-ties have been constructed for emergency transfers with the cities of Cupertino, Mountain View and Santa Clara and with California Water Service Company.

These inter-ties (two automatic and 14 manual connections) are intended only for water supply emergencies and are not intended for long-term water transfers. Agreements for emergency transfers between the City of Sunnyvale and the other entities are attached as Appendixes B and C.

RELIABILITY OF TREATED WATER PROVIDED BY SANTA CLARA VALLEY WATER DISTRICT

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

Long term planning and modeling analysis performed by the District as part of the Integrated Water Resources Planning Study (IWRP) and UWMP 2005 indicates that if additional investments are made, future countywide demands can reliably be met. It is the intent of the District to ensure that these additional investments be undertaken in accordance with the IWRP framework, which recommends a flexible resource mix be implemented in phases over the planning horizon. This flexibility allows the District to respond to changing and uncertain future conditions.

The water supply will reliably meet future countywide demands. The IWRP's strength is its inherent flexibility and integrated approach to water resources management. Although this UWMP presents projections of future water supply by source, ongoing coordination with the District will be necessary to ensure projections are consistent with the District's long-term water management strategies. We will continue to work with the District to refine future water supply projections and ensure long-term planning efforts are consistent.

In addition, SCVWD completed an infrastructure reliability study that assessed the vulnerability of its regional raw and treated water delivery systems. The District's screening process identified the following hazards as some that pose the most significant risk to its system functionality:

- San Andreas M7.9 earthquake
- Southern Hayward M6.67 earthquake
- 100 year flood
- 500 year flood
- Regional electric power outage

An earthquake at the region's major fault zones has the potential for disrupting the delivery of potable treated water from the District's water treatment plants. The result of the combination of seismic probabilities for each one of the fault zones indicates about a 1-in-100 chance each year for a major earthquake that could result in a one- to two-week interruption of the District treated water

supply to the City of Sunnyvale. The possible flooding of some District facilities is of much lesser concern to the City than a seismic event.

Another unstated vulnerability for the District is the reliability of the supplies of regional imported water from the Sacramento-San Joaquin Delta to the District. Recent studies indicate that levees protecting many of the Delta farming islands are extremely vulnerable to catastrophic failure. Under certain conditions levee failure could interrupt the ability to pump treatable water to the State or Federal water projects for delivery to the District.

The temporary loss of water supply from the District could be replaced in the short term by a combination of increased well production of groundwater and an increase in SFPUC supply (within contract limits). The areas of the City served by District connections could be served primarily via stored water in reservoirs and secondarily by pumping of Hetch-Hetchy water from Wolfe/Evelyn Water Plant through the Wolfe/Homestead transmission main and from Mary/Carson Water Plant into Zone II. Sufficient supply from Hetch-Hetchy and well water would be required to mitigate an extended loss of District supply.

RELIABILITY OF WELL WATER

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

The Santa Clara Valley Water District's Groundwater Management Plan ensures that local groundwater resources are sustained and protected. Groundwater management encompasses activities and programs that identify and mitigate contamination threats to the groundwater basin, replenish and recharge groundwater supplies, prevent groundwater overdraft and land subsidence, and sustain storage reserves. District programs to sustain and protect groundwater resources are described in detail in the District's Groundwater Management Plan of 2001 included as Appendix A of this document.

RELIABILITY OF TREATED WATER PROVIDED BY SAN FRANCISCO PUBLIC UTILITIES

The San Francisco Public Utilities Commission (SFPUC) has recently identified serious concerns about portions of the Hetch-Hetchy system that are aging and in need of repair or replacement. Because of the age of the system, most facilities were not designed to current seismic standards and the system is vulnerable to earthquakes. A large earthquake or catastrophic event could result in a prolonged disruption of the Hetch-Hetchy system with loss of service for two to four months. In the last few years SFPUC completed an evaluation of

the Hetch-Hetchy water system that indicates approximately \$4.4 billion in infrastructure replacement and upgrades are necessary to ensure the capacity and reliability of the water system for the suburban users (San Francisco Public Utilities Commission, Bay Area Water Users Association: Water Supply Master Plan - A Water Resource Strategy for the SFPUC, April 2000).

In order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability and water supply, the SFPUC is undertaking a Water System Improvement Program (WSIP). 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 its customers in a reliable, affordable and environmentally sustainable manner.

The origins of the WSIP are rooted in the "Water Supply Master Plan" (April 2000). Planning efforts for the WSIP gained momentum in 2002 with the passage of San Francisco ballot measures Propositions A and E which approved the financing for the water system improvements. Also in 2002, Governor Gray Davis signed Assembly Bill 1823, the Wholesale Regional Water System Security and Reliability Act. The WSIP is expected to be completed by 2016.

The business relationship between San Francisco and its wholesale customers is largely defined by the "Settlement Agreement and Master Water Sales Contract" (Master Contract) executed in 1984. The Master Contract primarily addresses the rate-making methodology used by San Francisco in setting wholesale water rates for its wholesale customers, in addition to addressing water supply and water shortages for the regional water system. The contract expires on June 30, 2009.

Barring catastrophic events, the SFPUC can meet the demands of its retail and wholesale customers in years of average and above-average precipitation. The Master Contract allows the SFPUC to reduce water deliveries to wholesale customers during periods of water shortage. Under the Master Contract, reductions to wholesale customers are to be based on each agency's proportional purchases of water from the SFPUC during the year immediately preceding the onset of shortage, unless this formula is supplanted by a water conservation plan agreed to by all parties.

The Master Contract's default formula discouraged SFPUC's wholesale customers from reducing purchases from SFPUC during periods of normal water supply through demand management programs or development of alternative supplies. To overcome this problem, SFPUC and its wholesale customers adopted an Interim Water Shortage Allocation Plan (IWSAP) in calendar 2000. This IWSAP applies to water shortages up to 20% on a system-wide basis and will remain in effect through June 2009. During times of

drought and subsequent reduced water supply, the IWSAP allows for water shortage allocations for SFPUC wholesale customer agencies.

The IWSAP allows for voluntary transfers of shortage allocations between SFPUC and any wholesale customer and between wholesale customer agencies. Also, water “banked” by a wholesale customer, through reductions in usage greater than required, may be transferred between agencies.

The temporary loss of Hetch-Hetchy supply would eliminate the single-source supply of water to Zone I and contributions to water supply to Zone II. Well water from all zones could be used to temporarily replace the loss of water from Hetch-Hetchy supply; long-term replacement would require supplying water from SCVWD to Zone I.

In order to improve water reliability, the City of Sunnyvale budgeted a capital project for Fiscal Year 2013/2014 that will connect the Raynor well to the Wolfe transmission main. This connection will provide well water to the Wolfe/Homestead area if the water supply from Hetch-Hetchy or Santa Clara Valley Water District (or both) is interrupted.

Reliability of water supply depends greatly on seasonal or climatic shortages. Table 2.4.1 summarizes historic data of available water for the area from each water supply source for normal water year, single dry water year, and multiple dry water years.

TABLE 2.4.1
Supply Reliability (AF/Y)

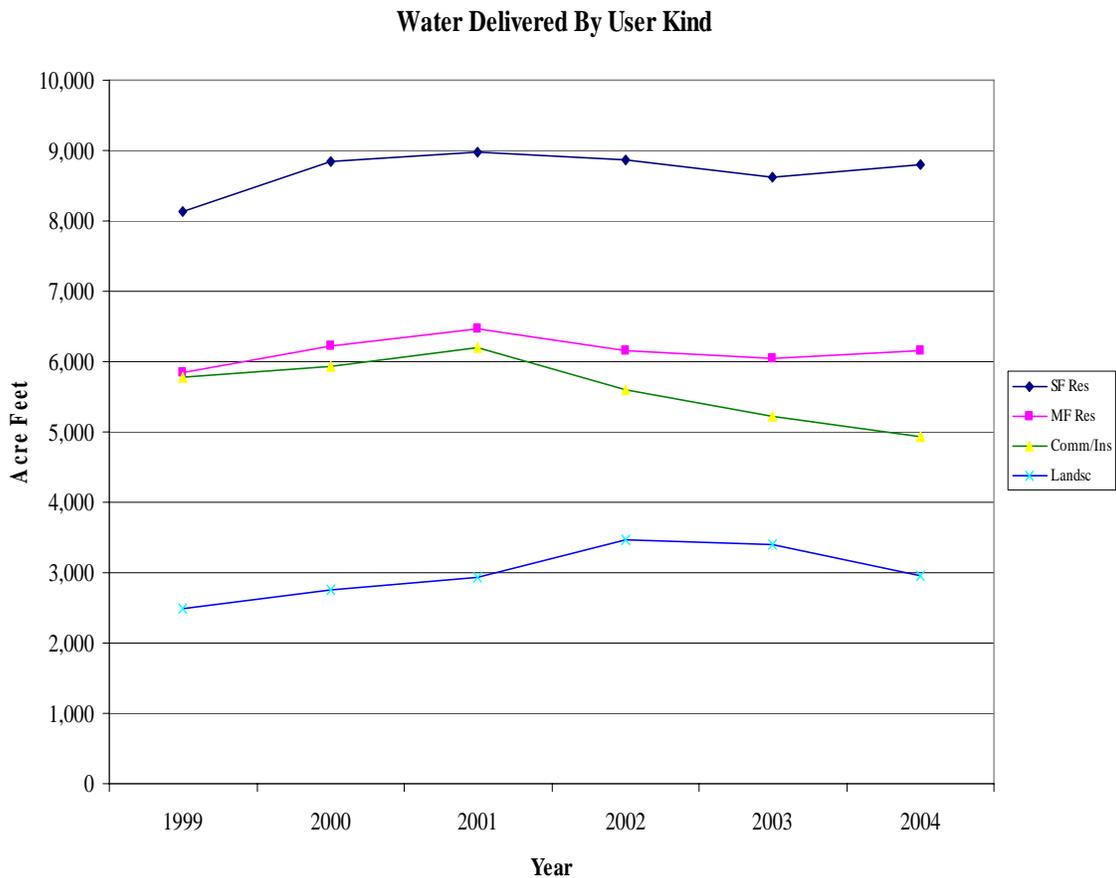
Source	Normal Year (1985)	Single Dry Year (1977)	Multiple Dry Average Years (1987-1992)	Year 87	Year 88	Year 89
SCVWD	9,199	6,636	16,934	10,335	12,073	11,503
SFPUC	13,209	10,956	10,000	10,956	9,522	9,522
Groundwater	8,369	5,104	2,793	4,019	4,116	2,509
Totals	30,777	22,696	29,727	25,310	25,711	23,534

2.5 Water Use by Customer Type – Past, Current and Future

The City of Sunnyvale categorizes its water accounts into four broad customer categories: Single-family, multi-family, commercial (incorporating industrial and institutional) and landscape. The commercial sector includes all non-residential accounts that are also not classified as landscape.

Figure 2.5.1 illustrates water demand by user category for the last 6 years. In examining the usage by user category during this period some facts become apparent. From 1999 to 2001 water consumption in all categories went up. Between 2001 and 2003 demand went down in general for all categories except landscaping, with the highest decrease being in the commercial/industrial category usage. This larger decrease in demand was mainly due to changes in the electronic industry that used to be the predominant industry in the City of Sunnyvale. In 2004 demand from the residential sector went up slightly, but demand in the commercial/industrial sector continued its downturn. ABAG projections show an increase in jobs in 2010 that would, at that time, increase the amount of water the commercial sector would require. Given the almost complete build-out of land in the City, we expect multi-family water demand to increase in the future when older low-density housing is replaced by high-density home developments.

Figure 2.5.1



Water use varies through the years depending on several natural factors such as weather, extension of seasons, etc. For example, a rainier-than-usual winter in Fiscal Year 2004/05 that reduced the need for landscape irrigation decreased water usage over the previous year. Water use is also dependent on

other factors such as business climate and economy. Long-term general trends in water requirements are valuable in projecting future supply needs.

The projected water demand by user type is shown in Table 2.5.1.

TABLE 2.5.1
Water Use Per Customer (AF/Y)

Year		Water Use Sectors	Single family	Multi-family	Commercial	Landscape	Total
2000	metered	# of accounts	22,683	1,588	2,781	749	27,801
		Deliveries AF/Y	8,978	6,473	6,198	2,928	24,577
2005	metered	# of accounts	23,211	1,588	2,796	880	28,475
		Deliveries AF/Y	8,807	6,146	4,936	2,950	22,839
2010	metered	# of accounts	23,641	1,617	2,848	896	29,002
		Deliveries AF/Y	8,958	7,453	5,601	3,279	25,291
2015	metered	# of accounts	24,477	1,675	2,948	928	30,028
		Deliveries AF/Y	8,996	7,586	5,799	3,246	25,627
2020	metered	# of accounts	25,573	1,750	3,081	970	31,374
		Deliveries AF/Y	9,012	7,625	6,059	3,253	25,949
2025	metered	# of accounts	26,548	1,816	3,198	1,007	32,569
		Deliveries AF/Y	9,054	7,660	6,290	3,269	26,273
2030	metered	# of accounts	27,697	1,895	3,336	1,050	33,978
		Deliveries AF/Y	9,078	7,696	6,562	3,373	26,709

SYSTEM LOSSES

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

The losses experienced by Sunnyvale’s water distribution system are substantially lower than the 10% losses normally experienced by systems in urban areas (AWWA, Water Resource Planning; Manual of Water Supply Practices M50, 2001, p33), as shown on Table 2.5.2 (average 96.3% water billed vs. purchased). Ninety-five percent of public water distribution systems experience losses between 7 and 15%. The system loss projections and total demand projections contained in this UWMP assume a future system loss percentage of approximately 3%, which is closer to the actual system losses historically experienced by the City of Sunnyvale.

TABLE 2.5.2
Additional Water Uses And Losses (AF/Y)

Water Use/Loss	2000	2005	2010	2015	2020	2025	2030
Recycled	419	1,710	1,674	1,674	1,674	1,674	1,674
Unaccounted-for system losses	217	741	791	810	823	834	846
Total	636	2,451	2,465	2,484	2,469	2,508	2,520

Total water use or total amount of water to be purchased is calculated as the sum of water required by all customer categories, including recycled water used and system losses. The total amount required to cover all sales, losses and recycled water is shown in Table 2.5 3.

TABLE 2.5.3
Total Water Use (AF/Y)

	2000	2005	2010	2015	2020	2025	2030
Total Water Use	25,213	25,290	27,773	28,111	28,446	28,781	29,229

2.6 Planned water supply projects and programs

The City of Sunnyvale’s water supply comes mainly from two wholesale providers, the Santa Clara Valley Water District and the San Francisco Public Utilities Commission. Well water is only utilized during emergency and drought situations, though wells are exercised continuously for freshness of water supply. Because of this, Sunnyvale has no current capital projects that would help increase its water supply. However, its 20-year budget includes a well study that will look into the need to drill new wells, to be conducted in Fiscal Year 2014/15 at an estimated cost of close to \$48,000. If the study concludes that the city needs more available well water, a project will be set up at that time.

2.7 Water supply including wholesale water

As discussed in Section 2.2 Sunnyvale receives water from both SFPUC and SCVWD. Both agencies are preparing their own UWMPs that discuss water availability and supply reliability.

SECTION 3 – DETERMINATION OF DMM IMPLEMENTATION

The City of Sunnyvale has a commitment to water conservation and to that end has instituted a tiered water fee schedule that penalizes excessive water consumption, and has also implemented a recycled water program. Many of the Demand Management Measures offered by Sunnyvale are actually programs run by or coordinated through the SCVWD, one of the wholesalers from which the City buys water. The programs are either funded through the wholesale water rates paid by Sunnyvale, or directly reimbursed by the City. Table 3.1 below lists each measure and indicates who administers the program and if Sunnyvale reimbursed SCVWD for it. Each demand management measure is discussed in detail after the table.

LEGAL AUTHORITY TO IMPLEMENT DEMAND MANAGEMENT MEASURES

The City of Sunnyvale, as a municipally-owned water utility, has the legal authority to implement demand management measures by ordinance or resolution through the City Council. This authority has been demonstrated through past implementation of demand management measure, fees, and penalties.

TABLE 3.1
Demand Management Measures

Demand Management Measure	City Program	District Program Reimbursed by Sunnyvale	District Program
Water survey programs for residential customers			X
Residential plumbing retrofit			X
System water audits, leak detection, and repair	X		
Metering with commodity rates	X		
Large landscape conservation			X
High-efficiency washing machine			X
Public information			X
School education			X
Conservation programs for commercial and industrial customers			X
Wholesale agency programs			X
Conservation pricing	X		
Conservation coordinator	X		
Water waste prohibitions	X		
Residential ultra-low-flush toilet replacement		X	

1. WATER SURVEY PROGRAMS FOR RESIDENTIAL CUSTOMERS

In its 2000 UWMP Sunnyvale identified the goal of offering audits to residential customers as one of the conservation measures that would provide greatest savings in water demand. The audits were offered through the SCVWD Water Wise House Call Program.

By July 1, 2008, SCVWD anticipates completing residential surveys for 15% of all single- and multi-family residential customers. In order to attain this goal, the District developed a pilot program targeting the top 20% of residential customers. The surveys include educating customers on how to read a water meter; checking flow rates of showerheads, faucet aerators and toilets; checking for leaks; installing low-flow showerheads, aerators and/or toilet flappers if necessary; checking irrigation systems for efficiency (including leaks); measuring landscaped areas; developing an efficient irrigation schedule for the different seasons; and providing customers with evaluation results, water savings recommendations, and other education materials. In 2004, the District began programming the homeowner's controllers as well (i.e. if allowed by the homeowner, the surveyors will input the recommended schedules into the controller).

In Fiscal Year 04/05 the District, in cooperation with its retailers, offered surveys to residential customers via letters mailed to the highest 30% of water users. The program is also promoted yearly through a county-wide summer media campaign that typically includes television, radio and print advertisements. Table 3.2 provides a summary of the number of Water Wise calls completed in Sunnyvale.

TABLE 3.2
Water Wise House Calls by SCVWD

Home Surveys	Through 6/2001	From 7/2001 To 6/2003	From 7/2003 To 6/2005	Total
Single Family	92	702	316	1,110
Multi-Family	347	235	874	1,456

2. RESIDENTIAL PLUMBING RETROFIT

This measure calls for high-quality, low-flow showerheads to be distributed to not less than 10 percent of single-family connections and multi-family units every two years until a 75 percent saturation of pre-1992 residences is obtained. The City of Sunnyvale makes low-flow showerheads and aerators available to residents free of charge and to date has directly distributed over 600 units to interested parties. Additional devices have been distributed through the Water Wise House Call program from SCVWD.

Based upon a study recently completed by the Santa Clara Valley Water District, Santa Clara County Residential Water Use Baseline Study (August 2004), the county is nearing the 75 percent saturation threshold and completion of this BMP. The study found saturation rates of 59 percent for pre-1992 constructed single-family homes and 51 percent of pre-1992 constructed multi-family units. A CUWCC report, Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices, estimates the average lifespan of a showerhead to be 3-7 years and the average lifespan of an aerator to be 1-3 years. Given that 13 years have passed since the efficiency standard was enacted, the District's study suggested the effects of natural replacement will move the county to the 75 percent threshold in the near future (2006 for single-family and 2010 for multi-family).

The City plans to continue offering free showerheads and aerators both directly and through the District's Water-Wise House Call Program.

3. SYSTEM WATER AUDITS, LEAK DETECTION, AND REPAIR

In order to fulfill this measure, the City of Sunnyvale has no unmetered accounts and offers help to its residential customers in determining if a leak exists at the property. Water Meter Readers also report leaky meters or water meters running when a residence does not appear to be occupied so that a technician can be dispatched to investigate and make repairs as needed.

Apart from staff continuously monitoring Sunnyvale's water distribution system through SCADA monitoring technology and field inspections, the City has also implemented a leak detection program. Every year a leak detection company is hired to check a certain number of miles of the distribution pipeline and produce a report of its status. Any leaks reported are promptly remediated by staff or a hired contractor. These programs have helped the City attain a lower-than-average system loss.

4. METERING WITH COMMODITY RATES

This measure requires water meters for all new connections and billing by volume of use, as well as establishing a program for retrofitting any existing unmetered connections. The City of Sunnyvale already requires meters on all connections to its water distribution system. There are no known unmetered connections at this time.

Sunnyvale encourages all new commercial, industrial, and multi-family developments to have dedicated water meters and separate accounts and meters for landscape irrigation. As old developments are torn down and new ones are built to replace them, any landscaping that did not have a dedicated

meter will be encouraged to acquire one. The City also has a program in place to retrofit and replace meters as they age.

5. LARGE LANDSCAPE CONSERVATION

Since 1995 the City of Sunnyvale has offered a free Irrigation Technical Assistance Program (ITAP) through the Santa Clara Valley Water District to sites with one acre or more of landscaping, with audits provided through the District that oversees and runs the program. A pre-screening mechanism was incorporated by the District that determines if the site's water usage is higher than similar-sized landscape areas, prior to conducting a full-scale audit. Landscape managers are provided with water-use analyses, scheduling information, in-depth irrigation evaluation, and recommendations for affordable irrigation upgrades. Each ITAP site receives a detailed report upon completion of the audit. The District also generates an annual report recapping the previous year's efforts. To generate several reporting and monitoring options, water use history, meter numbers, account numbers, and site contacts and addresses are captured for each site in a specialized database.

ITAP is promoted through advertising in Tri-County Apartment Association's monthly Apartment Management magazine, colorful flyers at the biannual Home & Garden Show, NCTLC Turf & Landscape Expo, the San Jose Mercury News, and retailer outreach through direct mailing of personalized letters to Sunnyvale's high water use customers and also through City newsletters.

Through June 2005, thirty-five ITAP evaluations were completed in the City of Sunnyvale since the program started. Twenty-eight of these audits were conducted between 2000 and 2004.

The City of Sunnyvale evaluated large-area landscapes for conversion to recycled water since they are typically the ones that benefit the most. The location of the recycled water pipeline system was selected based on the concentration of potential customers since that would make the most economic sense. To date the City has converted approximately 90 private and public sites, including the City's Baylands Park and golf courses, to recycled water for irrigation of turf areas.

The City issued Ordinance No. 19.38.070 regulating conservation in landscaping. This ordinance applies to all new and rehabilitated landscaping for public agency projects and private development projects that require a permit; and developer-installed landscaping in single-family and multi-family projects. A copy of this ordinance is included in Appendix D.

The City plans to continue to offer both ITAP and recycled water to customers with large landscape areas.

6. HIGH EFFICIENCY CLOTHES WASHER REBATE

The City offers rebates on high-efficiency clothes washing machines through the SCVWD. As of June 2005, a total of 3,691 rebates had been issued. A breakdown of the rebates issued per year is shown in Table 3.3. The California Urban Water Conservation Council (CUWCC) estimates that the average water savings for high-efficiency clothes washers is approximately 5,100 gal/yr. Therefore, the 3,691 rebates issued to date equal an approximate savings of 18,824,100 gal/yr or 58 acre-ft/yr.

TABLE 3.3
High-Efficiency Clothes Washer Machines Rebate

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	6/2005
No. of Rebates	8	110	295	375	386	510	587	639	483	298

7-8. PUBLIC INFORMATION AND SCHOOL EDUCATION PROGRAMS

The City of Sunnyvale participates in Santa Clara Valley Water District's very active public information program on water conservation by including inserts and information flyers in customer bills, and articles and information in newsletters and reports sent to City residents.

Sunnyvale also has a water pollution and conservation outreach program spearheaded by Sunnyvale's Water Pollution Control Plant staff. This program offers tours of the plant, classroom presentations and a creek water education program.

Plant tours teach youth about the function of wastewater treatment, water pollution prevention, and water conservation. Oftentimes, the tour is a supplement to a water study module in the classroom, and approximately 50 percent are repeat tours scheduled year after year by teachers.

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

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

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

Table 3.4 below shows a breakdown of activities during fiscal years 03/04 and 04/05.

TABLE 3.4
Public Information and School Education Activities

Fiscal Year	Plant Tours	Classroom Presentations	Creek Education	Presentations and Public Activities
03/04	15	15	1	4
04/05	25	25	1	5

In addition, all utility bills include a water usage chart comparing current to previous year usage to help customers who have unknowingly increased their water consumption to check on the cause of the increase.

The City plans to continue the existing public information program.

9. CONSERVATION PROGRAMS FOR COMMERCIAL AND INDUSTRIAL ACCOUNTS

The City of Sunnyvale offers industrial and commercial audits through a program administered by the Santa Clara Valley Water District. These audits include the following programs: Commercial Toilets, Commercial Washers and Pre-Rinse Spray Valves. Table 3.5 below shows the number of rebates or items installed for Sunnyvale residents as of June 2005.

TABLE 3.5
Rebate Programs Implemented by SCVWD for the City of Sunnyvale (2005)

Commercial Toilets	Commercial Washers	Pre-Rinse Spray Valves
254	324	231

10. CONSERVATION PRICING

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

Prior to the 1976-1978 drought, the City had a traditional declining-rate block structure, which meant that the more water used by a customer, the lower the

cost per unit. In 1977, a flat-rate block structure was established with costs fixed regardless of the quantity used. In the year following the drought, an inverted rate structure was adopted and is regularly modified to ensure water conservation and to adequately reflect the high cost of developing new water resources projects.

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

Sunnyvale's Fiscal Year 2005/06 Utility Fee Schedule is attached as Appendix E.

11. CONSERVATION COORDINATOR

The City of Sunnyvale established the position of Water Conservation Coordinator in 1999. The person currently tasked with coordinating conservation efforts is

Name: Justin Ezell
Title: Water System Operator
Address: 221 Commercial St., Sunnyvale, CA 94085
Phone: 408-730-7567
Fax: 408-736-1611
E-mail: jezell@ci.sunnyvale.ca.us

12. WATER WASTE PROHIBITION

The Water Conservation Plan adopted by the City of Sunnyvale in 1989 established a listing of non-essential water practices that were prohibited in Sunnyvale. Some of these prohibitions were lifted after the drought was over, but the following is a listing of current non-essential water practices prohibited by the City:

- Allowing or maintaining broken or defective plumbing, sprinklers, watering or irrigation systems which permit the escape or leakage of potable water.
- Using potable water in any manner which causes, allows or permits the flooding of any premises, or any portion thereof, or which causes, allows or permits water to escape from any premises or any portion thereof and flow into gutters, streets, or any surface water drainage system.
- Using any hose or similar device using potable water for washing automobiles, trucks, buses, boats, trailers, equipment, recreational vehicles, mobile homes or other vehicles or machinery, unless the hose or device is equipped with a positive automatic shutoff valve.

- Using potable water to wash sidewalks, driveways, filling station aprons, patios, parking lots, porches or other paved or hard surfaced areas, unless there is a positive automatic shutoff valve on the outlet end of the hose.
- The service of water by any restaurant or other eating or refreshment establishment to any patron, except upon the specific request by a patron for such services.
- Installation of any single pass cooling process in new construction.
- Any use of non-potable water not in compliance with all federal, state and local laws, rules and regulations. Use of reclaimed water from the city's water pollution control plant shall be subject to the discretion of the Director of Public Works.

Violation of these provisions may escalate to installation of a flow restricting device upon the water service lines and cumulative fines.

13. RESIDENTIAL ULTRA LOW FLOW TOILET REPLACEMENT PROGRAMS

From 1992 through June 2003, the Santa Clara Valley Water District (SCVWD), through a cost-sharing agreement with the City of Sunnyvale, provided incentives for the retrofit of approximately 16,484 residential toilets. The City's share of the program was \$264,875.00.

In 2004 SCVWD launched a new rebate program for high-efficiency toilets (HETs) that use even less water than conventional ULFTs. Sunnyvale participates in this program through the District.

CONCLUSION

The City of Sunnyvale has implemented or participated in programs that comply with all Demand Management Measures, and intends to continue to do so in the future.

SECTION 4 – WATER SHORTAGE CONTINGENCY PLAN

4.1 Stages of Action

In March 1989, in response to the third year of a continuing drought, the Santa Clara County Valley Water District announced a supply reduction of 25 percent (of 1987 county wide water usage). All water retailers and cities in the county were asked to implement plans to achieve the 25 percent reduction for the remainder of 1989.

Sunnyvale staff, in anticipation of 25, 35 and 45 percent supply reductions developed a water shortage contingency plan that includes mandatory (and voluntary) water use restrictions (associated with each of the three anticipated levels of reduction), rate block adjustments for each level and approaches for enforcement.

As stated above, the following (Table 4.1.1) are the three levels of supply reductions (assuming interruption in imported supplies) that were used for development of Sunnyvale’s water shortage contingency plan. Also shown is a fourth level of reductions developed in anticipation of a 50 percent water shortage.

Table 4.1.1
Stages of Action in Response to Water Supply Shortages

Stage No.	% Shortage
1	25
2	35
3	45
4	50% or greater

4.2 Estimate of Minimum Supply for Next Three Years

In June 1, 2005 the SFPUC informed the City of Sunnyvale of the results of SFPUC’s water supply reliability for meeting current deliveries during a multiple dry year (3-years) period. Those projections are presented in Table 4.2.1 below.

According to the draft 2005 UWMP for the SCVWD (Section 7), the District indicates that it currently would be able to meet demand over the next three years (assuming a repeat of the driest 3-year historic sequence). The District would be able to meet current demand by utilizing groundwater storage withdrawals from banking reserves and/or transfers and exchanges. However, if the three-year sequence were to occur in a future time when storage levels

are not as high as current conditions, the prospect for meeting demand would change.

If a shortage should occur, the SCVWD contingency plan indicates the following potential actions will be considered for implementation:

- Cut back allocation among retailers and retailer customer classifications
- Consideration of other water sources, such as SFPUC, recycled water, as well as demand-side management program in allocations
- Criteria for demand cutbacks and purchases of additional supplies.

Information obtained from SFPUC and SCVWD is presented in Table 4.2.1 below, together with information on Sunnyvale’s local groundwater and recycled water supplies.

Table 4.2.1
Three-Dry-Year Estimated Minimum Water Supply (AF/year)

Source	Year 1	Year 2	Year 3	Normal
SFPUC Hetch-Hetchy	11,290	11,400	11,450	11,600
SCVWD	10,600	10,600	10,800	11,200
Local groundwater	1,600	2,100	2,400	2,500
Recycled water	1,800	1,720	1,700	1,680
Total	25,290	25,820	26350	26,980

4.3 Catastrophic Supply Interruption Plan

Both the SFPUC’s and SCVWD’s draft 2005 UWMPs present discussions with regard to a catastrophic water supply interruption.

SFPUC CATASTROPHIC SUPPLY INTERRUPTION PLAN

Following the 1989 Loma Prieta earthquake, SFPUC created a departmental Emergency Operations Plan (EOP). The EOP was updated in the year 2000 and again in the year 2004. The EOP was created to address a broad range of potential emergency situations. The EOP provides a description of SFPUC’s emergency management organization, roles and responsibilities and emergency policies and procedures.

In February 2005 the Water Quality Bureau within SFPUC published a City Emergency Drinking Water Alternatives report. This project developed a plan for supplying emergency drinking water in the City after a major disaster damages and/or contaminates the raw and/or treated water system.

SFPUC prepared a Regional Water System Emergency Response and Recovery Plan in 2003. This plan describes the Regional Water System 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 Regional Water System seismic event or other major disaster.

SFPUC is undertaking capital projects designed to increase the seismic reliability of the system by 2016. In addition, SFPUC has constructed interties for use during catastrophic emergencies, short-term facility maintenance and upgrade activities with SCVWD and with the South Bay Aqueduct. An East Bay Municipal Utility District-City of Hayward-SFPUC intertie is scheduled for completion in 2006.

SCVWD CATASTROPHIC SUPPLY INTERRUPTION PLAN

In September 2005, SCVWD released the Water Infrastructure Reliability Project report. The purpose of the study was to evaluate ways to lessen the impacts on the SCVWD system during a disaster. The report concludes that a magnitude 7.9 earthquake along the San Andreas Fault could damage pipes and disable pump stations and treatment plants. Outages due to this scenario were projected to last up to two months.

The report provides recommendations for short-term actions and long-term capital improvements. Currently SCVWD is purchasing and storing replacement pipes and hardware to have an adequate supply of replacement pipe on hand by June 2006. This step will cut in half the estimated time it would take to restore service following a disaster.

Recommended long-range projects included expansion of well fields on the west and east sides of Santa Clara Valley. Preliminary cost estimates for this step are \$150 million. Expansion of the well fields would reduce the outage period to 7 to 14 days. SCVWD is currently studying this option further to identify opportunities to reduce costs, identify potential funding options and to determine and identify needed approvals.

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 is proposing to retrofit key water infrastructure components that are at

risk. The City has prioritized seismic vulnerability mitigation projects and included them in its 20-year Capital Improvements Plan.

4.4 Prohibitions, Penalties and Consumption Reduction Methods

To meet the anticipated 25, 35, 45, and 50 percent or greater supply reductions the City of Sunnyvale has developed a water shortage contingency plan that includes mandatory (and voluntary) water use restrictions (associated with each of the three anticipated levels of reduction). Table 4.4.1 presents the types of mandatory water use prohibitions and the supply reduction stage when the prohibitions go into effect.

Table 4.4.1
Mandatory Prohibitions at each Supply Reduction Stages

Mandatory Prohibitions	Stage When Prohibition Becomes Mandatory
Flooding or runoff on sidewalks, streets or gutters	1
Cleaning sidewalks, driveways, buildings, patios, parking lots or other paved/hard surfaced areas	1
Using hose for washing cars, buses, boats, trailers without positive automatic shutoff valve on hose	1
Use of decorative fountains	1
Water for construction (unless no reclaimed water available),	1
Water waste due to broken/defective plumbing, sprinkler, watering or irrigation systems	1
Restaurant water service unless requested	1
Landscape irrigation during daylight hours	1
Hydrant flushing (unless for public health or safety)	1
New installations of plants, shrubs, trees, lawns other growing things	2
Landscape for mounds, hardscape okay but cannot include living plant materials	2
New swimming pool or pond construction	2
Filling or refilling swimming pools (can replace water loss due to evaporation)	2
Outdoor watering December through March.	2
Watering turf, grass or dichondra lawns (can provide minimal water for sports playing fields)	3
Golf courses except for tees and greens	3
Landscape irrigation with potable water of any City-owned premises or businesses where recycled water is available for connection.	4
Utilization of potable water for any City operation where recycled water could be used.	4

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 street trees and landscaping, and public safety. The rates and charges for water services will be further increased for the 50% reduction case.

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 percent 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.

SUNNYVALE 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.

Responsibility for enforcement is assigned to the Neighborhood Preservation Division. 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 will be available to provide information and to respond to complaints.

4.5 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 percent 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 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.

4.6 Draft Ordinance and Use Monitoring Procedure

Water Code section 10632 (h & i)

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

(DRAFT) ORDINANCE NO. _____

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF SUNNYVALE DETERMINING AND DECLARING A WATER SHORTAGE EMERGENCY, ESTABLISHING REGULATIONS AND RESTRICTIONS ON THE DELIVERY AND CONSUMPTION OF WATER, AND ESTABLISHING PENALTIES FOR VIOLATION THEREOF

WHEREAS, a water shortage emergency prevails throughout the central portion of the State of California due to a prolonged drought which has lowered the level of watersheds, reservoirs and wells to a level which threatens the availability of water for human consumption, sanitation and fire protection; and

WHEREAS, the Hetch-Hetchy, operated by the San Francisco Water Department, supplies about _____ percent of Sunnyvale's water needs, and the San Francisco Water Department has imposed a mandatory water reduction of the supply of water to Sunnyvale of _____ percent; and

WHEREAS, the City of Sunnyvale operates nine water wells which if further significantly depleted will adversely affect the level of ground water in the area and the stability of land; and

WHEREAS, the Santa Clara Valley Water District supplies about _____ percent of Sunnyvale's water needs and controls Sunnyvale's well pumping, and has imposed a mandatory reduction of the supply of water to Sunnyvale of _____ percent; and

WHEREAS, the City Council of the City of Sunnyvale, at a regular meeting held on _____, approved by motion a Water Conservation Plan ("The Water Conservation Plan") in response to a water shortage emergency then in existence. On _____, the City Council reviewed that Water Conservation Plan and determined that with modifications necessary to address the current circumstances, as set forth in Report to Council No. _____, this ordinance and other actions, said Plan is appropriate to address the current water shortage emergency and adopted said Plan as may be amended; and

WHEREAS, on _____, the City Council adopted a First (Second/Third) Level Action Plan under The Water Conservation Plan, as modified by Report to Council _____, calling for mandatory conservation efforts to achieve water usage reductions of twenty-five (thirty-five, forty-five) percent; and

WHEREAS, said Level No. 1 (2, 3, 4) mandatory reductions were insufficient to conserve that amount of water necessary to meet the mandatory reduction requirements of the San Francisco Water Department and the Santa Clara Valley Water District; and

WHEREAS, the Council finds that it is imperative to the public wellbeing that Level No.

2 (3, 4, 5) mandatory controls, as amended by this ordinance, be implemented to achieve required water usage reductions of at least twenty-five (thirty-five, forty-five, fifty) percent and to eliminate uses of water which are not essential to public health, safety, or welfare in order to conserve the water supply of Sunnyvale for the greatest public benefit with particular regard to domestic use, sanitation and fire protection; and

WHEREAS, on _____, following notice duly given, a public hearing was held by the City Council at which time consumers of the water supply of the City of Sunnyvale had an opportunity to be heard, and were heard, on the question of the existence of a water shortage emergency condition, and the implementation of Level No. 2 (3, 4) regulations and restrictions on the delivery and consumption of water; and

WHEREAS, the specific water uses prohibited or restricted by this ordinance are nonessential, if allowed would constitute wastage of the water supply of the City of Sunnyvale, and should be prohibited or restricted pursuant to the provisions of Water Code Sections 350, *et seq.*, the authority granted this City Council pursuant to the Charter of the City of Sunnyvale and the common law; and

WHEREAS, the actions taken by and under this ordinance are exempt from the provisions of Sections 21000, *et seq.*, of the Public Resources Code, pursuant to Section 21080(b)(4) of the Public Resources Code, and Title 14, California Administrative Code, Section 15269, as specifications necessary to prevent or mitigate an emergency;

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF SUNNYVALE DOES ORDAIN AS FOLLOWS:

SECTION 1. DECLARATION OF EMERGENCY. It is hereby found and declared that a water shortage emergency exists within the water source and service area of the Water Department of the City of Sunnyvale, and it is necessary to prohibit and regulate water uses as provided in this ordinance. It is further found that it is necessary to implement said prohibitions immediately in order to achieve the water use reductions needed.

SECTION 2. APPLICATION OF REGULATIONS. The provisions of this ordinance shall apply to all persons using water both in and outside the City of Sunnyvale and within the City's water service area, and regardless of whether any person using water shall have a contract for water service with the City. Use of water by the City itself shall be in conformance with a water conservation plan to be presented by the City Manager to the City Council for approval.

SECTION 3. PROHIBITION. No person, firm, partnership, association, corporation or political entity shall use water obtained from the water system of the City of Sunnyvale in violation of Section 4 hereof.

SECTION 4. NONESSENTIAL USES – MANDATORY. The following uses, methods, types or techniques of uses of water are hereby determined and declared nonessential, except as expressly to the contrary hereinafter provided and are hereby prohibited:

(25% Restriction)

1. Water waste, including, but not limited to, flooding or runoff on sidewalks, streets or gutters.
2. Using potable water to wash sidewalks, driveways, buildings, filling station aprons, patios, parking lots, porches or other paved or hard surfaced areas. Using potable water for washing windows is allowed, as long as a positive automatic shutoff valve on the hose.
3. Use of water through a hose or similar device using potable water for washing automobiles, trucks, buses, boats, trailers, equipment, recreational vehicles or other vehicles or machinery, unless said hose or device is equipped with a positive automatic shut-off valve.
4. Operation of decorative fountains or ponds, except for required maintenance of equipment or to maintain water levels and quality in those ponds that support flora and fauna including, but not limited to, ducks, fish and aquatic plants,
5. Using potable water for construction purposes, such as dust control and consolidation of backfill, unless no source of reclaimed water is available and no alternative method can be used.
6. Water waste due to broken or defective plumbing, sprinklers, watering or irrigation systems which permit the escape or leakage of potable water.
7. Sprinkling, watering or irrigation of outdoor landscaping between sunrise and sunset, except for necessary testing of irrigation systems during installation or repair.
8. The service of water by any restaurant or other eating or refreshment establishment except upon specific request by a patron.
9. Flushing of hydrants, except where required for public health or safety.
10. Installation of any single pass cooling process in new construction.
11. Any use of non-potable water not in compliance with all federal, state and local laws, rules and regulations. Use of reclaimed water from the City's Water Pollution Control Plant shall be subject to the discretion of the Director of Public Works.

(35% Restriction)

12. New installation of plants, shrubs, trees, lawns or other growing things.

13. As long as this level of water reduction is in effect, new landscape construction will be allowed for the purpose of installing mounds, hardscape or any other landscape facility which does not include living plant materials. Irrigation systems may be installed, but not hooked up to the public water supply.
14. New swimming pool or pond construction.
15. Filling or refilling of swimming pools. Use of water to replace evaporation loss in pools is allowed.
16. Outdoor watering from December through March.

(45% Restriction)

17. Watering of turf, grass or dichondra lawns. Shrubs, bushes, trees and groundcovers may receive minimal watering only. Turf or grass areas specifically identified as organized sports playing fields may receive minimal watering only.
18. Watering of golf courses, except for tees and greens.

(50% Restriction)

19. Watering of landscape on any City-owned premises or businesses that have recycled water connections available.
20. Utilization of potable water for any City operation for which recycled water can be substituted.

SECTION 5. EXCEPTIONS. The Director of Public Works is hereby authorized to grant to any user an exception to the prohibitions set forth in Section 4 hereof, upon a finding by him or her that such exception is necessary to prevent an emergency condition affecting the health, sanitation or fire protection of such user, and that the user to whom such adjustment or exception pertains has adopted or used all practicable water conservation measures. Exceptions permitted hereunder shall be made only upon written application therefore to the Director setting forth a statement of justification for such exception. The Director may attach conditions, specifications or other qualifying provisions to any exception granted pursuant hereto in furtherance of the general purposes of this ordinance, or any provision thereof. Use of water by any user in accordance with the provisions of any exception duly granted by the Director shall not be deemed in violation of this ordinance.

SECTION 6. PENALTY – MISDEMEANOR. It is unlawful for any person to violate or fail to comply with any provision or requirement contained in Section 4 of this ordinance, or of any exception granted pursuant to Section 5 of this ordinance. Any person violating or failing to comply with any provision or requirement contained in Section 4 of this ordinance, or of any exception granted pursuant to Section 5 of this ordinance, is guilty of a misdemeanor. Each such person is guilty of a separate offense for each and every day during any portion of which any

violation of any provision or requirement of Section 4 of this ordinance, or of any exception granted pursuant to Section 5 of this ordinance, is committed, continued or permitted by such person and shall be punished accordingly.

Any person convicted of a misdemeanor under the provisions of this ordinance shall be punishable by a fine of not more than \$_____ or by imprisonment in the County jail for a period not exceeding _____ or by both such fine and imprisonment.

SECTION 7. PENALTY – FLOW RESTRICTING DEVICES. Upon a determination by the Director of Public Works that a user has continuously or repeatedly violated or failed to comply with one or more provisions of Section 4 of this ordinance, or of any exception granted pursuant to the provisions of Section 5 hereof, the Director may issue an order to cease and desist from continued or repeated violation, and further order such user to comply forthwith with such provisions or exception, or otherwise to take appropriate remedial or preventive action. If after the issuance of such cease and desist order, such user continues to consume or use, or again consumes or uses water in violation of any such provision or exception, the Director may order the installation of a flow-restricting device upon the water service line to the premises of such user. Such flow-restricting device shall be installed and maintained for a period of not less than _____ days nor more than _____ days for a first violation, and shall be installed and maintained for not less than _____ days for each succeeding violation, and may be ordered to remain installed and maintained for the duration of the emergency declared herein upon a finding by the Director that any user is habitually in violation of any of the provisions of this ordinance, or the provisions of any exception granted pursuant to Section 5 hereof. Prior to installation of any such flow-restriction device, the Director shall give written notice of intent to install such device, including the reasons for the proposed installation. The notice shall specify the date, time and place at which the user or other interested party may appear before the Director to present any evidence or reasons why such installation should not occur. Instead of appearing, the user or other interested party may present written material to the Director at or before the time specified. The installation of a flow-restricting device shall not occur less than twenty-four hours after the time specified in the notice. The written notice shall be delivered personally, or by posting with the United States Mail Service, first class postage prepaid, certified mail, and addressed to the last known address of the user to whom given. Copies of the notice shall also be delivered personally or by mail as specified above, to the owner of the property on which the flow restrictor is proposed to be installed as shown on the last equalized assessment roll of the County Assessor, County of Santa Clara, and to the person or entity shown on the latest City records as being responsible for payment of utility charges on such property, if either or both is different from the user to whom the notice is sent. There are hereby established, and there shall be imposed and levied charges in the amount of \$_____ for each installation and \$_____ for each removal of flow-restricting devices under this section.

SECTION 8. REMEDIES CUMULATIVE. The remedies and penalties provided for in this ordinance shall be cumulative and not exclusive, and shall be in addition to any or all other remedies available to the City.

SECTION 9. NOTICES. Except as otherwise provided, notices required to be given pursuant to the provisions of this ordinance shall be in writing, may be combined with water

service bills or other written communication, and shall be delivered personally, or by posting with the United States Mail Service, first class postage prepaid, and addressed to the last known address of the user to whom given, or to the owner of the premises to which the water service or such user pertains, shown on the last equalized assessment roll of the County Assessor, County of Santa Clara.

SECTION 10. IMPLEMENTATION. The Director of Public Works is hereby authorized and empowered to delegate his or her authority hereunder to such deputies, officers, employees or agents of the City as he or she shall designate, and to establish such rules, regulations and procedures, and to prepare or furnish such forms as he or she deems necessary or appropriate to carry out the provisions of this ordinance.

SECTION 11. INTERPRETATION. In the event any provision of this ordinance conflicts with any provision of any other ordinance, any resolution, regulation, rule, order or permit, the provisions of this ordinance shall govern and control over the provisions in conflict therewith for the duration of the emergency and until termination of this ordinance.

SECTION 12. SECTION/SUBSECTION HEADINGS. Section and subsection headings as used in this ordinance are for convenience only, and shall not be deemed to amend, modify or otherwise affect the section or subsection headed thereby.

SECTION 13. SEVERABILITY. If any provision of this ordinance or any provision of any exception granted pursuant to the provisions of Section 5 hereof, or the application of this ordinance to any person or circumstance is held invalid by the judgment or decree of a court of competent jurisdiction, such invalidity shall not affect any other provision of this ordinance, or any other provision of any exception, or the application of this ordinance which can be given effect without the invalid provisions or application, and to this end, the provisions of this ordinance are severable.

SECTION 14. URGENCY MEASURE; EFFECTIVE DATE. This Council hereby declares this ordinance to be necessary as an emergency measure for the immediate preservation of public peace, health or safety for the reasons set forth herein, and in accordance with the declaration of emergency set forth in Section 1 hereof. This ordinance shall be effective upon its adoption and the penalty provisions of Sections 6 and 7 shall become operative _____.

SECTION 15. POSTING AND PUBLICATION. The City Clerk is directed to cause copies of this ordinance to be posted in three (3) prominent places in the City of Sunnyvale and to cause publication once in the The Sun, the official newspaper of the City of Sunnyvale, of a notice setting forth the date of adoption, the title of this ordinance, and a list of places where copies of this ordinance are posted, within fifteen (15) days after adoption of this ordinance.

Introduced at a regular meeting of the City Council held on _____, 200 , and adopted as an ordinance of the City of Sunnyvale at a regular meeting of the City Council held on _____, 200, by the following vote:

AYES:
NOES:
ABSTAIN:
ABSENT:

ATTEST:

APPROVED:

City Clerk
(SEAL)

Mayor

APPROVED AS TO FORM AND LEGALITY:

City Attorney

Proposed mechanisms the City will use to determine actual reductions include City staff monitoring, on a daily basis, imported water reductions by reading meters at the water connections (sources) through the City's new SCADA system.

SECTION 5 – RECYCLED WATER PLAN

5.1 COORDINATION

Since the early 1990s, the City of Sunnyvale has produced and sold recycled water, for non-potable purposes, in the northern part of the Sunnyvale service area. A separate master plan was developed for recycled water, detailing the level of treatment, types of uses, and possible expansion phases for provision of recycled water throughout the City. Since 1993 the SCVWD has provided financial assistance and support by underwriting some of the operational costs for the Sunnyvale recycled water system. This assistance was provided in acknowledgement of the savings to the SCVWD by avoiding the need to purchase new sources of water that might otherwise be necessary without the benefit of recycled water to substitute for potable water in non-potable uses.

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

5.2 WASTEWATER QUANTITY, QUALITY AND CURRENT USES

TREATMENT AND DISPOSAL OF WASTEWATER

The City of Sunnyvale's Donald M. Somers Water Pollution Control Plant (WPCP) is located at 1444 Borregas Avenue and is designed for an ultimate flow capacity of 29.5 million gallons a day (mgd). Current flows through the plant average around 16.9 mgd. The amount of influent wastewater handled by the WPCP varies with the time of day and with the seasonal changes in demand throughout the irrigation year.

The City of Sunnyvale's WPCP collects wastewater in the sanitary sewer system which must then be treated before it can be discharged to the lower San Francisco Bay. This treatment occurs at the WPCP, which is an advanced tertiary treatment plant consisting of the following processes:

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

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

In 1991 the City of Sunnyvale identified short-term goals of recycling 20-30 percent of high-quality effluent from the City's Water Pollution Control Plant (WPCP). The long-term goal of the City's recycled water program is to reuse 100 percent of all wastewater generated from the plant to reduce all flows to the bay. Sunnyvale has experienced a slight decrease in plant influent over the past five years. However, the City anticipates a steady level of 15 mgd for plant influent over the next 25 years.

CURRENT USES OF RECYCLED WATER- COMPLETED PROJECTS

The City has completed Phase I and some of Phase II (IIa and IIb) of the recycled water program. The Baylands Park distribution facilities were first constructed during the Phase I program. The pipelines consist of 24,200 feet of pipe ranging from 12-inch to 36-inch lines extending from the WPCP east to Baylands Park and west to the Sunnyvale Golf Course. Recycled water deliveries to these two locations began during the summer of 1996. The combined demand for these first two facilities was an average of 0.62 mgd during July and August. Work later progressed to include remaining targeted customers including Lockheed/Martin, Sunnyvale SMaRT[®] Station, and the Caltrans interchange at US101 and SR237. Phase I also included pipelines to connect the Moffett Golf Course and could possibly serve the wind tunnel at the NASA/Ames Research Center in the near future.

Phase IIa pipelines include 34,000 feet of piping to serve landscape uses in the Moffett Park Area north of Highway 237 plus the first 3,000 feet of the 24-inch "east main" connection which extends south from Caribbean Drive. This phase of the project was completed in October 1996. Approximately 140 potential customers have been identified in the Phase IIa area, with a total demand of 0.41 mgd.

Phase IIb pipeline completes the 24-inch transmission main between Caribbean Drive and Kifer Avenue. A two-million-gallon storage tank has been constructed to hold recycled water at Wolfe Road and Kifer Avenue.

Table 5.2.1 presents the total amount of wastewater that is collected and treated and the amount that is treated to meet recycled water standards. This information is projected out to 2030.

Table 5.2.1
Wastewater collected and treated
(AF/year)

	2000	2005	2010	2015	2020	2025	2030
Wastewater collected and treated in service area	18,930	16,802	16,802	16,802	16,802	16,802	16,802
Quantity that meets recycled water standard	1,893	1,680	1,680	1,680	1,680	1,680	1,680

Table 5.2.2 compares the City of Sunnyvale’s projected uses of recycled water in 2000 with actual uses in 2005 within the service area.

Table 5.2.2
Recycled Water Uses
(Actual AF/Y)

Type of Use	Treatment Level	2005 (AF/Y)
Agricultural	Tertiary	0
Landscape	Tertiary	782
Wildlife Habitat	Tertiary	0
Wetlands	Tertiary	0
Industrial	Tertiary	0
Groundwater Recharge	Tertiary	0
Other (WPCP operations)	Tertiary	943
Other (Hydrants)	Tertiary	10
Total		1,735

5.3 POTENTIAL AND PROJECTED USE, OPTIMIZATION PLAN WITH INCENTIVES

WATER RECYCLING PROGRAM

To preserve potable water supplies for the highest use, the California Water Code requires the use of recycled water in place of potable water whenever it is

economically and technically feasible. Recycled water is also a reliable source of supply for non-potable uses during a drought.

With the State of California growing at a rate of two percent a year and the Santa Clara County area growing at six percent a year, it is necessary to look to alternative supplies to help augment our existing limited water supplies in Santa Clara County. Significant water reuse can also provide an alternative to unrestricted discharge, thereby helping to comply with discharge requirements, and at the same time avoid costs to build new wastewater treatment facilities.

It should be noted that increased use of recycled water also “hardens” the potable resource. That is, as potable water become available, due to the substitution of recycled water, and is used for increasing potable water demand, the flexibility of the potable water system is diminished. In the case of drought conditions it will become more difficult to adjust water uses and cut back on potable water demand. Techniques that have been predicted to provide savings of 20 to 30% might therefore only yield actual savings of 5 to 10%.

BENEFITS OF RECYCLED WATER

The use of recycled water benefits the following groups:

- Potable water users benefit since more water becomes readily available for the potable water users.
- All Sunnyvale residents benefit from securing a long-term adequate water supply to sustain economic growth and ensure public health.
- Recycled water users benefit by avoiding strict conservation requirements and water use restrictions during times of drought and by paying less than the cost of potable water.
- All water users benefit from avoidance costs associated with bringing in another water source to augment supplies.
- Sewer ratepayers benefit by avoiding additional costs that could be required if additional sewer treatment was mandated for all wastewater flows due to the higher discharge rates triggering higher discharge requirements.

In addition to the above benefits derived from the City of Sunnyvale's Water Reclamation Program, the Santa Clara Valley Water District provides an added incentive to recycled water retailers in Santa Clara County, sharing the benefits of not needing to acquire more expensive water sources to meet growing demands by subsidizing a portion of the recycled water program costs.

The City promotes the use of recycled water through its price structure. Recycled water is priced at 90 percent of the prevailing, first-tier potable water

rate. The City intends to continue this financial incentive in the foreseeable future, as possible.

Division 7, Chapter 7 of the California Water Code, known as the Water Recycling Law, provides a legal basis for mandating the use of recycled water. The law states that the use of potable water for non-potable purposes (including irrigation) constitutes a waste or unreasonable use of water, if recycled water of suitable quality is available at reasonable cost. Based on State law, some jurisdictions have implemented “mandatory use” policies through local ordinance. Sunnyvale’s use of the market technique of providing recycled water at a 10 percent discount, and assistance in making on-site modifications (retrofits), along with an active public education process and “user-friendly” permit process have resulted in significant expansion of the system. With few exceptions, the pricing policy has been successful in encouraging prospective users to convert to recycled water in those areas where it is available. A re-occurrence of drought conditions could be expected to further enhance interest in recycled water.

RECYCLED WATER OPTIMIZATION

The City of Sunnyvale Water Reclamation Program is designed to distribute reclaimed water throughout the City for irrigation of schools, parks, golf courses, businesses, and groundwater recharge. The recycled water distribution system consists of approximately 43,000 feet of 12-inch through 36-inch transmission mains and over 34,000 feet of 8-inch distribution lines. Areas in Sunnyvale served by the system are shown in Figure 5.3.1.

The Phase IIb Main pipeline and Phase II Pumping and Storage Facilities located at Wolfe Road and Kifer Avenue are complete. The storage tank at Kifer Avenue created two million gallons of recycled water storage to assist in meeting demands on the system. Pipelines designated as Phase IIc and Phase IId on Figure 3 represents possible future extensions of the system.

Estimates of recycled water demand for sites within Sunnyvale are based on actual or projected irrigation use, as determined from reviewing City water billing records. For sites outside Sunnyvale, estimates are based on the facility area or by comparison to other similar sites within Sunnyvale. Pipeline alignments were selected to minimize overall piping requirements, and to accommodate a phased approach to construction. Projects are described below. Pipeline alignments are also shown illustrated in Figure 5.3.1.

Figure 5.3.1



	Reclaimed Water Distribution System - Phases I & II <i>EXISTING</i>	Legend Baylands/Phase I Main ————— Phase IIa - Moffett Park Area ———— Phase IIb - East Main Extension - - - - - Phase IIc - Duane Ind Area - - - - - Phase IId - Parks & Playgrounds	Figure No. 1
	City of Sunnyvale Water Reclamation Program	<i>FUTURE (SEE TEXT)</i>	ECA, Inc.
			June 1998

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* See "Recycled Water Pipelines in Moffett Park Area"

PROJECTED FUTURE USES OF RECYCLED WATER

The remaining phases will be developed as part of the City's Capital Improvement Program (CIP), in coordination with all other water and infrastructure needs.

For instance, **Phase IIc** was proposed for the East Duane Industrial area. Demand in this area has been measured at approximately 0.6 mgd. However, this area is involved in redevelopment to high density residential, and the potential potable and non-potable uses will need to be reevaluated.

Phase IId would construct 20,000 feet of 8-inch distribution piping from Phase I and Phase IIb mains to serve several City parks and industrial customers adjacent to Phase I and Phase IIb. Sites include Orchard Park, Fair Oaks Park, Columbia Park, Lakewood Park, San Miguel Playground, and several users on Kifer Avenue. The estimated demand is approximately 0.12 mgd.

Southwest Sunnyvale, via the West Main, would require an extension of the west main southward from Sunnyvale Golf Course and would permit service to parks, playgrounds, City landscape, industrial customers, and homeowner associations located in the southwest portion of Sunnyvale. Major users would include Cannery Park, De Ana Park and School, Las Palmas Park, San Antonio Park, Serra Park, Washington Park, Fremont High School, Mango School, Sunnyvale Civic Center, shopping centers at Washington and Mary and Mary and Fremont, Woodgate and Sunset Homeowners Associations (HOAs) and other HOAs located just off Sunnyvale-Saratoga Road south of Fremont Avenue. The total recycled water demand for this phase is estimated to be 0.45 mgd. Approximately 14 miles of pipeline to include a 12-inch main plus a 4-inch to 8-inch distribution piping would be required.

Southeast Sunnyvale, via the East Main, would permit use at additional parks, playgrounds, City landscape, industrial customers, and HOAs. Major users would include Sunken Gardens Golf Course, Peterson High School, Ortega Park, Columbia Park, Murphy Park, Raynor Park, Sunnyvale Community Center, Ellis School, Palmer College, Sunset Oaks HOA, Roundtree HOA, IKOS, Signetics, Town Center, Westinghouse and the shopping area at Wolfe/Reed/Old San Francisco Road area. The total recycled water demand is estimated to be 0.74 mgd. Approximately 14 miles of pipeline to include a 12-inch main and 4-inch to 8-inch distribution piping would be required.

LOS ALTOS AND CUPERTINO AREAS

Further extension of the east and west mains to sites outside the City limits reach a number of potential customers in the Cupertino and Los Altos areas as indicated in Figure 5.31. The estimated recycled water demand is 1.2 mgd.

TECHNICAL AND ECONOMIC FEASIBILITY OF FUTURE RECYCLED WATER PROJECTS

Landscape irrigation: Opportunities for expanded use of recycled water for irrigation are ultimately limited by the total City-wide irrigation demand and the seasonal nature of such demand. The total irrigation demand, including residential use, is estimated to be in the range of 5-6 mgd on an annual average basis. Service to individual residences is not practical from a cost or administrative point-of-view, although service to apartment complexes and homeowner associations (HOAs) is viable. Excluding individual residences, the total potential City-wide irrigation demand is about 3.4 mgd; demand on a peak summer day may be two to three times this amount. However, because of the high cost of pipelines and other infrastructure, not all of this demand can be served in a cost effective manner. The larger sites (primarily City parks) provide the main driver for expansion of the distribution network.

Industrial/Commercial Process Use: Recycled water is a suitable source of water for a variety of commercial/industrial processes, including use in cooling towers, wet scrubbers, boilers, car washes, commercial laundries, and other processes. To date, such uses have not developed to any significant degree in Sunnyvale. Nevertheless, the City will continue to encourage such non-irrigation uses.

Streamflow Augmentation and Indirect Potable: The SCVSD recently announced its intention to assess and evaluate the feasibility of pursuing an indirect potable reuse project in Santa Clara County. Studies to be conducted by the SCVSD will provide recommendations on treatment technologies and alternatives, conveyance and storage systems, project capital and operating costs, and permitting requirements.

Table 5.3.1. shows the projections of recycled water through the study period.

Table 5.3.1
Projected Future Use of Recycled Water in the
City of Sunnyvale’s Service Area (AF/Y)

Type of Use	2010	2015	2020	2025	2030
Landscape	775	770	870	870	870
Wildlife Habitat	0	5	5	5	5
Other (WPCP)	900	900	800	800	800
Other (Hydrants)	5	5	5	5	5

RECYCLED WATER GROUNDWATER RECHARGE

Non-irrigation uses such as streamflow augmentation and groundwater recharge represent long-term options and solutions that could potentially accommodate large amounts of recycled water flow. In addition to the regulatory issues, construction of one or both of the main extensions described above, plus some additional piping, would be required.

SECTION 6 – WATER QUALITY IMPACTS ON RELIABILITY

As described previously, the City of Sunnyvale has three sources that supply its potable water. These are the San Francisco Public Utilities Commission (SFPUC), the Santa Clara Valley Water District (SCVWD) and local groundwater. SCVWD provides approximately 47 percent of Sunnyvale's annual potable water, SFPUC provides approximately 40 percent, Sunnyvale owned- and operated-wells provide 6 percent and the remaining 7 percent comes from recycled water.

The SFPUC Hetch-Hetchy system originates from reservoirs located in the area of Yosemite National Park. Water from the reservoirs moves from the Sierra across the Central Valley, where it is blended with local reservoir water.

The current supplies available include the Tuolumne River and supplies from local Bay Area reservoirs. The majority of the water supply originates in the upper Tuolumne River Watershed high in the Sierra Nevada, remote from human development and pollution. This pristine water, referred to as Hetch-Hetchy water, is protected in pipes and tunnels as it is conveyed to the Bay Area, requiring only primary disinfection and pH adjustment to control corrosion in the pipelines. SFPUC will continue to rely on their high-quality water resources. The water delivered to Sunnyvale is typically 85 percent from Hetch-Hetchy and 15 percent from local reservoirs.

In SFPUC's draft 2005 UWMP, the agency does not anticipate that water quality issues will, in the future, alter the SFPUC's current water management strategies or supply reliability. It is anticipated that there will be no degradation of water quality in the future.

SCVWD WATER QUALITY

The water supplied by the SCVWD originates from the State Water Project and from the Central Valley Project (CVP). Approximately 60 percent of the water from SCVWD is from the federal CVP and 40 percent is from the State Water Project system. CVP water originates in the Sierra and is imported from the Sacramento-San Joaquin Delta and is then blended with local reservoir water. This water is treated at the Rinconada Treatment Plant (located in Los Gatos) and then delivered to Sunnyvale.

The District is responsible for protecting surface and groundwater resources for use in the County. Water quality programs include treating local and imported surface water for sale to retailers and participating in regional and statewide coalitions to safeguard source water quality protection and to investigate opportunities for water quality improvements through partnership in regional

facilities or exchanges. Water treatment is necessary to ensure that the water the District provides meets or exceeds all federal and state drinking water standards.

The District continues to identify potential management practices that could improve source water quality and reduce the impact of potential contaminant sources. The District completes a Watershed Sanitary Survey every five years, as required by the California Department of Health Services (DHS), to examine possible sources of drinking water contamination and recommend how to protect water quality at the source.

Local reservoir storage is operated by SCVWD to protect and improve water quality. For example, SCVWD can address occasional increases in bromide concentration in imported water by blending the source water for the water treatment plants with other source waters, such as local surface water or groundwater. Existing local water storage can also be operated for water quality benefits by releasing water when quality is better than imported water during dry years or dry seasons, when imported water quality is poorer. SCVWD continually reviews and evaluates regional alternatives for water quality improvements to determine the costs and benefits of District participation.

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. The SCVWD Water Quality Unit monitors surface water quality in District reservoirs. No contaminant associated with any of these activities has been detected in the District's treated water. The water treatment plants provide multiple barriers for physical removal and chemical inactivation of potential contaminants and/or microbial constituents.

As required by the California Department of Health Services (DHS), every five years SCVWD evaluates the vulnerability of water sources to contamination and prioritizes protective measures.

SCVWD is a voluntary member of the Partnership for Safe Water. As such, the District continuously evaluates its current water treatment practices, makes improvements where necessary, has its water operations examined by independent experts and reports the findings to its customers.

SCVWD is in the middle of major renovations at each of the District's three water treatment plants. The first phase is complete and phase two will be completed by 2010. The first phase of the project provides treatment improvements to ensure continued compliance with the first stage of the U.S.

Environmental Protection Agency's new Disinfectant/Disinfection Byproducts Rule and Interim Enhanced Surface Water Treatment Rule.

With the addition of these treatment upgrades, e.g., ozonation, the District will reduce the formation of trihalomethanes (THMs), a byproduct of chlorination that is regulated as a suspected carcinogen. During the warmest times of the year when algae can cause unpleasant tastes and odors, ozonation will also enhance the flavor of the finished water. Water diverted from the Bay Delta contains relatively high concentrations of salts (bromide) and organic compounds. These constituents are precursors to the formation of disinfection byproducts, a major concern for the District. Delta water will only be able to meet current and anticipated drinking water standards through advanced treatment technologies and source water quality improvements.

Possible future changes to the bromate drinking water standard may require ultraviolet (UV) treatment at SCVWD's water treatment plants. At the present time, however, it is difficult to determine the best long-term response by SCVWD to increasingly stringent drinking water regulations.

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 percent of the MCL and conducts monitoring for nitrate more often than is required by regulation.

SECTION 7 – WATER SERVICE RELIABILITY

7.1 PROJECTED NORMAL WATER YEAR SUPPLY AND DEMAND

The water demand projections for this Urban Water Management Plan were developed as part of a series of technical studies performed in support of the Capital Improvement Program for the SFPUC Regional Water System: SFPUC Wholesale Customer Water Demand Projections (URS 2004); SFPUC Wholesale Customer Water Conservation Potential (URS 2004); SFPUC Wholesale Customer Recycled Water Potential (RMC 2004); and SFPUC 2030 Purchase Estimates (URS 2004).

Water demand projections for the SFPUC wholesale agency were developed using an “End Use” model. Two main steps are involved in developing an End Use model: (1) Establishing base-year water demand at the end-use level (such as toilets, showers) and calibrating the model to initial conditions; and (2) forecasting water demand based on future demands of existing water service accounts and future growth in the number of water service accounts.

Establishing the base-year water demand at the end-use level is accomplished by breaking down total historical water use for each type of water service account (single family, multifamily, commercial, irrigation, etc.) to specific end uses (such as toilets, faucets, showers, and irrigation).

Forecasting future water demand is accomplished by determining the growth in the number of water service accounts in a wholesale customer service area. Once these rates of change were determined, they were input into the model and applied to those accounts and their end water uses. The Decision Support System (DSS) model also incorporates the effects of the plumbing and appliance codes on fixtures and appliances including toilets (1.6 gal/flush), showerheads (2.5 gal/minute), and washing machines (lower water use) on existing and future accounts.

The following three tables (7.1.1 – 7.1.3) present a comparison of projected normal supplies to projected normal water use over the next 20 years in 5 year increments. All tables in this section were calculated based on 2005 as the “normal year” as requested by SFPUC.

Table 7.1.1
Projected Normal Water Year Supply (AF/Y)

Supply	Y 2010	Y 2015	Y 2020	Y 2025	Y 2030
SFPUC	11,762	12,210	12,658	13,106	13,554
SCVWD	11,537	11,427	11,313	11,201	11,089
Local Groundwater	2,800	2,800	2,800	2,800	2,912
Recycled Water	1,674	1,674	1,674	1,674	1,674
Total	27,773	28,111	28,445	28,781	29,229
% of Normal Year (2005)	110%	111%	112%	114%	116%

Table 7.1.2
Projected Normal Water Year Demand (AF/Y)

	Y 2010	Y 2015	Y 2020	Y 2025	Y 2030
Demand	27,773	28,111	28,445	28,781	29,229
% of Normal Demand	110%	111%	112%	114%	116%

Table 7.1.3
Projected Normal Year Supply and Demand Comparison (AF/Y)

	Y 2010	Y 2015	Y 2020	Y 2025	Y 2030
Supply total	27,773	28,111	28,445	28,781	29,229
Demand total	27,773	28,111	28,445	28,781	29,229
Difference (supply minus demand)	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

As shown in the three tables above, Sunnyvale would be able to increase the amount of groundwater pumped to meet reasonably anticipated deficiencies from other sources, thus supply is projected to be sufficient to meet demand out to 2030. The Sunnyvale groundwater basin is not adjudicated, which means the right to pump groundwater from the basin has not been given by judgment of a court or board.

7.2 PROJECTED SINGLE-DRY-YEAR SUPPLY AND DEMAND COMPARISON

The following three tables (7.2.1-7.2.3) present a comparison of projected single-dry year water supply to projected single-dry year water use over the next 20 years in 5-year increments.

Table 7.2.1
Projected Single Dry Year Water Supply (AF/Y)

	Y 2010	Y 2015	Y 2020	Y 2025	Y 2030
Supply					
SFPUC	10,586	10,989	11,392	11,795	12,199
SCVWD	13,787	13,722	13,653	13,586	13,630
Local Groundwater	1,600	1,600	1,600	1,600	1,600
Recycled Water	1,800	1,800	1,800	1,800	1,800
Total	27,773	28,111	28,445	28,781	29,229
% of projected normal	100%	100%	100%	100%	100%

Table 7.2.2
Projected Single Dry Year Water Demand (AF/Y)

	Y 2010	Y 2015	Y 2020	Y 2025	Y 2030
Demand	27,773	28,111	28,445	28,781	29,229
% of projected normal	100%	100%	100%	100%	100%

Table 7.2.3
Projected Single Dry Year Supply and Demand Comparison (AF/Y)

	Y 2010	Y 2015	Y 2020	Y 2025	Y 2030
Supply totals	27,773	28,111	28,445	28,781	29,229
Demand totals	27,773	28,111	28,445	28,781	29,229
Difference (supply minus demand)	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

Through increased amounts of water provided by Santa Clara Valley Water District, City Management would be able to meet projected demand without rationing.

7.3 PROJECTED MULTIPLE-DRY-YEAR SUPPLY AND DEMAND COMPARISON

The following series of tables (7.3.1-7.3.15) presents an analysis of water supply reliability for the City of Sunnyvale based on a three-year dry year period, projected out 20 years in 5 year increments. For each five-year period, the three-year dry period is assumed to occur in the last three years of the period. The normal supply and demand projections (for the first two years of the five year period) were developed using the same approach as that used in Section 7.1.

2006 THROUGH 2010 – MULTIPLE DRY YEAR EVALUATION

Table 7.3.1
Projected Supply During Multiple Dry Year Period Ending in 2010 (AF/Y)

	Y 2006	Y 2007	Y 2008	Y 2009	Y 2010
Supply					
SFPUC	10,955	9,521	9,521	9,521	9,521
SCVWD	11,066	12,974	13,465	13,956	14,447
Local Groundwater	1,966	1,988	1,994	1,999	2,005
Recycled water	1,800	1,800	1,800	1,800	1,800
Total	25,787	26,283	26,780	27,276	27,773
% of projected normal	100%	100%	100%	100%	100%

Table 7.3.2
Projected Demand During Multiple Dry Year Period Ending in 2010 (AF/Y)

	Y 2006	Y 2007	Y 2008	Y 2009	Y 2010
Demand	25,787	26,283	26,780	27,276	27,773
% of projected normal	100%	100%	100%	100%	100%

Table 7.3.3
Projected Supply and Demand Comparison
During Multiple Dry Year Period Ending in 2010 (AF/Y)

	Y 2006	Y 2007	Y 2008	Y 2009	Y 2010
Supply Total	25,787	26,283	26,780	27,276	27,773
Demand total	25,787	26,283	26,780	27,276	27,773
Difference (supply minus demand)	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

2011 THROUGH 2015 – MULTIPLE DRY YEAR EVALUATION

Table 7.3.4
Projected Supply During Multiple Dry Year Period Ending in 2015 (AF/Y)

	Y 2011	Y 2012	Y 2013	Y 2014	Y 2015
Supply					
SFPUC	11,762	11,605	11,605	10,104	10,104
SCVWD	11,479	11,703	12,943	13,999	13,772
Local Groundwater	2,800	2,800	1,628	2,140	2,435
Recycled water	1,800	1,800	1,800	1,800	1,800
Total	27,841	27,908	27,976	28,043	28,111
% of projected normal	100%	100%	100%	100%	100%

Table 7.3.5
Projected Demand Multiple During Dry Year Period Ending in 2015 (AF/Y)

	Y 2011	Y 2012	Y 2013	Y 2014	Y 2015
Demand	27,841	27,908	27,976	28,043	28,111
% of projected normal	100%	100%	100%	100%	100%

Table 7.3.6
Projected Supply and Demand Comparison
During Multiple Dry Year Period Ending in 2015 (AF/Y)

	Y 2011	Y 2012	Y 2013	Y 2014	Y 2015
Supply Total	27,841	27,908	27,976	28,043	28,111
Demand total	27,841	27,908	27,976	28,043	28,111
Difference (supply minus demand)	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

2016 THROUGH 2020 – MULTIPLE DRY YEAR EVALUATION

Table 7.3.7
 Projected Supply During Multiple Dry Year Period Ending in 2020 (AF/Y)

	Y 2016	Y 2017	Y 2018	Y 2019	Y 2020
Supply					
SFPUC	12,210	11,773	11,773	11,773	11,773
SCVWD	11,369	11,872	13,110	12,682	12,452
Local Groundwater	2,800	2,800	1,629	2,124	2,420
Recycled water	1,800	1,800	1,800	1,800	1,800
Total	28,178	28,245	28,312	28,379	28,445
% of projected normal	100%	100%	100%	100%	100%

Table 7.3.8
 Projected Demand During Multiple Dry Year Period Ending in 2020 (AF/Y)

	Y 2016	Y 2017	Y 2018	Y 2019	Y 2020
Demand	28,178	28,245	28,312	28,379	28,445
% of projected normal	100%	100%	100%	100%	100%

Table 7.3.9
 Projected Supply and Demand Comparison
 During Multiple Dry Year Period Ending in 2020 (AF/Y)

	Y 2016	Y 2017	Y 2018	Y 2019	Y 2020
Supply Total	28,178	28,245	28,312	28,379	28,445
Demand total	28,178	28,245	28,312	28,379	28,445
Difference (supply minus demand)	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

2021 THROUGH 2025 – MULTIPLE DRY YEAR EVALUATION

Table 7.3.10
Projected Supply During Multiple Dry Year Period Ending in 2025 (AF/Y)

	Y 2021	Y 2022	Y 2023	Y 2024	Y 2025
Supply					
SFPUC	12,658	12,142	12,142	10,585	10,585
SCVWD	11,255	11,837	13,077	14,189	13,960
Local Groundwater	2,800	2,800	1,628	2,140	2,435
Recycled water	1,800	1,800	1,800	1,800	1,800
Total	28,513	28,579	28,647	28,714	28,780
% of projected normal	100%	100%	100%	100%	100%

Table 7.3.11
Projected Demand During Multiple Dry Year Period Ending in 2025 (AF/Y)

	Y 2021	Y 2022	Y 2023	Y 2024	Y 2025
Demand	28,513	28,580	28,647	28,714	28,781
% of projected normal	100%	100%	100%	100%	100%

Table 7.3.12
Projected Supply and Demand Comparison
During Multiple Dry Year Period Ending in 2025 (AF/Y)

	Y 2021	Y 2022	Y 2023	Y 2024	Y 2025
Supply Total	28,513	28,580	28,647	28,714	28,781
Demand total	28,513	28,580	28,647	28,714	28,781
Difference (supply minus demand)	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

2026 THROUGH 2030 – MULTIPLE DRY YEAR EVALUATION

Table 7.3.13
Projected Supply During Multiple Dry Year Period Ending in 2030 (AF/Y)

	Y 2026	Y 2027	Y 2028	Y 2029	Y 2030
Supply					
SFPUC	13,106	12,523	12,523	10,921	10,921
SCVWD	11,165	11,836	13,100	14,279	14,073
Local Groundwater	2,800	2,800	1,626	2,138	2,434
Recycled water	1,800	1,800	1,800	1,800	1,800
Total	28,871	28,960	29,050	29,139	29,229
% of projected normal	107%	107%	100%	95%	103%

Table 7.3.14
Projected Demand Multiple
Dry Year Period Ending in 2030 (AF/Y)

	Y 2026	Y 2027	Y 2028	Y 2029	Y 2030
Demand	28,871	28,960	29,050	29,139	29,229
% of projected normal	100%	100%	100%	100%	100%

Table 7.3.15
Projected Supply and Demand Comparison
During Multiple Dry Year Period Ending in 2030 (AF/Y)

	Y 2026	Y 2027	Y 2028	Y 2029	Y 2030
Supply Total	28,871	28,960	29,050	29,139	29,229
Demand total	28,871	28,960	29,050	29,139	29,229
Difference (supply minus demand)	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	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 groundwater pumping and implementation of drought conservation programs City Management would be able to address the projected demand without rationing.

SECTION 8 – ADOPTION AND IMPLEMENTATION OF UWMP

City of Sunnyvale’s Adoption Resolution

(DRAFT) RESOLUTION NO. _____

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF
SUNNYVALE UPDATING AND ADOPTING THE CITY OF
SUNNYVALE URBAN WATER MANAGEMENT PLAN 2005**

WHEREAS, the California Legislature enacted Assembly Bill 797 (Water Code Section 10610 et seq., known as the Urban Water Management Planning Act) during the 1983-1984 Regular Session, and as amended subsequently, which mandates that every supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare an Urban Water Management Plan, the primary objective of which is to plan for the conservation and efficient use of water; and

WHEREAS, the City of Sunnyvale is an urban supplier providing water to over 130,000 customers; and

WHEREAS, the City of Sunnyvale has adopted an Urban Water Management Plan in accordance with the State requirements; and

WHEREAS, the City is required to review the Plan at least once every five years and make amendments or changes to the Plan which are indicated by the review; and

WHEREAS, the Plan must be adopted by Council after public review and hearing, and filed with the California Department of Water Resources within thirty days of adoption; and

WHEREAS, the City of Sunnyvale reviewed its Plan and prepared and circulated for public review a draft updated Urban Water Management Plan, and a properly noticed public hearing regarding the Plan was held by the City Council on December 13, 2005; and

WHEREAS, the City of Sunnyvale did prepare and shall file said Plan with the California Department of Water Resources in a timely manner;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SUNNYVALE THAT:

1. The Sunnyvale Urban Water Management Plan 2005 is hereby adopted and filed with City Clerk;

2. The Director of Public Works is hereby authorized and directed to file the City of Sunnyvale Urban Water Management Plan 2005 with the California Department of Water Resources within 30 days after this date.

Adopted by the City Council at a regular meeting held on _____, 2005, by the following vote:

AYES:
NOES:
ABSTAIN:
ABSENT:

ATTEST:

APPROVED:

City Clerk
(SEAL)

Mayor

APPROVED AS TO FORM AND LEGALITY:

City Attorney

2000 UWMP Implementation

The City of Sunnyvale has implemented or participated in programs that comply with all Demand Management Measures, and intends to continue to do so in the future.

Public Notification

The City of Sunnyvale encouraged the involvement of social, cultural and economic community groups during the preparation of the 2005 UWMP. Specific efforts were made to send out a public notification mailer to all community groups, including public and private water suppliers. BAWSCA agencies were also notified of the 2005 preparation process and the City of Sunnyvale directed these agencies to where the Draft UWMP could be accessed and solicited comments and suggestions.

The public notification mailer contained the following language:

PUBLIC NOTICE
URBAN WATER MANAGEMENT PLAN

The City of Sunnyvale City Council will consider adopting the City's draft 2005 Urban Water Management Plan at their regularly scheduled meeting on:

Tuesday, December 13, 2005
City Council Chambers – Sunnyvale City Hall
456 West Olive Avenue, Sunnyvale

Beginning on Friday, November 11, 2005 copies of the plan will be available for review at the Sunnyvale Public Library, 665 West Olive Avenue, and at the One Stop Center in City Hall, 456 West Olive Avenue.

An electronic copy of the plan can be mailed to you upon request or can be downloaded from the City's web site at www.sunnyvale.ca.gov.

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

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Sunnyvale, CA 94088-3707
408-730-7510
408-736-1611 (FAX)
vconzet@ci.sunnyvale.ca.us

Val Conzet
Public Works Supervisor

cc: City Council
Department Directors